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Resources Stewardship and Science – Cultural Resources Preservation Services
WASHINGTON, D.C.

HISTORIC STRUCTURE REPORT
for Worthington House
Monocacy National Battlefield

Title I Architect/Engineer Services



National Park Service - MONO
Frederick, MD

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Table of Contents

EXECUTIVE SUMMARY 1

PART 1. DEVELOPMENTAL HISTORY 1

A. Historical Background and Context 3

1. Historical Significance 3
2. Architectural/Cultural Significance 3
3. Archeological Significance 3
4. **Timeline Summary** 3

B. Chronology of Development and Use (Additions to) 5

1. Ownership and Development of the Farmstead 5
2. The Farmstead's Original Configuration 5
3. Appearance of Farmstead In 1864 (Battle of Monocacy) 5
4. Appearance of Farmstead In 1982 5
5. **Appearance of Farmstead in 1995 (Summary of Previous Report)** 5

C. Physical Description – Existing Conditions (1995) 7

D. Physical Description – Existing Conditions (2019) 9

1. **Farmstead's Existing Appearance and Condition** 9
2. **Farmhouse 2019 Structural System Evaluation** 63
3. **Farmhouse Existing Electrical, Mechanical, and Plumbing Systems** 81
4. **Farmhouse Existing Life Safety Systems** 86
5. **Farmhouse Compliance with Building Codes and Regulations** 94
6. Forces Affecting the Preservation of the Farmhouse and Site 103

PART 2. TREATMENT AND USE 111

A. Justification for Recommendations 113

1. Option I 116
2. Option II 116
3. Option III 116
4. Option IV 116
5. **Base Design Concept: Stabilization / House Museum / Offices** 116
6. **Optional Design Treatments** 141

B. Recommendations, Alternatives 151

1. General Condition Statement 151
2. Building Elements – Problems, Alternatives and Recommendations 151
3. **2019 Class C Cost Estimate** 153

C. Possible Areas of Further Research 167

1. Architectural Investigation 167
2. Historical Investigation 167
3. Archeological Investigation 167

4. Cultural Landscape Study 167
5. Finish Analysis 167
D. BIBLIOGRAPHY 169
E. 1995 Historic Structure Report 171

FIGURES

East Elevation Looking Southwest viii
West Elevation looking Northeast. viii
Photo A1: Northeast corner looking southwest. 10
Photo A2: Southwest corner looking northeast. 10
Photo A3: One of three chimneys rebuilt in 2004. West elevation looking east. 11
Photo A4: Room 002 chimney breast repaired in 2004. 11
Photo A5: Room 000 chimney breast repaired in 2004. 12
Photo A6: Masonry retaining walls at doorway D00 rebuilt in 2004. Looking west. 12
Photo A7: Existing brick deterioration in Room 203. 13
Photo A8: W27, north window in Room 203 showing interior screen with closed shutters. 14
Photo A9: West elevation looking east. A) W16 with double-hung sash and open shutter. B) W31 louvered window replaced with screen panel and closed shutters. C) Rot at sill of W18. 15
Photo A10: Restored main entry door D10 on the east elevation. 15
Photo A11: Conserved interior face of door D10 with new hardware and glazing. 16
Photo A12: Conserved interior face of door D11 with new hardware. 16
Photo A13: Door D14 with new hardware 17
Photo A15: Attic door with split at hinged mullion. 18
Photo A16: Room 201 window with animal gnaw marks on sash. 18
Photo A17: Room 200 window sash with rot. 19
Photo A18: Open joint under sill at W14 on the north elevation. 19
Photo A19: East porch from the northeast corner looking southwest. 20
Photo A20: South deck from the southwest corner looking northeast. 21
Photo A21: Cellar stairs rebuilt in 2004. 21
Photo A22: Open seams at porch columns with failed sealant. 22
Photo A23: Open seams at porch columns with failed sealant. 22
Photo A24: Paint flaking from a brick pier supporting the east porch. 23
Photo A25: Mud daubers below porch. 23
Photo A26: East slate roof with snowboards and east porch metal standing seam roof. 25
Photo A27: Downspouts at southwest and southeast corners wrap onto the south elevation and align with previous configuration. 25
Photo A28: A) Orange rust stain from leaking gutter above on west elevation. B) Rotting window sill from leaking gutter. 26
Photo A29: Vegetation at east snowboard. 26
Photo A30: Braced servant stair in Room 002. 28
Photo A31: Imminent failure of adhesive holding up plaster ceiling in Room 000. 28
Photo A32: Disaggregating brick on the east wall of Room 000. 29
Photo A33: Plaster and mortar loss, unsupported door frame, and animal burrows at D01 in Room 002. 29

Photo A34: Room 001 with fairly intact plaster under the east porch and salvage storage. 30
Photo A35: A) Dislodged mantel in Room 202. B) Dislodged sill in Room 202. 31
Photo A36: Animal gnaw marks on wood trim in Room 101 32
Photo A37: Buckled tongue and grooved flooring in Room 103. 32
Photo A38: Cupped wood flooring in Room 102 33
Photo A39: Evidence of first-generation flooring in Room 104. 33
Photo A40: High moisture content in damaged plaster at west wall of Room 102 near screened window. 38
Photo A41: Room 200 at ell connection showing extensive previous plaster damage. Relatively unchanged from 1995 38
Photo A42: Disaggregating brick in east wall of Room 000 39
Photo A43: High moisture content and increased plaster damage in Room 202. 39
Photo A44: High moisture content and increased plaster damage at northwest corner of Room 103. 40
Photo A45: High moisture content and increased plaster damage at east wall of Room 201 above porch. 40
Photo A46: Pencil drawings on south wall of Room 101. 41
Photo A47: Pencil drawings on north wall of Room 102. 41
Photo A48: Pencil drawings on north wall of Room 102. 42
Photo A49: Pencil drawings on south wall of Room 203. 42
Photo A50: Bleeding decorative paint in Room 102 suggesting paint may be water soluble. 43
Photo A51: Paint loss at areas of moisture infiltration in Room 200. 43
Photo A52: Bowing ceiling in Room 200. 44
Photo A53: Bowing ceiling in Room 104. 44
Photo A54: Bowing ceiling in Room 102. 45
Photo A55: Straight cracks in plaster in the Room 201 indicating lath damage or broken plaster keys. 45
Photo S1: Supplemental first floor framing at cut floor joist. 64
Photo S2: Strengthening of existing roof rafters. 64
Photo S3: Brick and mortar spalling on the east wall in the south basement. 66
Photo S4: Reconstructed chimney on the south wall of the south basement. 66
Photo S5: Brick and mortar spalling on the west wall in the north basement. 67
Photo S6: Brick and mortar spalling on the south wall in Room 002. 67
Photo S7: Brick and mortar spalling on the north wall in Room 002. 68
Photo S8: Brick and mortar spalling on the east wall in Room 002. 68
Photo S9: Example of extent of mortar spalling on the west wall in Room 002 69
Photo S10: Brick and mortar spalling on the northwest corner of Room 103. 69
Photo S11: Brick and mortar spalling on the east wall of Room 200. 70
Photo S12: Brick and mortar spalling on the northwest corner of Room 200. 70
Photo S13: Brick spalling and mortar deterioration on west wall of Room 200. 71
Photo S14: Brick and mortar spalling on the northwest wall of Room 202. 71
Photo S15: Brick and mortar spalling below the window sill on the east wall of Room 202. 72
Photo S16: Brick and mortar spalling on the west side of the south wall of Room 202. 72
Photo S17: Brick and mortar spalling on the north wall of Room 203 73
Photo S18: Brick and mortar spalling below the window sill on the south wall of Room 203 73

Photo S19: Brick and mortar spalling below the window sill on the south wall of Room 203..... 74
Photo S20: Brick spalling on the porch pier. 74
Photo S21: Wood-framed deck at the re-entrant corner of the house. 75
Photo S22: Reconstructed wood front porch on brick piers. 75
Photo S23: View from above the moisture-stained joists showing apparent signs of additional deterioration..... 77
Photo S24: Repaired existing wood joist and subfloor above Room 103. 77
Photo S25: Repaired existing wood joist and subfloor above Room 103. 78
Photo S26: Repaired existing wood joist above Room 202. 78
Photo S27: Deterioration of the existing joist. 79
Photo E1: Electrical and telecom panels. A) Electrical panel. B) Telecom panel. 81
Photo E2: Inside of telecom panel. 82
Photo E3: Lightning protection on roof. A) Air terminal on chimney. 82
Photo E4: Fluorescent fixtures in basement. 83
Photo M1: Room 104 (northwest corner) 84
Photo P1: Existing concrete well cap. 85
Photo P2: Existing electric water pump. 85
Photo FP1: Servant stair. 88
Photo FP2: West side basement entrance door. 88
Photo FP3: Fire alarm control panel. 89
Photo FP4: East side porch stair. 96

APPENDICES

A. Exterior Rehabilitation Drawings, NPS, 2004

B. SMACNA Gutter Calculations



Worthington House ❸
4236 Baker Valley Road
Frederick, MD 21704

Monocacy National Battlefield
4632 Araby Church Road
Frederick, MD 21704

National Register
Worthington House is a contributing property within Monocacy Battlefield Historic District.

Introduction

The purpose of this project is to update the 1995 Worthington House Historic Structure Report (HSR) to inform the rehabilitation of the building, and to ensure its long-term preservation while accommodating visitors. The Part 1 portion (Developmental History) is an update to the 1995 document describing subsequent work, current conditions, and current recommendations only. The Part 2 portion (Treatment and Use) presents design concepts for rehabilitating Worthington House based on existing conditions, historic documentation, and a design charrette with the National Park Service. This section does not refer to the 1995 design concepts, but instead reflects a single comprehensive approach for the conservation and rehabilitation of the building. This report also includes a Class C cost estimate for the proposed base design concept.

To differentiate the updated sections from the 1995 HSR, new content is distinguished by bolded headings, while unchanged content has non-bolded headings. The 1995 content was not copied into this report, but the headings are included to show how the update ties into the original. The table of contents reflects these changes as well. The 1995 HSR is included starting on page E-1 of this updated report for reference.

Background: In 1995, the National Park Service completed a Historic Structure Report for Worthington House, which was a stabilized shell following decades of vacancy and neglect. Prior to intervention, the interior suffered from prolonged water infiltration, and the interior finishes were severely compromised. In the last 24 years, the building envelope was stabilized with a new roof, repointing, painting, a new porch on the east elevation, and a deck on the west elevation. The 1995 HSR, and now this 2019 update, puts forward recommendations to address existing conditions and to rehabilitate the house for use as a museum and offices.

National Significance:[1]

The Battle of Monocacy was a critical one-day event that had significant repercussions and effects, which helped to hasten the end of the Civil War. Yet the 1,647 acres of Monocacy Battlefield are part of a much larger cultural scene that played a major role in attracting the events of the Civil War in the first place. Monocacy is significant for its cultural and historical setting, as an agricultural landscape, and as the site of a transportation network that figured so prominently in the events of the 1860s.

Worthington House contributes significantly to the historical context of the Monocacy Battlefield. The house was witness to a major portion of the fighting between Confederate and Union forces in the late morning and afternoon of July 9, 1864. The house also served as a field hospital after the battle. As the only remaining structure on that part of the battlefield, it is an important feature in the interpretation of the battle. A six-year-old Glenn Worthington also witnessed the battle erupt from the cellar of the building. Glenn would eventually become a prominent member of the Frederick community, write a book about his eyewitness account of

[1] National Register of Historic Places, Monocacy Battlefield, Frederick County, Maryland, Section 8. p 5 National Register 66000908

the battle, and was instrumental in the establishment of Monocacy Battlefield by the U.S. Congress in 1934.

Physical Description:[2] The Worthington Farm (originally named "Clifton Farm") sits on a hill overlooking the Monocacy River. It is situated within the wide curve of the river that turns from its approximately 2-mile east-west stretch through Monocacy National Battlefield to continue its course southwest to the Potomac River. The farm is mostly wooded now, with a sweeping hayfield serving as the east and northwest lawn of the house. The farm and house are accessed via a wooded driveway, which parallels I-270 westward from Baker Valley Road, then turns to the southwest to reach the house. Historically, the Worthington/Clifton Farm complex had access along a riverside road from Georgetown Pike; however, the dualized Route 240 intersected that lane in the 1950s. The only building remaining on the Worthington/Clifton property is the main house. It faces northeast toward Araby Mill and the Georgetown Pike.

The house is a two-story, five-bay brick dwelling with an ell extension to the rear. The house faces northeast, which is typical of Maryland farmhouses, and is designed with a Georgian-inspired window-window-door-window-window plan. However, the detailing exhibits strong influence from the Greek Revival and Italianate styles from the third quarter of the 19th century. The dwelling was built between 1847 and 1852.

The brick masonry at the front elevation displays common bonding, as do the side and rear walls, all with a 5:1 stretcher-to-header row ratio. The house rests on stone foundations. Windows have six-over-six light double-hung sashes hung beneath wide wood lintels, and flanked with pairs of louvered shutters. A raised basement has half-sized windows, which open beneath the front porch. One four-over-four light double-hung sash window in the south wall of the ell extension lights the back stairway. Brick chimneys extend from inside each gable end. A recent slate shingle roof covers the building.

Besides the main entry in the center bay, there are five additional entrances: one in the rear elevation of the front section, one from the rear kitchen wing on the south side, one from the north side of the kitchen wing, one from the cellar at the foot of a flight of stone steps at the rear of the front section, and another from the cellar of the ell in the south wall. The main level entrances have four-panel doors, and the south kitchen wing door has a three-light transom. None of the doors have sidelights other than the front door.

Although built in several phases of construction, the plan of the house was completed as a single-pile, two-story center hall house with an ell, attic, and full basement. The brick walls were laid directly on the rubble stone foundation, which is exposed approximately 1 to 2 feet above grade. A wide wood porch stretches the entire width of the east elevation (front) of the house.

[2] National Register, Section 7. p 33



East Elevation Looking Southwest



West Elevation looking Northeast.

EXECUTIVE SUMMARY

A. Summary of Scope of Work

The scope of this project includes updating the 1995 Historic Structure Report (HSR) for Worthington House, which is a contributing structure of Monocacy National Battlefield. The new sections include an Executive Summary, existing conditions for 2019 in Part I: Developmental History Update, and a fully developed design concept for rehabilitation of the building as a museum and offices in Part 2: Treatment and Use. The 2019 HSR updates architectural, structural, mechanical, electrical, plumbing, and life safety analyses for both the condition assessment and the design concept. Finally, a Class C cost estimate is presented for the design concept and includes square footage costs, markups, adjustments, and add-ons. The cost estimate accounts for inflation for Fiscal Year 2020 construction costs. This cost estimate is included in Part 2 Section B.

B. Summary of Conditions

The historic fabric of Worthington House is unstable, and the National Park Service has completed various maintenance and repair campaigns to address mechanisms of decay. These campaigns have included installing a new roof, providing new window screens to prevent pests, repointing exterior masonry, and repainting exterior masonry and wood trim. However, little has been done to remediate loss of historic materials on the building interior. Without further intervention, water infiltration, woodwork damage, and plaster deterioration will continue and accelerate.

Rehabilitation of the house as a museum and offices will require extensive repair and conservation of the building interior. Heavily deteriorated floors and ceilings require significant repairs to return them to solid surfaces. Interior plaster and decorative paint are in an especially advanced stage of deterioration and will require extensive stabilization and repair. Interior woodwork must be either repaired or replicated and then refinished to complete the interior spaces.

The building lacks the mechanical, electrical, fire protection, life safety and plumbing infrastructure necessary for public use on a regular basis. It will require significant engineering systems upgrades to support any proposed public use options and to stabilize interior finishes.

C. Summary of NPS Use Requirements

Representatives from the National Park Service – National Capital Region (NPS-NCR), Monocacy National Battlefield, and the design team met on December 11, 2018, for a charrette to discuss design options for Worthington House. From the results of that meeting as well as from previous research and assessments, the most significant measures to take for the building program are to arrest active processes of decay and prevent future damage to historic fabric. NPS-NCR favors stabilization over strict restoration as an economical treatment that is respectful of historic material while emphasizing the building's 'layered' history. After stabilizing existing historic fabric, the next highest priority is to adapt the basement and first floor of Worthington

House for use as a house museum. Lesser priorities within the umbrella of the house museum include preserving the layered history of Worthington House, providing access, including Architectural Barriers Act Accessibility Standard (ABAAS) access, for up to 20 visitors at one time, and introducing exhibits to interpret the history of Worthington House.

In addition to the design drivers identified in the charrette, NPS-NCR wishes to explore treatments for retrofitting heating, ventilation, and air conditioning (HVAC), reconstructing porches, adding an accessible lift at the building rear, and converting the upper floor to office space.[3] Rehabilitation of the second floor as office and conference space is desirable only if it does not divert resources away from water damage mitigation, stabilization, and adaptation as a house museum. NPS acknowledges that this level of rehabilitation would have a significant impact on historic fabric. Additional treatment options for consideration are constructing an ABAAS-compliant facility on the first floor in Room 104 and omitting the offices on the second floor.

D. Summary of Use Concept

Exterior Base Concept Parameters

Architecture

Previous repair campaigns have stabilized the exterior building envelope. These have included installing a new roof, providing new window screens to prevent pests, repointing exterior masonry, and repainting exterior masonry and wood trim. These mitigation efforts, especially installation of the new roof, have significantly slowed water infiltration and the resulting deterioration of interior finishes. However, water is still penetrating the building envelope, and no steps have been taken to correct past water damage of historic materials. The areas most affected on the interior align with the roof intersection between the main building and the ell and with the flashing at the east porch roof.

Gutter calculations indicate undersized gutters are a contributing source of water infiltration and a new re-sized system is required. Water infiltration appears to be most severe on elevations where historic porches have been lost or removed. Reconstructing porches may serve to divert water away from the building. However, it is not advisable to reconstruct porches where there is little evidence of their original design. The north porch should not be reconstructed unless vernacular precedent can be established. The east porch will require repainting and repairing open joints in the woodwork. Continued water infiltration into the basement in Room 000 suggests that exterior waterproofing should be considered below grade at the foundation of the inside corner of the ell intersection.

An exterior wheelchair lift is required to provide full ABAAS accessibility to interpretative space, which will occupy the basement and first floor. In order to maintain the historic appearance of the house from the most prominent viewsheds, a two-sided lift should be installed in the west yard within the footprint of the west porch. The lift will have three stops, one at the

[3] Memo from Rene Senos, NPS-NCR Project Manager/Contracting Officer's Representative, and Elizabeth Milnarik, NCR Architect, to Lala Matties, AECOM Project Manager. April 9, 2019.

basement, one at grade, and one at the first floor, with a path leading to the lift from the yard. The accessible tour will begin on the first floor and follow the same tour route as the other visitors, ending in the basement.

Replication and installation of the double-hung sash will return the building to its original appearance.

Interior Base Concept Parameters

Architecture

Use of the house as a museum should be limited to the basement and first floor, reserving the second floor for staff offices. The tour should begin at the east porch to experience the house first from its formal entry. The tour path can then move through the first-floor rooms to the servant stair in the ell toward the basement. All previous tenant partitions should be removed in their entirety to allow for better circulation. The tour path should continue to the basement, which is the optimal location for primary exhibit space to tell the vital stories of Worthington House. The likely focus of the interpretive space is window W00, from which the Worthington Family witnessed the Battle of Monocacy in 1864. The tour path can exit through door D00 to the west of the house..

In contrast to the public spaces in the basement and first floor, the upper floor Rooms 201 and 202 can be converted to office space and a conference room, respectively. The conference room is best situated in Room 202, as it has two uninterrupted walls to the south and west for projection and document pin-ups. Room 201 can accommodate at least three desks and will be easily accessible from the main stair hall even when the conference room is in use. The north side of Room 203 can be converted to a staff restroom. With the restroom in Room 203 as opposed to Room 202, it can be accessed via the servant stair when the conference room is in use. The south side of Room 203 contains circulation spaces and pencil drawings on the wall from 1953, when Jenkins Brothers, Inc., used Worthington House for migrant farm worker housing. While the pencil drawings are not original to the house, they do help to interpret the evolution of the building use over time. It is therefore not suitable for conversion. Walls in all three rooms can be furred out and insulated to allow climate conditioning for current comfort standards. To insulate the new offices, blown insulation can be installed within the attic above occupied space, and padding and carpet can insulate the floor.

Stabilization is the highest priority for all interior finishes. All interior brick and stonework require repointing and replacing of missing or failed bricks to stabilize the walls. The plaster in Room 000; the decorative painted plaster in Rooms 101, 102, and 200; and the plaster in the unmodified section of Room 203 require conservation to retain as much historic plaster as possible. These areas are more meaningful in a conserved state rather than fully restored, as they will express the age, fragility, and craftsmanship of the materials. Wet plaster repairs in the areas of decorative paint are not recommended because the risk to the paint system is too great. Instead, the areas of missing plaster should be infilled with gypsum board and painted the color of the wall field to blend. All other plaster on the first floor and plaster ceilings on the second floor should be reattached, consolidated, and repaired to a unified appearance. Interior

woodwork must also be repaired or replaced in kind. In particular, the main stair and servant stair require significant stabilization and repairs, including replication of missing elements. Once repaired, all woodwork must be cleaned and either painted or treated with a protective wax finish.

The 1995 HSR included a partial paint analysis, but a more in-depth analysis is required to answer questions about the historic paint palette and binder composition in the interpreted spaces.

New energy-efficient lighting fixtures are required throughout the house. The fixtures must be modern, yet compatible with the historic character of the building. All egress lighting will be backed up by an emergency power source. All lighting and conduits should be surface mounted in a discreet manner so as not to detract from the historic nature of the building and decorative paint.

A sprinkler system should be provided throughout each level of the building. A fire water tank located in the yard west of the house and an electric fire pump are required to support the sprinkler system. A fire extinguisher is proposed on each level of the building.

HVAC will be installed to address occupant comfort in the office space as well as conservation of historic materials and finishes throughout the interior. HVAC equipment must be strategically located and carefully installed to have the smallest impact on interior finishes. Museum employees must closely monitor and adjust the system to maintain temperatures between 60 and 75 degrees Fahrenheit and relative humidity between 35% and 65%. Since the building has never had anything but passive cooling with fireplaces and stoves for heating, any mechanical climate regulation must occur gradually to avoid shocking existing materials, which could result in additional material loss

A new septic system for sewage disposal will be necessary if toilet rooms are installed either inside or outside the house. This will require disturbing the land outside the house to accommodate a new septic tank, drain field, percolating soil, and piping. Installation of restroom facilities would also require a new water distribution system and sewage disposal system.

E. Summary of Recommendations

Exterior Masonry

- Repoint below window sills at each window to prevent water infiltration.
- Repoint at east porch flashing to prevent water infiltration.

Windows and Doors

- Repair rot at window W18.
- Replace shutter at window W16.
- If a passive ventilation system remains, retain current screened windows but replace 1980s vintage windows with replicated double-hung sash windows.
- If an HVAC system is installed, replace all windows with replicated historic double-hung sash windows.

- Replicate basement door D01 and install.
- Clean faux-grained doors on second floor. Stabilize paint and provide protective coating similar to the treatment of first floor doors done during 2004 repairs.

Porches

- Complete an architectural survey of historic porch configurations on structures of the same period and style.
- Reconstruct the west porch and stair using existing physical evidence (joist holes and ghost marks on the brick) and an understanding of historic architectural porch configurations gleaned from the survey of historic porches. Simplify detailing to avoid making unnecessary conjectures about the structure's historic appearance.
- If the architectural survey yields enough information to make a reasonable conjecture about its configuration, reconstruct the north porch and stair. Simplify detailing to avoid making unnecessary conjectures about the structure's historic appearance.

Gutters

- Low-Impact Option: Increase gutter size without adding to the number of downspouts but increasing capacity.
    - Replace gutter with 7-inch half-round gutter.
    - Replace downspouts with four 4-inch downspouts.
- Medium-Impact Option: Increase gutter size without adding new downspouts.
    - Replace gutter with 8-inch half-round gutter.
- High-Impact Option: Increase gutter size and add downspouts for increased capacity.
    - Replace gutter with 6-inch half-round gutters.
    - Replace four downspouts with 4-inch round downspouts.
    - Add two additional 4-inch downspouts at ell intersection on north and south elevations.

Basement Finishes

- Replace bricks that are missing or deteriorated by half of one wythe or more.
- Repoint joints in interior brick or stone where missing or failed. Assume 100% repointing in exposed areas.
- Repair or install a level concrete floor in all three basement rooms to provide ABAAS access.

Woodwork

- Repair wood trim, casework, and mantels in the basement and on the first floor to infill areas of rot or imperfections with epoxy. If an area of repair is larger than 3 inches x 3 inches, consider using a dutchman to complete the repair.
- Replicate missing trim, mantels, or missing elements of casework to match the existing.
- Replicate missing elements and reconstruct main stair in Room 101/200. Determine if original finish was a clear finish or a painted finish from paint analysis.

- For wood that was originally clear-finished, such as floors, clean existing woodwork with a non-ionic detergent and protect with a microcrystalline wax finish.
- For wood that was originally painted, prepare, prime, and repaint with colors determined by paint analysis. Do not strip original paint from woodwork.
- Dismantle (but conserve) wood floors to allow access for floor joist and plaster ceiling repairs in the room below. Restore first-generation flooring.
    - Steam individual boards to reverse cupping as required for reinstallation.
    - Replace warped boards.
    - Remove modern flooring and repair original flooring in Room 104.

Plaster

- Replace missing or fully detached plaster with new plaster to match the original composition in Rooms 103 and 104 as well as the ceilings of Rooms 201, 202, and 203. Where possible, use expanded metal lath to differentiate replacement plaster from original plaster. Document the extent of the repairs for house records.
- For Rooms 000, 101, 102, and 200, conserve as much of the original plaster as possible.
- Conduct tests to determine the best products and application procedures for adhesive stabilization of loose plaster.
- Remove historic flooring to access unstable plaster ceilings. Salvage and document wood for reinstallation. Stabilize remaining plaster using fasteners and adhesive keys at deflecting ceilings. Repair cracks.
- Reattach loose wall plaster with adhesives. Consolidate friable brown and scratch coats prior to applying adhesives, if required. Repair cracks.
- Install a reversible wall treatment to compensate for areas of loss at decorative painted finishes in Rooms 101, 102, and 200. Use cyclododecane to protect surrounding painted plaster during installation.

Paint Conservation

- Complete paint analysis of all painted surfaces in Worthington House to determine historic finishes and paint colors.
- Complete Fourier-transform mid-infrared spectroscopy (FTIR) analysis of decorative paint to identify the organic binder.
- Test dry and low-water cleaning methods at an inconspicuous location to determine which method, if any, is appropriate.
- Test various consolidants in different solvents to determine which will consolidate decorative paint without causing further damage. Test various consolidation techniques to determine the most appropriate.
- Test encapsulants at existing paint in rooms without decorative paint.
- Clean painted surfaces without damaging or removing historic paint.
- Consolidate paint in Rooms 101, 102, and 200. Do not consolidate pencil drawings.
- Encapsulate paint in all other rooms.

Conservation Climate Control

- Install humidity and temperature data loggers in various locations throughout Worthington House to establish baseline interior conditions. The results of the monitoring should be used to determine which intervention option will best suit Worthington House.
- Assign a staff member to monitor interior climate data and make any necessary adjustments to the system to maintain prescribed conditions. This process will be necessary regardless of which type of system is ultimately used to control the interior climate.
- Low-Impact Option:
    - Use passive cooling and ventilation methods to control interior humidity. Passive cooling and ventilation methods include:
        - Opening windows or replacing windows with louvers or screens (which are already in place at Worthington House).
        - Using shutters to control entry of sunlight into the space.
    - Box fans may also be used to move air in the space.
- Medium-Impact Option:
    - Install a conservation heating/ventilation system to maintain humidity levels between 35% and 65%.
    - Take care to disrupt as little historic material as possible during installation.
    - Use a humidistat rather than a thermostat to control the system. The goal is to maintain desirable humidity levels rather than a specific interior temperature.
    - Allow interior humidity levels to vary depending on the season. In summer, the goal should be to keep interior humidity below 65%. In winter, humidity levels can drop as long as they do not go below 30%.
- High-Impact Option:
    - Install an all-air HVAC system to maintain temperature and humidity levels for occupant comfort and material conservation.
    - Take care to disrupt as little historic material as possible during installation.
    - Allow interior humidity levels to vary depending on the season. In summer, the goal should be to keep interior humidity below 65%. In winter, humidity levels can drop as long as they do not go below 30%.
    - Maintain temperatures between 60 and 75 degrees Fahrenheit throughout the year. Monitor temperature against dewpoints to prevent condensation.

Landscape

- Follow recommendations in the Cultural Landscape Report (CLR).
- Create accessible pathways from the parking area to the wheelchair lift.
- Keep all vegetation at least 2 feet from the building envelope.

- Remove the tree on the south side of the house.

Masonry Deterioration

The recommendations provided in this report are consistent with those presented in the 1995 HSR.

- Remove all vegetation from masonry on both interior and exterior elevations.
- Replace bricks that are missing or deteriorated by half of one wythe or more.
- Repoint joints in interior brick or stone where missing or failed. Assume 100% repointing in exposed areas.

Wood Framing Deterioration

- Consistent with the 1995 HSR, rotted joists should be replaced, and any insect damage should be stopped by treating the areas.
- Provide supplemental 2x wood floor joists between the joists in Rooms 102, 201, 202, and 203. Disassemble floors to access floor joists without disrupting historic plaster.
- Rebuild servant staircase.
- Perform wood species and grade testing to determine the proper allowable design stresses to be incorporated into the evaluation of the existing framing.

Electrical

To use the building as a house museum, the following electrical work will need to be performed:

- Upgrade the electrical service with adequate service capacity to support the HVAC, lighting, plumbing, and a fire pump that will be required for the building. New service is preferred to be a 208/120 volt, three-phase, four-wire system. New utility power needs the approval of the power company.
- Provide an emergency generator for backup power for the fire pump. A 100-kilowatt generator operating on diesel fuel should be adequate as the emergency backup power.
- Install new light-emitting diode (LED) lighting fixtures throughout the house. The new lights should be compatible with the historic character of the house.
- Back up all egress lighting with an emergency power source. These lights should be in the *on* position at all times.
- Install new exterior LED lighting that operates with a photocell or programmable timer switch. The new lights should be compatible with the historic character of the building.
- Assess the telecom service to determine if it will be adequate for the services that will be performed at the house museum. A new data line will need to be brought to the building to provide high speed data service.
- Reconfigure the security system to accommodate the final architectural layout.

Mechanical

Minimum climate control measures are required at Worthington House to support public use.

- Provide temperature data loggers throughout Worthington House to establish and maintain mechanical infrastructure for continuous climate control.

- As a minimally invasive option, introduce passive cooling and ventilation methods for interior humidity control. Passive cooling and ventilation methods include opening windows or replacing windows with louvers or screens (which are already in place at Worthington House). These measures can include shutters to control entry of sunlight into the space.

Plumbing

- Provide a new septic system for sewage disposal if toilet rooms are installed inside the house. A new water distribution and sewage disposal system is required for plumbing fixtures inside the house.

Life Safety and Fire Protection

- Provide a wheelchair lift to facilitate access for persons with mobility impairments. It is proposed that this lift provide access to the first floor and basement. Access for people with mobility impairments is not proposed for the second floor. Occupancy of the second floor should be limited to persons without impaired mobility. Providing compensating space in a different building should be considered.
- Door D00 has insufficient headroom clearance for egress requirements. Increase headroom for this door by a combination of lowering the floor and raising the lintel for the door.
- The servant stair has several egress deficiencies. The stair is planned to be rebuilt to meet NFPA 101 allowances for existing stairs.
- The main monumental stair does not have a handrail or guard; reinstall the former handrail for this monumental stair.
- No fixed fire protection system exists in this building. Make provisions for:
    - A fire water storage tank, sized at approximately 11,000 gallons, located in the yard.
    - An electric fire pump to supply sprinkler systems on each level.
    - A well pump to re-supply the fire water storage tank within 8 hours.
    - One yard fire hydrant and fire main.
    - Dry pipe sprinkler systems controlled by one dry pipe valve in the basement serving all levels.
- Provide a manual fire alarm system for the building reporting to a central station. This consists of fire alarm horn/strobe appliances on all occupied levels. Provide a pull station near the utility room exit door and a smoke detector at the main fire alarm control panel. Provide a new fire alarm control panel to control these systems. Provide one fire extinguisher on each level of the building.

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PART 1. DEVELOPMENTAL HISTORY

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PART 1. DEVELOPMENTAL HISTORY (ADDITIONS TO)

A. HISTORICAL BACKGROUND AND CONTEXT

1. HISTORICAL SIGNIFICANCE

2. ARCHITECTURAL/CULTURAL SIGNIFICANCE

3. ARCHEOLOGICAL SIGNIFICANCE

4. TIMELINE SUMMARY

1835–1847: Land purchased by Griffin Taylor and named Clifton Farm.

1847–1852: House built by Griffin Taylor on Clifton Farm. House has a 2/3 plan with hall and parlor, basement, and attic. Perhaps occupied by tenants.

1856: Clifton Farm sold to Turner Alfred Ball and John F. Wheatley

1862: Clifton Farm sold to John T. Worthington

1856–1870: Sources indicate the front parlor (Room 102) was given the decorative tromp l'oeil treatment after 1862 (National Register [NR] Nomination) or 1870 (Historic American Buildings Survey [HABS] Documentation).

July 9, 1864: Battle of Monocacy took place in the vicinity of Worthington House. North rooms and ell completed, turning house into a single-pile, center hall house.

1890: House turned into a boarding house and farming stopped.

1902: Mary Worthington died.

1905: John Worthington died and property transferred to Glenn and Clarke Worthington. House is rented by tenant farmers. (The Cultural Landscape Report [CLR] says the same tenant family used the house until 1953.)

1932: Glenn Worthington publishes "Fighting for Time" about his eye-witness account of the Battle of Monocacy.

1953: Farm sold to Jenkins Brothers, Inc., and house used as migrant farmer housing. South rooms divided on first and second floors.

1973: Monocacy Battlefield added to National Register of Historic Places and designated a National Historic Landmark (NHL).

- NR 66000908
- NHL 26976

1982: National Park Service (NPS) acquires Worthington House.

1983: NPS Rehabilitation

- East and west porches dismantled.

- Window and door repairs made to sills, heads, lintels, and jambs.
- 37 window sashes replaced.
- 13 sashes repaired.
- 22 sashes replaced with wood louvers.
- Roof replaced with sheet metal.
- Chimneys dismantled.

1991: Historic American Building Survey drawings completed.

- HABS MD,11-FRED.V,17-

1995: Historic Structure Report (HSR) completed by National Park Service National Capital Region.

2004: Worthington House named as contributing to the significance of the Monocacy National Battlefield in an addendum to the 1973 National Register listing.

- Addendum Paula S. Reed and Associates, Inc. 5/2000 accepted 6/16/2003 and updated 7/2004

2004: NPS Rehabilitation

- New shutters installed.
- Louvers replaced with screens.
- Restoration of east porch and construction of new west deck.
- Slate roof added.
- Three chimneys rebuilt.
- Exterior doors restored.
- Interior chimney breasts stabilized in basement.

2007: Stabilization

- Gypsum board removed from partitions.
- Plaster ceiling in basement stabilized.
- Support posts added in cellar.
- Joists sistered.
- Plywood flooring installed in areas of missing or weak floors.

2011: General Maintenance

- Exterior of house painted.
- General cyclical maintenance performed.

2013: CLR completed by National Park Service National Capital Region.

2017: General cyclical maintenance.

2019: HSR update completed by AECOM and John Milner Associates Preservation.

B. CHRONOLOGY OF DEVELOPMENT AND USE (ADDITIONS TO)

1. OWNERSHIP AND DEVELOPMENT OF THE FARMSTEAD

2. THE FARMSTEAD'S ORIGINAL CONFIGURATION

3. APPEARANCE OF FARMSTEAD IN 1864 (BATTLE OF MONOCACY)

4. APPEARANCE OF FARMSTEAD IN 1982

5. APPEARANCE OF FARMSTEAD IN 1995 (SUMMARY OF PREVIOUS REPORT)

Farmhouse

The National Park Service conducted a stabilization and restoration project of the Worthington House in 1983 under the purview of the Williamsport Training Center and led by Thomas Vitanza. In 1983, the collapsed east and west porches were dismantled, and sound wood elements were stored in the south room of the basement. However, the salvaged components were too deteriorated for use. Instead, NPS replicated the original pieces and reconstructed the historic east porch with the same dimensions, configuration, and joinery methods. The collapsed porches had damaged bricks at joist pockets, and the door on the north elevation (D12) was missing. The stabilization project filled the empty ceiling joist pockets on the east elevation with polyurethane expanding foam and epoxy. The floor joist pockets were filled with mortar. By 1995, when NPS completed a condition assessment and Historic Structure Report, these fill materials were failing, and the foam was riddled with bird-made holes.

In 1983, windows and doors were extensively repaired including replacement of some interior sills, exterior sills, interior heads, exterior lintels, and jambs. Thirty-seven sashes were completely replaced, and 13 sashes had parts replaced with new components. All wood window components were conditioned, primed, and painted. At 22 windows, the bottom sashes were replaced with wood louvers to promote ventilation while the house was mothballed. The removed bottom sashes were stored in the basement of the house. Missing side-lights and doors were blocked with plywood or replaced with plywood doors. Some door lintels and sills were replaced. All exterior woodwork was primed and painted to match Munsell color 2.5YR 8.5/2 based on paint analysis of 34 different samples.

By 1995, the infilled doorway at the south elevation of the ell was badly deteriorated with washed-out joints and loose masonry. Stone retaining walls at the areaway were unstable. The failing lintel had cracked bricks in the wall above the door. Other sills and lintels were continuing to rot on the east elevation. The louvers and screens in the windows continued to provide good ventilation. However, the screens showed signs of damage, and the louvers harbored wasps and other insects. Animals, most likely groundhogs, had chewed and soiled sashes stored on the first floor of the house.

Masonry repairs in 1983 included 300 square feet (sf) of repointing and 275 sf of brick replacement. Extensive analysis was performed on the mortar at that time, but the replicated mix

was still not an exact match. Exterior portions of the three deteriorated chimneys were dismantled. The dimensions and overall appearance of the chimneys were recorded to aid in rebuilding, but those records were lost. In 1995, some spot repointing was performed at the stone foundation, but more joints were deteriorated, particularly on the south elevation where holes in the foundation had been caused by animals and on the west elevation north of the basement window. A large vertical crack was identified in the south elevation of the ell brick foundation, and another crack was found at the top of the window on the west elevation of the ell. A smaller diagonal crack ran from the top of the lintel above door D13, and the mortar below the sill of window W28 above the door was completely washed out. In the basement, moisture had infiltrated around the perimeter walls of the south room and caused plaster deterioration. It was not clear in 1995 if the moisture was related to exterior groundwater or to elevated humidity levels inside the house.

In 1983, the existing slate roof was salvaged and replaced with a 29-gauge galvanized sheet metal roof with new 28-gauge galvanized gutters and downspouts. The salvaged slates were stored in the basement along with miscellaneous exterior hardware including snow brackets, insulator hooks, hinge sets, cut nails, window gratings, gutter hangers, and metal plates. The gutters were extended 11 feet out from the building to help re-direct stormwater away from the house. The beaded raking molding was replaced with flat molding. By 1995, the replacement roof was still in good condition with the exception of loose downspouts that no longer carried the water away from the house foundation. The flashing from the dismantled east porch roof was still attached to the east elevation, and some evidence of limewash was present below the porch roofline.

Interior Finishes

The following discusses the condition of interior finishes as they existed at the time of the 1995 HSR.

Basement

In the basement, the lath and plaster ceiling of the south room of the basement was missing 40% of the plaster; 30% of the replacement gypsum board in the room under Room 101 had fallen. The newel post was missing from Room 101, and the joist to which it was supposed to be attached was broken. The beaded board partition walls had been cut off just below the ceiling. The chimney breast had collapsed, and the remaining brick and plaster work was unstable. Each wall in the south room had a different treatment of plaster and limewash, but all walls showed deterioration of the finishes from excessive moisture.

Stairs

The wood stairway in the ell from the basement to the first floor was shaky and dangerous due to loose stringers. The main stair was stable, but much of the ornamental woodwork was missing. The stair from Room 203 to the attic was missing a tread, and the door (D24) had split from its hinges before it was removed.

Woodwork

Much of the woodwork in the house was missing. Much of the remaining woodwork was damaged, and wood finishes were deteriorated.. Casings were missing from many windows and doors. Mantels had been removed from all of the rooms except for Room 202. Painted finishes were peeling or missing. Remaining original doors with faux graining included doors D10, D11, D20, D21, and D22. The wood floors showed signs of moisture infiltration. The northwest corner of Room 202 and the northeast corner of Room 203 showed the greatest damage to wood floors, joints, and rafters.

Plaster

There was extensive plaster deterioration due to water infiltration. The 1983 stabilization project had stopped most sources of water infiltration, but damaged plaster remained unstable. The west wall of Room 200 showed the most extensive plaster damage. The wall under the stairs had several holes that were poorly repaired or not repaired at all. Lighting fixtures were installed by cutting into decorative painting rosettes in Rooms 101 and 102. The walls and ceiling of the northwest corners of Rooms 103 and 202 had extensive water damage and plaster failure. The west wall of Room 104, the northwest corner of Room 203, and the ceilings of both rooms had extensive plaster damage.

Landscape

Between 1983 and 1995, sitework included removing two trees: the elm tree at the south elevation and the catalpa tree at the west elevation. The road to the house was graded and graveled, and a chain-link fence was added to protect the house from vandalism. By 1994, new growth from the stump at the southwest corner had reached to the height of the cornice. This tree was completely removed by 1995. Weeds and shrubbery obscured the house around the chain-link fence, particularly to the east. By 1995, the views around the fencing were cleared of debris.

C. PHYSICAL DESCRIPTION – EXISTING CONDITIONS (1995)

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D. PHYSICAL DESCRIPTION – EXISTING CONDITIONS (2019)

1. FARMSTEAD'S EXISTING APPEARANCE AND CONDITION

Farmhouse

From 2000 to 2004, the National Park Service conducted a rehabilitation project that addressed the recommendations in Option I and Option II of the 1995 HSR. Patrick MacDonald of the Denver Service Center managed the drawings, and Richard H. Brown acted as construction manager for Monocacy Battlefield. The contractor was Southeastern Roofing Co. of Pineville, Inc. from Pineville, West Virginia. The project included pest-control measures and restoration of original exterior elements. New screens replaced the louvers installed in 1983 to provide passive ventilation. The exterior restoration included restoring the east porch, installing a slate roof, rebuilding three chimneys above the roofline (Photo A3), reconstructing two chimney breasts in the basement, and restoring the exterior doors (Photos A4 and A5). In 2007, NPS conducted a selective stabilization campaign of the interior ceilings and joists. During this campaign, gypsum board was removed from the modern partitions, loose plaster on the cellar ceiling was stabilized, support posts were installed on compromised cellar joists, floor joists were sistered in multiple rooms, and plywood flooring was installed where flooring was insufficient. In 2011 and 2017, cyclical maintenance campaigns involved replacing deteriorated wood trim and door sills, painting exterior woodwork, and replacing spalled bricks.

Exterior Masonry

During the 2004 repair campaign, the masonry restoration included excavating 5 feet below grade to repoint the stone base. Approximately 432 sf of the stone foundation was repointed around the entire building from the bottom of the brick to 2 feet below the existing grade. The stone retaining walls at door D01 were repaired, reset, and repointed. At doorway D00, work included removing cement parging, replacing bricks, repointing masonry, and installing a new wood lintel to match the existing (Photo A6). The concrete masonry unit (CMU) infill at the door D01 was left intact. Other brick repairs included repointing 50 sf of brick around the exterior and rebuilding the three chimney stacks (Photo A3). The entire exterior was painted to unify the appearance of the building.

As of 2019, the exterior masonry is in stable condition. Paint covers all exterior brickwork so that a visual assessment of joint condition was not possible. On the interior, areas of plaster loss documented in the 1995 HSR still remain. Exposed bricks at these locations are still deteriorated, and many are missing as reported in the 1995 structural assessment (Photo A7). Vines continue into the interior through the brick walls on the north side. The deteriorated bricks have not been replaced, and ongoing vegetation intrusion suggests the deterioration continues.



Photo A1: Northeast corner looking southwest.



Photo A2: Southwest corner looking northeast.



Photo A3: One of three chimneys rebuilt in 2004. West elevation looking east.



Photo A4: Room 002 chimney breast repaired in 2004.



Photo A5: Room 000 chimney breast repaired in 2004.



Photo A6: Masonry retaining walls at doorway D00 rebuilt in 2004. Looking west.



Photo A7: Existing brick deterioration in Room 203.

Windows and Doors

In 2004, NPS replaced louvers installed on the first and second floors during the 1983 moth-balling process with full-size screen panels. These louvers had only occupied the lower half of the window openings. The louvers and upper sashes were removed to accommodate the new screen panels. Sashes were stored in the building. Louvers on the basement and attic levels were stripped, repaired, repainted, and reinstalled. All of the windows received shutters, and the shutters were fixed in a closed position wherever screen panels replaced louvers (Photo A8). The window shutters were not replicated from originals, but dimensions were derived from historic and modern field photographs. Two new double-hung sash windows were installed on the north elevation (W14 and W25) and one on the west ell elevation (W16). These windows replaced louvers installed in 1983 (Photo A9).

The main entrance door assembly (D10), including the casing, was fully restored. The exterior trim and door face were stripped and repainted (Photo A10). Decorative finishes on the interior trim and door face were conserved in their existing condition (Photos A10 and A11). The door sill and missing trim were replaced. New glazing and hardware, including a new rimlock and keeper, were installed. Holes from previous hardware were repaired with dutchman. Door assemblies D11, D13, and D14 were treated similarly (Photos A12 and A13). At door location D12, a new replica door was fabricated using existing door D13 as a model. Exterior and interior casing, transom, and trim at D12 were conserved and restored (A14). At the west basement entry, door assembly D00 received a new mahogany door casing, a new door, and a repaired lintel. Door D01 received a new lintel to match the dimensions of the existing.

Currently, the restored doors are in stable condition, but some of the interior doors are missing. There is a door to the attic that has split from its hinged stile (Photo A15). The stile and hinges are still attached to the attic frame, but the door is stored under the attic stairs. This is not a new condition, but it was not mentioned in the previous report.

The replaced window sashes from 1983 show signs of accelerated deterioration including rot and animal gnaw marks (Photos A16 and A17). Windows W25 and W14 on the north elevation have open joints under the sills that correlate with damp plaster on the interior (Photo A18). The window sill at W18 on the west elevation shows signs of rot, possibly related to open seams in the gutter above. Window W16 is missing a shutter (Photo A9).



Photo A8: W27, north window in Room 203 showing interior screen with closed shutters.



Photo A9: West elevation looking east. A) W16 with double-hung sash and open shutter. B) W31 louvered window replaced with screen panel and closed shutters. C) Rot at sill of W18.


Photo A10: Restored main entry door D10 on the east elevation.



Photo A11: Conserved interior face of door D10 with new hardware and glazing.



Photo A12: Conserved interior face of door D11 with new hardware.



Photo A13: Door D14 with new hardware.



Photo A14: Restored door assembly at D12 on the north elevation.



Photo A15: Attic door with split at hinged mullion.



Photo A16: Room 201 window with animal gnaw marks on sash.



Photo A17: Room 200 window sash with rot.



Photo A18: Open joint under sill at W14 on the north elevation.

Porches

The 1995 HSR recommended restoring the porches on the east, west, and north sides of the house. By 2004, NPS had reconstructed the east porch and installed a deck on the west side of the house. The columns and railings for the east porch were replicated from the existing elements stored in the basement. The porch featured a hipped roof, bracketed square columns, a balustrade with square balusters, and a central stair (Photo A19). The porch was supported on brick piers and had its own gutter system. To the west, a deck was installed in the footprint of the former porch (Photo A20). The deck was unpainted and supported on concrete footers. The west cellar steps were replaced, including the wood stringers and five treads (Photo A21).

The east porch is in relatively good condition. The seams have begun to open on the decorative trim at the columns. The sealant used to repair the open joints is failing, leaving the column assembly susceptible to moisture infiltration (Photos A22 and A23). Routine maintenance now includes painting the porch, but paint is flaking on the brick piers from moisture, especially around the downspouts (Photo A24). The west deck is in good to fair condition, but the wood elements are beginning to check and warp. Mud daubers are present on both the porch and the deck (Photo A25).



Photo A19: East porch from the northeast corner looking southwest.



Photo A20: South deck from the southwest corner looking northeast.



Photo A21: Cellar stairs rebuilt in 2004.



Photo A22: Open seams at porch columns with failed sealant.



Photo A23: Open seams at porch columns with failed sealant.



Photo A24: Paint flaking from a brick pier supporting the east porch.



Photo A25: Mud daubers below porch.

Roofing and Flashing

The 1995 HSR recommended replacing the corrugated metal roofing with period-appropriate slates. This was completed in 2004 (Photo A26). The roof underlayment included 3/8-inch plywood sheathing overlaid perpendicular to the existing transverse wood sheathing. New gutters and downspouts were also installed. Where shadow lines of previous gutters existed, the new gutters were reinstalled to match, using remaining leader sleeves and leader clamps when possible. Downspouts at the southeast, southwest, and northwest corners of the main building and the southwest corner of the ell wrapped to the adjacent short elevation at the south of the main block and west of the ell (Photo A27). The downspout to the southwest of the ell was connected to a buried drainage pipe, and 2-inch x 8-inch snowboards were installed at the eaves above the gutters. The raking molding at the gable ends was replaced to match the original.

The roof of the east porch was installed with a metal standing seam over #30 felt and rosin paper underlayment. The porch roof was designed with its own gutter and downspouts at the north and south ends. The cap flashing at the porch roof intersection was set into the same mortar joints as the previous porch.

Currently the gutters and downspouts are in good to fair condition. The west gutter appears to have had some weather damage, which has resulted in open seams in the middle of the west elevation. In turn, this has led to staining on the stone foundation and rot on a window sill (Photo A28). Large vegetation is growing out of the snowboard at the south end of the east elevation (Photo A29). There is evidence on the interior of the building (discussed in the next section) that suggests the gutters frequently overspill at the intersection of the main block to the ell on the north and south sides.



Photo A26: East slate roof with snowboards and east porch metal standing seam roof.



Photo A27: Downspouts at southwest and southeast corners wrap onto the south elevation and align with previous configuration.



Photo A28: A) Orange rust stain from leaking gutter above on west elevation. B) Rotting window sill from leaking gutter.


Photo A29: Vegetation at east snowboard.

Interior Finishes

Interior finishes at Worthington House remain little changed from the 1995 HSR, largely due to the 2004 stabilization project and ongoing cyclical maintenance. However, some conditions have worsened since 1995. Wall plaster has continued to fail, and ceilings have become more significantly bowed. Rodents continue to damage interior wood trim. Additional wood trim elements, such as fireplace mantels and window stools, have been displaced. The exact cause of this displacement is unknown. Repairs undertaken in 2004 are now 15 years old and require maintenance.

Basement

Basement repairs during the 2004 stabilization included rebuilding the west and south chimney breasts with a new steel ½-inch lintel over the hearth opening and a soldier course of brick above the steel. The drawings called for the chimney breasts to be parged, but they are not currently parged. Lighting and a telephone line were added to Room 002. In 2007, further stabilization of the basement included installing posts to support compromised joists in the cellar. It is unclear if this phase included stabilizing the servant stair in Room 002, but currently the stringer and framed opening structural members are braced (Photo A30).

Room 000 still exhibits plaster loss at the ceiling with much of the lath exposed. The area is cordoned off with cones to warn people from walking below the failing plaster. At the west cellar entry, anchors and washers hold the falling plaster in place. In another area, an injection adhesive was used to reattach the plaster (Photo A31). The anchors and washers remain, but the adhesive is on the verge of imminent failure. Plaster ceilings never existed in Rooms 001 and 002. These spaces always had exposed ceiling joists.

Most of the walls in the basement exhibit coating loss, disaggregating bricks, missing brick, and mortar loss related to water infiltration (Photo A32). The east porch protects the east basement walls, and these are in significantly better condition than the other walls.

At door D01, the interior frame of the door is unsupported and shifting out of place (Photo A33). There are burrows under the CMU infill, suggesting animals have an entrance into the building (Photo A33). Period bricks are currently stored in the chimney hearth in Room 000. Parts of the dismantled porch, roof slates, and a window sash are stored in Room 001 (Photo A34).



Photo A30: Braced servant stair in Room 002.



Photo A31: Imminent failure of adhesive holding up plaster ceiling in Room 000.



Photo A32: Disaggregating brick on the east wall of Room 000.



Photo A33: Plaster and mortar loss, unsupported door frame, and animal burrows at D01 in Room 002.



Photo A34: Room 001 with fairly intact plaster under the east porch and salvage storage.

Woodwork

The woodwork in the house includes flooring, doors, door casings, window sashes, window casings, baseboards, casework, mantels, stairs, and trim. While much of the woodwork remains in place, much has been removed. Most of the missing pieces were documented in the 1995 report. Trim loss seems to correspond with areas of heaviest water infiltration, including on the west side of Room 200, at the north side and southeast corner in Room 203, and around the windows on the west side of Room 102. In Room 202, there is a loose window stool in the middle of the room that could be part of the windows with missing trim (Photo A35). The wood mantel in this room is detached from the wall and lays face down in the room. The mantel is some distance from its original location, suggesting it was placed there (Photo A35). In Room 203, it is possible the stool stored in the closet under the stairs belongs with one of the north windows missing its trim. Also in Room 203, several of the wood baseboards are missing at areas of plaster damage, and most of the toe molding is gone. It is possible that water infiltration at areas of plaster damage led to deterioration of adjacent wood trim and precipitated its removal. In particular, rot is evident at the interior sill of W18, likely related to open seams in the exterior roof gutter above this window.

Gnaw marks on door and window trim indicate ongoing rodent intrusion into the building. This is especially evident in Rooms 101 and 200 (Photo A36). Photographs from the 1995 HSR indicate this is a more recent problem, perhaps associated with the removal of the fence around the perimeter of the property.

Water infiltration has led to significant buckling of wood floors in Room 103 and cupping of wood floors in Room 102 (Photos A37 and A38). The wood flooring in Room 103 is potentially a second-generation floor. Its planks are thin like the second-generation flooring in Room 104. Room 104 exhibits several generations of linoleum and at least two generations of wood flooring (Photo A39). There is evidence that the original wood flooring remains under the subsequent flooring but is heavily damaged. On the second floor, much of the original flooring remains, though it was partially removed in Rooms 202 and 203 due to water damage.



Photo A35: A) Dislodged mantel in Room 202. B) Dislodged sill in Room 202.



Photo A36: Animal gnaw marks on wood trim in Room 101.



Photo A37: Buckled tongue and grooved flooring in Room 103.



Photo A38: Cupped wood flooring in Room 102.



Photo A39: Evidence of first-generation flooring in Room 104.

Plaster

The loss of plaster from ongoing moisture damage is most prevalent in the following locations: the west elevation of the first floor, the south intersection of the ell and the main block on all floors, at the center of the north elevation on the first and second floors, and on the east elevation above the porch roof (Graphic A1).

John Milner Associates Preservation analyzed these locations with a Tramex Survey Encounter moisture meter to determine if the moisture damage was dormant or active. In all areas listed above, the readings were above 50% moisture content, which indicates ongoing water infiltration. The wettest areas were found on the center of the north elevation below the eastern windows on the first and second floors (Graphic A2). An exterior survey of these windows revealed that the joints under the sills are open and a possible source of moisture infiltration. This location is under the roof connection between the main block and the ell. There are currently gutters at this location, but the high moisture content of walls below the gutters suggest they overflow during heavy rain. This may indicate the gutters are undersized. If gutters do overflow, they pose a threat to brick walls as well as the interior plaster.

It is likely that moisture in the plaster on the west wall and at the south ell intersection is also related to the exterior gutter system. Specifically, a damaged gutter may divert water through the screened opening at Window W18 (Photo A40). At the south ell intersection, there is no downspout where the gutters connect. This is potentially a point of overflow from the hipped roof flashing. Originally, the west porch roof may have collected this water and diverted it away from the foundation. However, the west porch roof is no longer extant, and overflow from the gutter is capable of saturating the wall below and affecting the interior (Photos A41 through A45). The painting of the exterior wall has improved the condition, but the interior plaster remains wet. The wet plaster in Rooms 200, 201, and 202 requires further investigation to determine if the moisture is related to porch flashing or open joints under sills (Photo A45). For further analysis of the gutter system, see the discussion in the "Alternatives and Recommendations" section on page 47 of this report.

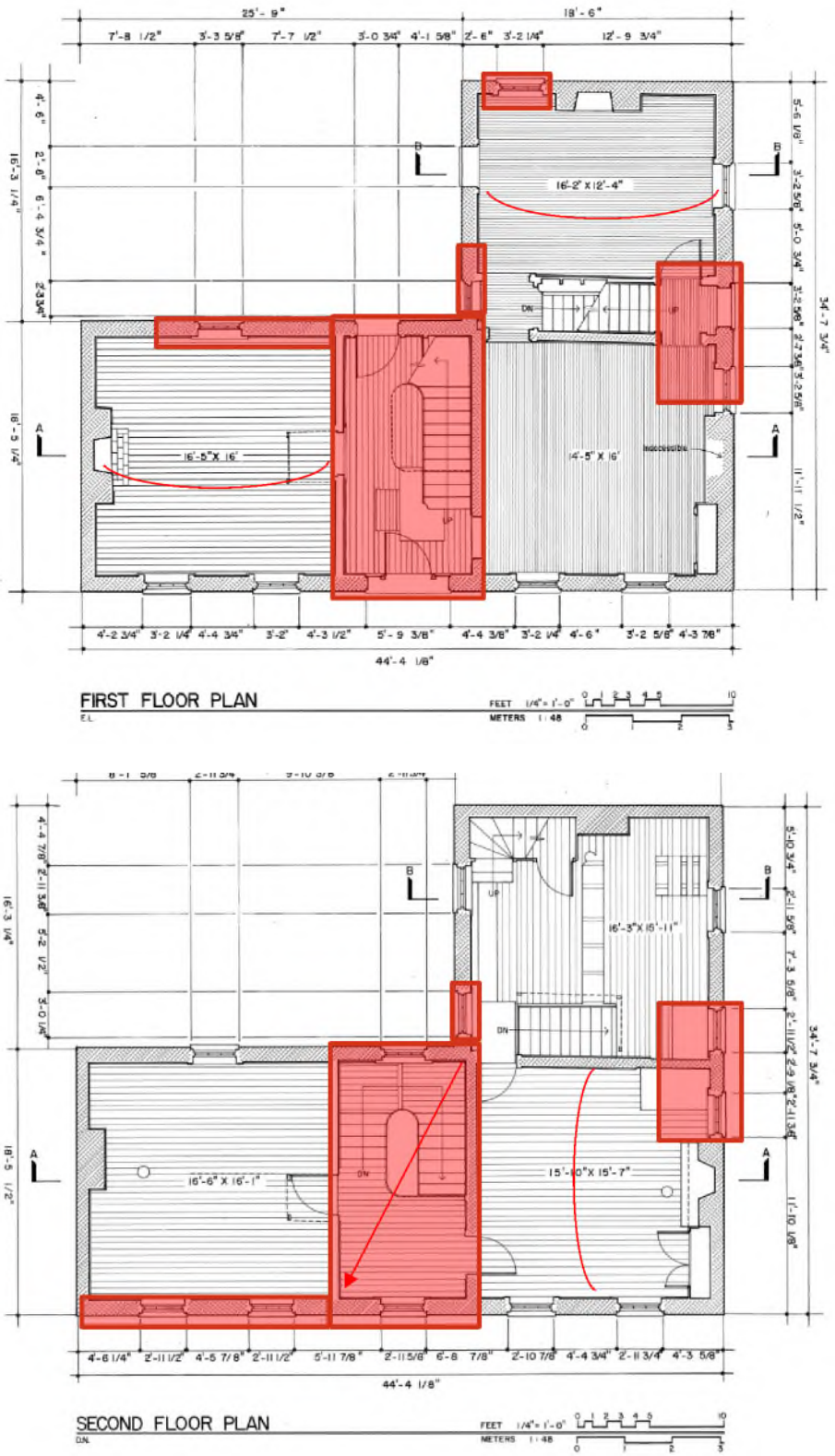
Other plaster conditions in need of attention include historic pencil drawings, bleeding decorative paint, and ceiling plaster that is cracking and/or bowing. These conditions were discussed in the 1995 HSR, but they merit additional discussion and treatment in 2019.

Historic pencil drawings are found on plaster walls in Rooms 101, 102, 201, and 203. The pencil drawings post-date 1953, when Jenkins Brothers, Inc., began using Worthington House for migrant farm worker housing. The drawings vary in nature from religious to whimsical to bawdy. The medium of the drawings is not confirmed, but it appears to be pencil on plaster. While the pencil drawings are not original to the house, they do help to interpret the evolution of the building use over time (Photos A46 through A49).

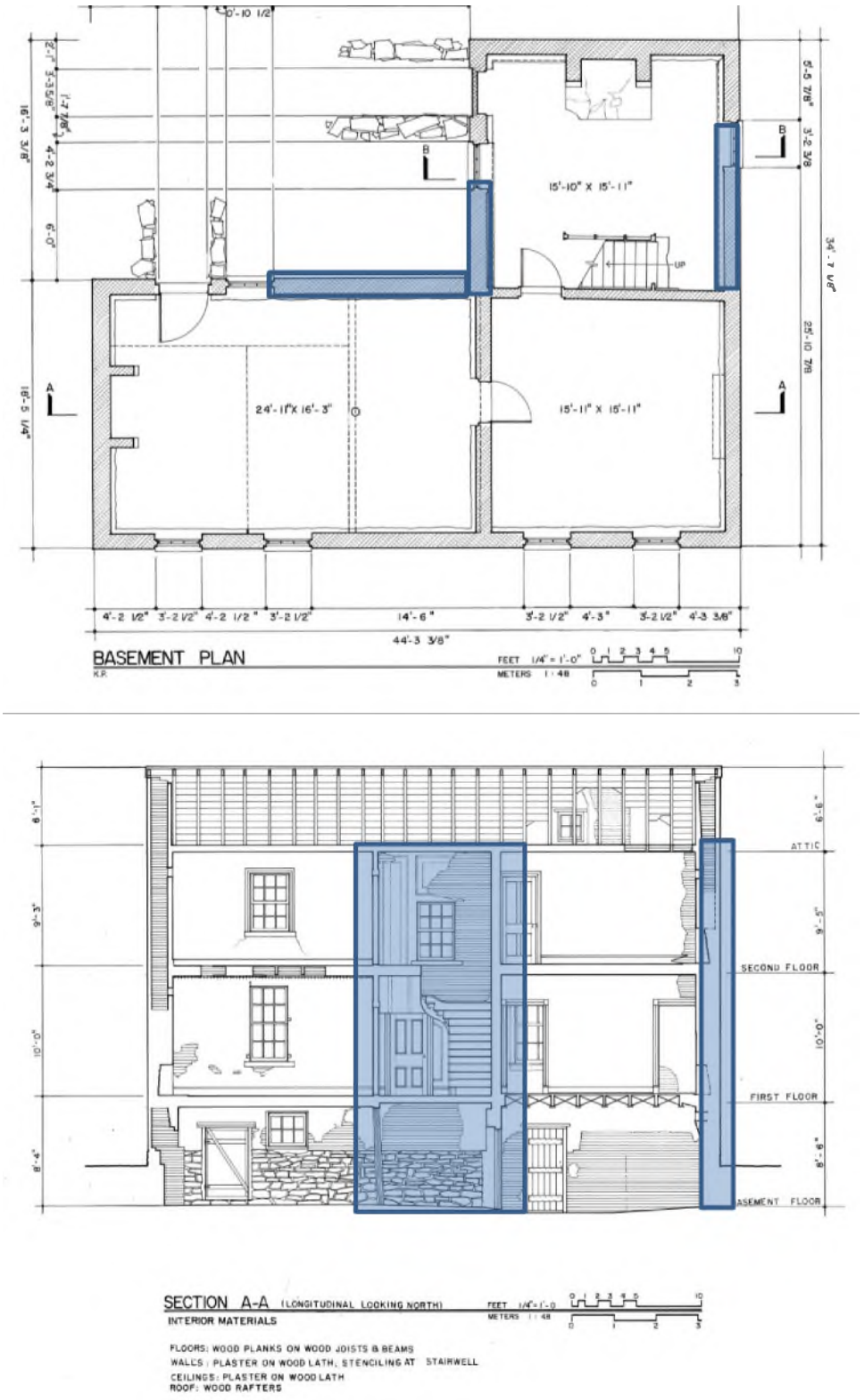
Rooms 101, 102, and 200 retain decorative painted plaster, but the paint is exhibiting signs of continued deterioration. The 1995 paint analysis indicates the paint is a water-based distemper made with whiting, pigments, and a proteinaceous binder such as egg whites, glue, or casein. The type of protein used in the binder determines whether it is water-soluble or not. There is some

evidence in Room 102 that previous water damage has caused the paint pigments to bleed, indicating it is in fact water soluble (Photo A50). If this is confirmed, extra care will be required to protect the existing painted surfaces during plaster repair work. Flaking of the decorative painted surfaces is considerable, particularly in areas of abrasion or water damage (Photo A51). Stabilization of the flaking paint is possible but requires extensive testing and research to ensure it is effective and reversible.

All of the plaster ceilings exhibit signs of destabilization of the supporting lath and broken keys. The cracking occurs mostly in straight lines that are likely aligned with the joints in the lath (Photos A52 through A55). The lath could have become loose for a number of reasons. Rapid swings in relative humidity can cause wood lath to swell and contract. Fasteners securing the lath to floor joists above may have become loose over time. In addition, prolonged water infiltration may have exacerbated both conditions. Most of the rooms have had significant plaster loss at the ceiling where the lath could no longer support the weight of the cracked plaster. Plaster loss has relieved some of the pressure, but each room must be evaluated for life safety issues related to falling material. Many of the plaster ceilings also exhibit significant bowing. In Room 200, the plaster ceiling is relatively intact, but it bows diagonally from the northwest corner to the southeast corner (Photo A52). In Room 104, the damaged ceiling also shows signs of bowing from north to south with a low spot in the middle of the room (Photo A53). In Room 102, the ceiling bows from east to west (Photo A54).



Graphic A1: The areas highlighted in red show areas of plaster damage. These correspond with moisture readings taken during survey and evidence of moisture infiltration.



Graphic A2: The areas highlighted in blue show areas of water infiltration. These correspond to areas of plaster damage shown in Graphic A1.



Photo A40: High moisture content in damaged plaster at west wall of Room 102 near screened window.



Photo A41: Room 200 at ell connection showing extensive previous plaster damage. Relatively unchanged from 1995.



Photo A42: Disaggregating brick in east wall of Room 000.



Photo A43: High moisture content and increased plaster damage in Room 202.



Photo A44: High moisture content and increased plaster damage at northwest corner of Room 103.



Photo A45: High moisture content and increased plaster damage at east wall of Room 201 above porch.

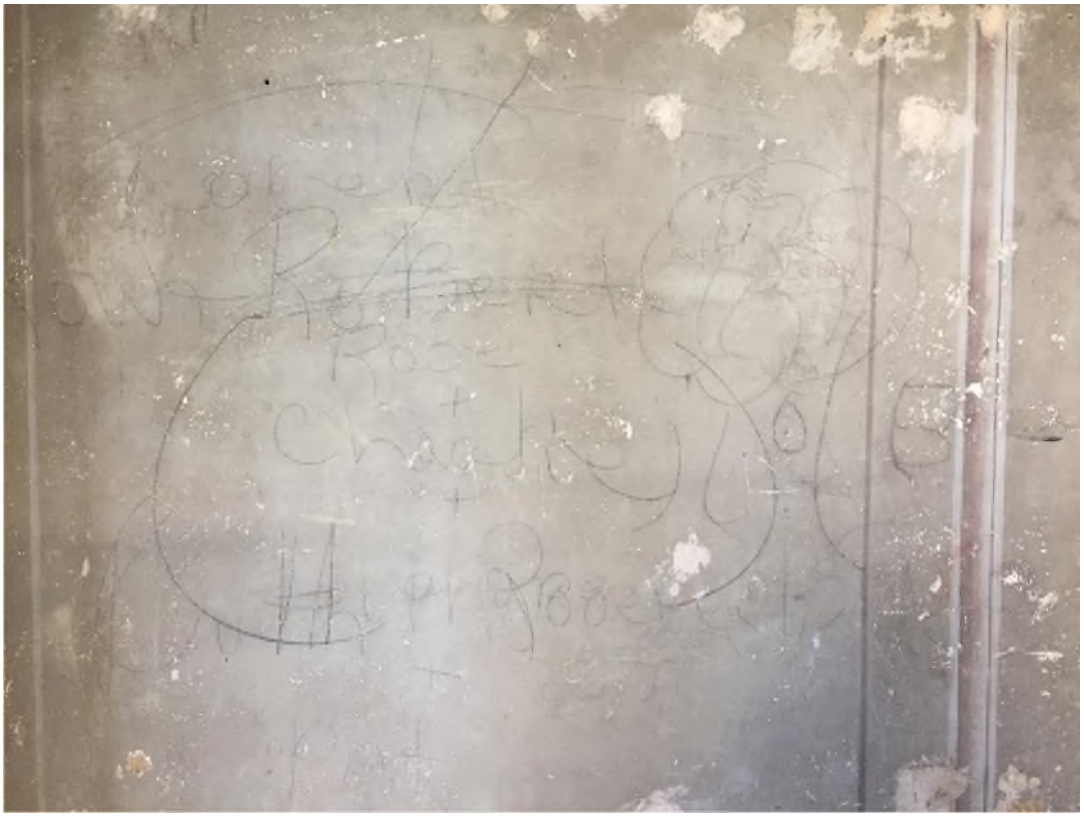


Photo A46: Pencil drawings on south wall of Room 101.



Photo A47: Pencil drawings on north wall of Room 102.



Photo A48: Pencil drawings on north wall of Room 102.



Photo A49: Pencil drawings on south wall of Room 203.



Photo A50: Bleeding decorative paint in Room 102 suggesting paint may be water soluble.



Photo A51: Paint loss at areas of moisture infiltration in Room 200.



Photo A52: Bowing ceiling in Room 200.



Photo A53: Bowing ceiling in Room 104.



Photo A54: Bowing ceiling in Room 102.



Photo A55: Straight cracks in plaster in the Room 201 indicating lath damage or broken plaster keys.

Landscape

The chain-link fence around the house was removed between 1995 and 2004. A fire/intrusion alarm was installed in 2004 as a new security measure in its place. The perimeter of the house was excavated in the 2004 repair campaign to reveal masonry 5 feet below grade for repointing and replacement.

In 2013, NPS completed a Cultural Landscape Report (CLR) for both Worthington Farm and the neighboring Thomas Farm. NPS investigated historic landscape configurations and features for both properties and evaluated the existing integrity of those configurations and features. The report concluded that Worthington Farm retained integrity of location, setting, materials, feeling, and association due to the preservation of Worthington House in its original location and the overall retention of the surrounding landscape's rural character and historic agricultural use. However, Worthington Farm did not have integrity of design or workmanship. This was largely due to the loss of historic outbuildings associated with the house. The report also expressed concern at the loss of the historic orchard and vegetable gardens, alterations to historic field and forest patterns, and the loss of sightlines between Worthington Farm and Thomas Farm. The report warned about possible future threats from the widening of Interstate 270 and encroaching suburban developments. The report concluded with a list of tasks recommended for the preservation and restoration of character-defining landscape features for both properties. The tasks that would affect Worthington Farm and House were as follows:

- Preserve historic road traces
- Construct pedestrian deck over I-270
- Manage white-tail deer population and protect vegetation from grazing deer
- Remove non-historic woods and tree lines
- Manage Osage orange trees
- Manage invasive and exotic plants
- Re-establish and preserve roadside trees and historic roads and road traces
- Re-establish views between Worthington House and Thomas Farm
- Rehabilitate historic fences
- Interpret lost building sites with signs or a smart phone app
- Rehabilitate commemorative area
- Improve accessibility according to Architectural Barriers Act Accessibility Standard (ABAAS) guidelines
- Improve landscape interpretation

Improvements to circulation and accessibility of Worthington House site are desirable. In particular, ABAAS-accessible pathways are required to provide access from the parking area to the wheelchair lift at the reconstructed west porch. Better interpretation of the site itself—specifically documentation of the locations of historic outbuildings and landscape features—will also create a more vibrant visitor experience.

The CLR found that plantings in the immediate vicinity of Worthington House do not date to the historic period. If any of these plantings are found to pose a threat to the conservation of

Worthington House, they may be removed with no risk of detracting from the historic landscape. It is typically best practice to keep all vegetation at least 2 feet from the building envelope. This prevents rain water shedding off the vegetation onto the building, roots encroaching on the foundation, and shading of the building façade, which can exacerbate moisture-related issues. There is a large tree near the south side of the house that may pose a threat to the building if it ever grows too close. Since the large tree is not a historic planting, it may be removed if it begins to encroach on Worthington House.

Alternatives and Recommendations

Exterior Masonry

- Repoint below window sills at each window to prevent water infiltration.
- Repoint at east porch flashing to prevent water infiltration.

Windows and Doors

- Repair rot at window W18.
- Replace shutter at window W16.
- If passive ventilation system remains, retain current screened window but replace 1980s vintage windows with replicated double-hung sash windows.
- If an HVAC system is installed, replace all windows with replicated double-hung sash windows.
- Replicate basement door D01 and install.
- Clean faux-grained doors on the second floor. Stabilize paint and provide protective coating similar to treatment of first floor doors in 2004.

Porches Alternatives

Further study is needed to understand the possible configurations of the west and north porches. There is currently sufficient physical evidence to determine the basic configuration of the west porch. Joist pockets are still apparent in the brick elevations at the west porch, indicating where floor and roof joists of the original structure once sat in the masonry wall. Existing HABS drawings document not only these joist pockets but also the outline of flashing, which can be used to determine the slope of the roof structure. By contrast, almost nothing is known about the north porch structure. A detailed survey of historic porch configurations of houses of the same style and period in the vicinity is necessary to inform reconstruction of the west porch. This study will also provide some information about possible configurations of the north porch.

There is currently no way to access the north exterior door from grade. There was certainly a stair or small porch at this location, but the exact configuration is unknown. A roof structure may have accompanied any stair or porch in this location. In HABS photographs dating to 1991, brick pointing mortar is significantly lighter above and below door D12 than across the rest of the north elevation. This suggests some alteration was made to the brickwork at these locations. It is possible this alteration occurred during removal of a porch and roof structure at this location. The 1995 HSR did not find definitive evidence of the historic porch or stair at this location. The HSR

describes two iron rings above the door that might have served as points of attachment for a small roof structure or awning.

In the absence of definitive physical evidence of the north porch or stair, a detailed study of similar vernacular houses of the period could provide insight into an appropriate construction for accessing the north door from grade. Following more extensive research of architectural trends of the region and period, it may be possible to design a porch structure or stair that is architecturally appropriate. Regardless of the results of research, detailing of the north porch would be simple and pared down to avoid making unnecessary conjecture about its historic appearance.

Porches Recommendations

- Complete an architectural survey of historic porch configurations on structures of the same period and style.
- Reconstruct the west porch and stair using existing physical evidence (joist holes and ghost marks on the brick) and an understanding of historic architectural porch configurations gleaned from the survey of historic porches. Simplify detailing to avoid making unnecessary conjectures about the structure's historic appearance.
- If the architectural survey yields enough information to make a reasonable conjecture about its configuration, reconstruct the north porch and stair. Simplify detailing to avoid making unnecessary conjectures about the structure's historic appearance.

Gutter Design Analysis

The house currently has 1,478 sf of roof (calculated with 1.3 slope) and is served by 5-inch half-round gutters and four 3-inch round downspouts. None of the gutters span more than 50 feet. Using Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) standards, the slope-adjusted square footage of the drainage multiplied by the local rainfall intensity rate of 7.1 inches per hour indicates the total square footage of the drainage of the roof is 10,494 sf.[4] This is the target range for the adjusted square footage when calculating capacity for the gutter combined with the downspouts. The existing gutter system consists of a 5-inch half-round gutter, which alone can accommodate 2,500 sf of roof area. With four 3-inch round downspouts, its capacity increases to 5,324 sf. That means that the gutter system needs to be adjusted to accommodate an additional 5,170 sf. The current gutter system is undersized when reviewing the roof drainage as a whole.

There are a few different ways to achieve the capacity needed for Worthington House. One way is to increase the size of the gutter but keep four downspouts. Another way is to keep the gutter but increase the number of downspouts. Alternatively, both the gutter and downspout sizes and number can be increased.

This last option is the best alternative for Worthington House, as it is the least visually disruptive while still effectively managing water. This alternative is shown as Option 7 in the chart below.

[4] "How to Size Gutters and Downspouts" https://www.thisoldhouse.com/ideas/how-to-size-gutters-and-downspouts; accessed 5/6/2019.

Increasing the gutter size significantly can also improve capacity without changing the number of downspouts. However, the visual appearance of the gutter may detract from the historic character of the house. Option 8 in the chart below shows the benefits of increasing just the gutter size, while Option 6 explores offsetting a larger gutter with additional downspouts. The data in Option 6 show that two additional downspouts would be required to meet the drainage capacity. The two additional gutters would function best if inserted on either side of the ell, where they would be highly visible to visitors.

The following chart shows capacity calculations for the current system as well three options that achieve the right capacity (Options 6 through 8, highlighted in green). Further analysis using the SMACNA Gutter and Downspout Calculator can be found in Appendix B.[5]

Roof sf	Pitch	Local Rainfall Intensity (in/hr)	Total sf
1,136	1.3	7.1	10,494

Element – Standard Capacity (sf)		Gutter System Design								
		Exist.	Opt. 1	Opt. 2	Opt. 3	Opt. 4	Opt. 5	Opt. 6	Opt. 7	Opt. 8
5" Half Round Gutter	2,500	1 ea.		1 ea.		1 ea.				
6" Half-Round Gutter	3,840		1 ea.		1 ea.		1 ea.	1 ea.		
7" Half-Round Gutter	5,520								1 ea.	
8" Half-Round Gutter	7,960									1 ea.
3" Round Downspout	706	4 ea.	4 ea.							4 ea.
4" Downspout	1,255			4 ea.	4 ea.	6 ea.	5 ea.	6 ea.	4 ea.	
Total Drainage sf		5,324	6,664	7,520	8,860	10,000	10,115	11,370	10,540	10,784
Target sf		*10,494*	*10,494*	*10,494*	*10,494*	*10,494*	*10,494*	*10,494*	*10,494*	*10,494*
Delta		-5,170	-3,830	-2,947	-1,634	-494	-379	876	46	290

Gutter Recommendations

- Low-Impact Option: Increase gutter size without adding to the number of downspouts but increasing capacity (Option 7).
  - Replace gutter with 7-inch half-round gutter.
  - Replace downspouts with four 4-inch downspouts.
- Medium-Impact Option: Increase gutter size without adding new downspouts (Option 8).
  - Replace gutter with 8-inch half-round gutter.

[5] "Downspout & Gutter Sizing Calculator" http://apps.smacna.org/dsgcal/; accessed 5/6/2019.

- High-Impact Option: Increase gutter size and add downspouts for increased capacity (Option 6).
    - Replace gutter with 6-inch half-round gutters.
    - Replace four downspouts with 4-inch round downspouts.
    - Add two additional 4-inch downspouts at ell intersection on north and south elevations.

Basement Finishes Recommendations

- Replace bricks that are missing or deteriorated by half of one wythe or more.
- Repoint joints in interior brick or stone where missing or failed. Assume 100% repointing in exposed areas.
- Repair or install a level concrete floor in all three basement rooms to provide for ABAAS access.

Woodwork Recommendations

- Repair wood trim, casework, and mantels in the basement and the first floor to infill areas of rot or imperfections with epoxy. If area of repair is larger than 3 inches x 3 inches, consider using a dutchman to complete the repair.
- Replicate missing trim, mantels, or missing elements of casework to match the existing.
- Replicate missing elements and reconstruct main stair in Room 101/200. Determine if original finish was a clear finish or a painted finish from paint analysis.
- For wood that was originally clear-finished, such as floors, clean existing woodwork with a non-ionic detergent and protect with a microcrystalline wax finish.
- For wood that was originally painted, prepare, prime, and repaint with colors determined by paint analysis. Do not strip original paint from woodwork.
- Dismantle (but conserve) wood floors to allow access for floor joist and plaster ceiling repairs in the room below. Restore first-generation flooring.
    - Steam individual boards to reverse cupping as required for reinstallation.
    - Replace warped boards.
    - Remove modern flooring and repair original flooring in Room 104.

Plaster Repair Alternatives

Plaster is one of the most significant character-defining features in Worthington House. The varied conditions of the plaster at the house will require a complex conservation treatment plan to stabilize what remains in the building. The different possible treatments include adhesive injection, metal fasteners, consolidation, lath/key restoration, and replacement.

The Secretary of Interior Standards and National Park Service bulletins indicate that all plaster should be retained where possible. It should only be replaced when repair is impossible. At Worthington House, extensive moisture damage has led to significant loss of plaster. If plaster has completely fallen away from wall or ceiling lath, it must be replaced. Replacement plaster should match the composition of the original to be true to the historic craftsmanship. However, expanded metal lath should be used instead of more traditional wooden lath at areas of plaster

replacement. According to NPS Preservation Brief 21, metal lath creates more reliable keying of the plaster and therefore a more durable patch than traditional wood lath. The metal lath also allows future stewards of the building to differentiate between original plaster and more modern repairs, which satisfies the Secretary of the Interior's mandate that new work be identifiable as such. This approach is appropriate in all rooms except those with decorative paint or pencil drawings.

Before any plaster can be repaired, the source of the plaster instability must be addressed. At plaster walls, it is most important to address moisture infiltration. At plaster ceilings, unstable lath is of the greatest concern.

At unstable plaster ceilings, the lath must be securely reattached to the joists with fasteners. After stabilizing the lath, two methods are appropriate for reattaching the plaster to the lath: installation of metal fasteners or adhesive replacement of keys. Metal fasteners should be installed through existing plaster and anchored to the lath behind to provide extra support to the plaster system. Where the back side of the lath is accessible, the fasteners can be further supported with jute daubing to hold everything in place. Adhesive replacement of plaster keys requires that the back side of the lath be exposed. The adhesive, such as AD Premixed from Historic Plaster Conservation Services (HPCS) (traditional formula is petroleum coke and ammonium hydroxide),[6] is applied with a caulking gun to cover the entire exposure between the lath. By re-establishing the keys, the adhesive does the work of carrying the plaster supported by the wood lath. At Worthington House where the ceilings have deflected, a combination of metal fasteners and adhesive keys should be considered. After the cracked substrates are stable, cracks should be opened to at least 1/8 inch wide to the depth of the crack and filled with finish plaster flush with adjacent surfaces.

Adhesive injection is a viable option for reattaching loose plaster to brick walls. For this method, injection ports are drilled through the plaster to reach the void between the brick and the plaster. (If the void is accessible through an area of loss, ports are not required.) The adhesive is injected, and the plaster is held against the substrate until the adhesive has cured. There are many conservation adhesives available. Acrylic polymers are the most common, but testing may be required to determine if this or another composition would perform best. If extensive water damage has undermined cohesion of the brown or scratch coats, a consolidant must be injected before the adhesive. Testing is required to determine an effective combination of products and application methods before wholesale treatment of historic plaster. Remaining cracks should be repaired and filled flush with finish plaster.

Repairs to missing plaster in Rooms 101, 102, and 200 requires further discussion. Standard plaster patching is not viable because the painted finishes are potentially water-soluble and will not survive wet plaster repairs. Contemporary conservation theory concerning the treatment of lacuna, or losses, should also be considered when determining the repair approach in these areas. Some conservation scholars have theorized that compensating for loss allows the viewer to

[6] "HPCS AD Premixed" https://historicplaster.com/sites/default/files/AD-Premixed-Technical-Data-Sheet.pdf; accessed 5/6/2019.

experience the whole of the designer's intent. Others theorize that how the losses are filled is subjective to the restorer. As such, repair can never fully re-create design intent and therefore should not be undertaken. If repair is undertaken, modern conservation practice dictates "that any insertion is clearly differentiated from the original, thus preserving the integrity of the original context and the possibilities for alternative interpretations now and in the future (that is, reversibility or retreatability)."[7]

Considering these arguments, the two possible approaches at Worthington House are 1) to stabilize the remaining plaster and leave brick and lath exposed, or 2) to stabilize historic surfaces and compensate for the losses with a reversible similar material that does not damage the surrounding historic fabric. Option 2 is recommended as a method that will approximate the historic appearance of plaster surfaces without damaging original material. For this treatment, gypsum board or other paintable material will compensate for the plaster losses in rooms with decorative painting. To further protect historic painted surfaces during installation of reversible materials, cyclododecane[8] will act as a barrier treatment. This solvent-based wax can be sprayed or brush-applied to sensitive surfaces. It naturally sublimates over time and completely disappears without intervention. It therefore provides temporary protection without leaving residue on historic materials.

Plaster Recommendations

- Replace missing or fully detached plaster with new plaster to match the original composition in Rooms 103 and 104 as well as the ceilings of Rooms 201, 202, and 203. Where possible, use expanded metal lath to differentiate replacement plaster from original plaster. Document the extent of the repairs for house records.
- For Rooms 000, 101, 102, and 200, conserve as much of the original plaster as possible.
- Conduct tests to determine the best products and application procedures for adhesive stabilization of loose plaster.
- Remove historic flooring to access unstable plaster ceilings. Salvage and document wood for reinstallation. Stabilize remaining plaster using fasteners and adhesive keys at deflecting ceilings. Repair cracks.
- Reattach loose wall plaster with adhesives. Consolidate friable brown or scratch coats prior to applying adhesives, if required. Repair cracks.
- Install a reversible wall treatment to compensate for areas of loss at decorative painted finishes in Rooms 101, 102, and 200. Use cyclododecane to protect surrounding painted plaster during installation.

Paint Conservation Alternatives

Paint conservation at Worthington House requires additional analysis of historic finishes, cleaning, and either consolidation or encapsulation of existing paint layers. A full analysis of

[7] Frank G. Matero, 2007. "Loss, Compensation, and Authenticity: The Contribution of Cesare Brandi to Architecture Conservation in America" https://repository.upenn.edu/cgi/viewcontent.cgi?article=1010&context=hp_papers p. 47. Accessed 5/6/2019.
[8] Kremer Pigmente GmbH & Co. KG. "Cyclododecane" https://shop.kremerpigments.com/media/pdf/87100e.pdf; accessed 5/6/2019.

interior trim and plaster is necessary to determine original finishes. This analysis must include identifying the binder and pigments used in decorative painting in Rooms 101, 102, and 200. This information is necessary to determine the best methods for cleaning and consolidating existing paint layers. After analysis of existing and original finishes, it will be necessary to test various methods of cleaning and consolidating to determine the best course of action for all interior painted finishes. Cleaning should only take place if it can be accomplished without further damage to delicate paint layers. Consolidation and encapsulation will take place after any cleaning program. These different phases of paint conservation are discussed in greater detail below.

First, a full interior finish analysis is necessary to inform the paint conservation process. The 1995 HSR included sampling and analysis of select historic finishes. This was limited to exterior wood trim and decorative painting in Rooms 101, 102, and 200. The finish study did not include any interior trim or doors. It also did not extend to the walls and ceilings in the basement, Room 103, Room 104, and second-floor bedrooms. To determine the appropriate treatment for all historic materials, it is necessary to perform a complete analysis of all interior painted surfaces. This includes all interior doors and wood trim as well as all plaster walls and ceilings in the basement, Room 103, Room 104, and the second-floor bedrooms. Additional testing will be necessary to confirm that the decorative paint in Rooms 101, 102, and 200 is a water-based distemper, since this will determine which cleaning and consolidation treatments are most appropriate. Fourier-transform mid-infrared spectroscopy (FTIR) analysis can identify the organic binder present in samples of the decorative paint. It will also be necessary to determine the composition of any other existing historic finishes that will require cleaning and consolidation or encapsulation.

All interior painted surfaces require cleaning, but only if this can be achieved without damaging historic materials. The decorative paint in Rooms 101, 102, and 200 is likely a water-based distemper with either animal glue or egg whites as the binder. If existing paint in rooms without decorative paint is of the same period, it is likely to have the same composition. Dry cleaning or low-water cleaning methods are required to avoid solubilizing the delicate distemper paint. Options for dry cleaning include soot sponges, document cleaning pads, vinyl erasers, and kneadable erasers. Limited use of cotton swabs slightly moistened with deionized water may be appropriate for cleaning heavily soiled areas.[9] All cleaning methods must be tested in an inconspicuous location before wholesale use. Methods must also be tested at each different type of paint and painted surface, as a method that is appropriate in one condition may not be appropriate in another. If water cleaning causes tidelines or any damage of the historic decorative paint, it should be discontinued immediately. Ultimately, retention of historic material is to be prioritized over the removal of soiling.

After cleaning, painted surfaces will either be encapsulated or consolidated. Encapsulation is necessary to prevent historic lead paint from flaking off the substrate and posing a health risk to

[9] Janice Passafiume, "Setting the Stage at the Elgin and Winter Garden Theatres: conservation of the *Butterfly Scenery* Flats," *JACCR,* vol. 28, p. 27-37 (Canadian Association for Conservation, 2003), 31. https://www.cac-accr.ca/wp-content/uploads/2018/12/Vol28_doc3.pdf; accessed August 2, 2019.

staff or visitors. Encapsulation is not reversible and is only appropriate on painted surfaces that do not have a decorative painted treatment. FTIR analysis of existing paints in Worthington House will assist in finding an encapsulant that is compatible with existing paint. The encapsulant should not damage the existing paint. It must also be vapor-permeable to avoid trapping moisture within the wall and exacerbating paint deterioration. Encapsulation should be tested at an inconspicuous location before wholesale treatment to ensure that it will not damage historic materials.

Consolidation rather than encapsulation is recommended for decorative paint in Rooms 101, 102, and 200. Consolidation is a more sensitive treatment option. It is also a difficult and time-consuming process that requires the services of a highly trained specialist conservator. The high level of finish in Rooms 101, 102, and 200 merits this level of treatment, whereas the plain painted surfaces throughout the rest of the house require only encapsulation.

The decorative paint in Rooms 101, 102, and 200 is severely deteriorated and flaking in many locations. Initially, large swings in relative humidity likely contributed to natural breakdown of the paint binder. However, the paint would have acclimated to its natural climate relatively early in its lifespan, and ongoing humidity swings likely have had little effect on recent deterioration. Much of this deterioration is instead the result of water infiltration through the failed roof before NPS installed a new galvanized steel roof in 1983. The existing slate roof is in good condition and is not a major source of water infiltration. Even in the absence of moisture, organic binders in historic paints will oxidize over time. This process makes paints brittle and leads to flaking.[10] Deterioration of historic paints is therefore inevitable even under ideal environmental conditions.

FTIR analysis and on-site testing will be necessary to determine which of the many available paint consolidants are most appropriate for use at Worthington House. Most consolidants belong to one of the following categories: wax resins, animal glues, gelatin, cellulose ethers, and synthetic resins.[11] Each category has its own benefits and limitations. Wax resins are the least effective. They require heat to lie down flakes and tend to darken the painted surface, which is not desirable. Animal glues typically lack sufficient flexibility or adhesion to successfully consolidate paint and require pressure to lay down paint flakes. Gelatin can be an effective consolidant and does not typically alter the appearance of the paint. However, it tends to swell and contract significantly during changes in relative humidity, which can result in consolidation failure.[12]

The most effective consolidants currently used in paint conservation are cellulose ethers and synthetic resins. Cellulose ethers are water-based. They typically do not become brittle or shrink over time, and they do not tend to alter the paint's appearance. However, they are viscous and might not be able to lay down extreme flaking. Synthetic resins are a diverse category that can be divided into solvent-soluble and water-soluble. Solvent-soluble synthetic resins are insoluble in water. They are successful at consolidating powder matte paints, but cannot set down curled

[10] Natalie LaVerne Ford, "Paint Consolidation: Preserving the Integrity of Painted Historic Walls," (Ann Arbor: ProQuest Information and Learning Company, 2008), 25-26.
[11] Ford, "Paint Consolidation," 43-45.
[12] Ford, 43-44.

paint flakes, as they lack the water that acts as a softening agent. Solvent-soluble synthetic resins are chemically and physically stable and do not yellow over time. Water-soluble synthetic resins may also be soluble in various solvents, and frequently are dissolved in water/solvent emulsions. They are exceptionally successful at consolidating deteriorated paint, but they are typically not reversible.[13]

Synthetic resins are likely the most appropriate consolidant for the conservation of the powdery matte decorative paint at Worthington House. The resin may be dissolved in a solvent or a water-solvent emulsion. A small amount of water in the consolidant solution may be desirable, as it will assist in softening and laying down the paint flakes.[14] However, too much water may also dissolve the water-based distemper paint or leave tidelines, neither of which is desirable.

On-site testing will be necessary to determine the appropriate materials and methods for consolidating historic decorative paint at Worthington House. All testing should be done in an inconspicuous area. If paint analysis determines that non-decorative paint in other rooms has a similar composition to the decorative paint, it is advisable to test consolidants in these locations first. If testing must be carried out in rooms with decorative painting, tests should take place in the plain painted field rather than the decorative borders or faux paneling. Multiple types of synthetic resin consolidants, as well as other forms of consolidants if appropriate, should be tested. It may also be necessary to test consolidants in different solvents and at various concentrations.

Different application methods must also be tested to determine the most effective sequence of applications and drying cycles. One effective method employed at Drayton Hall in Charleston, South Carolina, involved using a spray bottle to atomize the consolidant solution. The applicator sprayed the consolidant solution onto the area of deterioration so that the surface was visibly wetted but not dripping. After allowing this application to begin to dry on the surface, the conservator applied another coat of the consolidant. This cycle was repeated multiple times. This process of multiple applications works the adhesive behind the flaking paint to a certain point of tackiness. It is necessary to allow the consolidant to penetrate the flaking paint. Otherwise, the consolidant would not penetrate beyond the surface, and there would only be partial consolidation. After multiple applications of the consolidant, a tacking iron was used at low heat to press the softened paint flakes flat through a sheet of mylar.[15] This method may be appropriate for paint consolidation at Worthington House. It should be tested in an inconspicuous area and any necessary alterations made to tailor the method to the specific conservation issues at Worthington House. If this method proves unsuccessful, it will be necessary to explore other methods.

The consolidation treatment should be reversible. The consolidant should therefore be soluble in a solvent that does not dissolve the decorative paint. It should be noted that, while a consolidation treatment may be technically reversible due to differences in solubility, it is highly

[13] Ford, 44-45.
[14] Ford, 45.
[15] Ford, 70-73.

unlikely to be fully reversible in practice. With heavily deteriorated paint layers, the mechanics of removing the consolidant is likely to remove at least some of the paint, even if the paint is not soluble in the solvent used. Even though it is not fully reversible, consolidation at Worthington House is preferable to the loss of significant decorative painted finishes.

Consolidation may not be appropriate at historic pencil drawings on painted walls in Rooms 101, 102, and 200. Reversibility is one of the most important measures of success for any preservation. Consolidation is not reversible and should only be used as a last resort to retain significant finishes that would otherwise face imminent loss. This justifies their use at severely deteriorated decorative treatments, which will likely be lost if not properly consolidated. Pencil drawings are also a significant feature, but they are in relatively stable condition. Plaster and paint at this location exhibit relatively little flaking and deterioration compared to the rest of the painted surfaces in this room. Application of an irreversible treatment that is not entirely necessary is therefore not desirable in this instance.

Paint Conservation Recommendations

- Complete paint analysis of all painted surfaces in Worthington House to determine historic finishes and paint colors.
- Complete FTIR analysis of decorative paint to identify the organic binder.
- Test dry and low-water cleaning methods at an inconspicuous location to determine which method, if any, is appropriate.
- Test various synthetic resin consolidants in various solvents to determine which will consolidate decorative paint without causing further damage. Test various methods of application to determine the most appropriate.
- Test encapsulants at existing paint in rooms without decorative paint
- Clean painted surfaces without damaging or removing historic paint
- Consolidate paint in Rooms 101, 102, and 200. Do not consolidate pencil drawings
- Encapsulate paint in all other rooms

Conservation Climate Control Alternatives

Climate control can be an effective method of preserving historic finishes within a historic museum property. Drastic swings in temperature and relative humidity can cause materials to swell and contract too quickly, resulting in material failure. Some of the most at-risk materials are wood, plaster, and painted finishes, all of which are significant character defining features at Worthington House. Unstable environmental conditions can lead to cupping of wood floors, splitting of wood trim, and movement of wood framing that can telegraph through cracks in plaster walls and ceilings. Large swings in humidity in particular can cause deterioration of plaster and painted finishes through cracking and flaking.

It should be noted that the materials within Worthington House have likely acclimated to their existing climate. Additional swings in temperature and relative humidity are unlikely to result in significant additional warping, cracking, or flaking of materials. The Smithsonian Institute tested the effects of repeated cycles of high and low humidity on a canvas painting. An oil painting on canvas was repeatedly cycled from 90% relative humidity to 35% and back to 90%. Most

damage occurred during the first four cycles. After nine cycles, there was no new cracking of the ground or extension of existing cracks.[16] The study also examined paintings rendered in egg tempera, a treatment similar to the distemper paint found at Worthington, and found that they reacted similarly to oil paints. The study concluded that most damage and cracking in paintings of both oil and egg tempera occurred with swings greater than from 70% relative humidity to 20%, and probably more on the order of 85% to 25%.[17]

Worthington House has likely already gone through sufficient relative humidity cycles that continued changes in relative humidity and temperature are unlikely to cause significant additional damage. The most serious ongoing environmental threats to materials within Worthington House are active water leaks and surface condensation, which only occurs at 100% relative humidity or when the interior temperature drops below the dew point. Therefore, the main goal of any climate control system should be to prevent condensation rather than to maintain a specific interior temperature or to address occupant comfort.

Within the museum industry, a narrow range of moderate temperature and relative humidity is deemed desirable for the conservation of collections. The Smithsonian Institute maintains its collections at 45% relative humidity +/- 8% and 70 degrees Fahrenheit +/-4 degrees.[18] Such narrow parameters are not usually practicable, or even desirable, for the preservation of historic structures. Historic structures such as Worthington House are frequently not well insulated and offer little opportunity for installing modern insulation, particularly in structural masonry walls that lack a wall cavity. Large differences between interior and exterior conditions can also lead to condensation on surfaces, especially single-pane windows, which can cause moisture damage of historic materials. The Smithsonian Institute has conducted research and laboratory analysis that indicates various organic materials, including wood and historic paints, can remain physically and chemically stable between 30% and 60% relative humidity.[19] This wider range for relative humidity levels is much more practical in an uninsulated historic structure like Worthington House.

According to the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), Worthington House qualifies as a Class III Building given its uninsulated masonry construction and single-glazed windows.[20] For this building class, ASHRAE recommends the following: "Low-level heat, summer exhaust ventilation, humidistatic heating for winter control." ASHRAE does not recommend the use of mechanized cooling in this type of structure. ASHRAE does recommend a full HVAC system for Class IV buildings, but to qualify Worthington House as such it would be necessary to provide a seamless plaster coating on the

[16] Marion F. Mecklenburg, 2007. "Determining the Acceptable Ranges of Relative Humidity and Temperature in Museums and Galleries," (Smithsonian Museum Conservation Institute), 45.
[17] Mecklenburg, 25.
[18] Mecklenburg, 1.
[19] Mecklenburg, 54.
[20] NPS is not required to follow ASHRAE Standards. However, ASHRAE standards do provide a framework for comparing various climate control treatment options.

inside of exterior masonry walls and to install interior storm windows.[21] Since gypsum board patches are recommended instead of wet plaster repairs at water-soluble decorative painting, a seamless envelope of interior plaster is not possible. Interior storm windows are an option at Worthington House, but they must be custom-designed and carefully installed so that they are as minimally intrusive as possible.

Historic House Case Studies

Passive Cooling and Ventilation: Drayton Hall

While climate control can provide a more stable environment for historic finishes, the installation of heating, cooling, and ventilation equipment within a previously unconditioned structure poses its own risks to historic materials. Installation of vents and air returns often requires cutting openings in or removing portions of historic flooring, baseboards, or plaster walls and ceilings. Visible ductwork can alter the historic appearance of the space, while constructing modern chases or bulkheads to hide ductwork usually means significant alterations to historic materials. Heating and additional electrical elements increase the risk of fire within historic structures. Condensation around ductwork associated with cooling systems can result in water damage to historic materials. Climate controlled environments also require careful monitoring to ensure temperature and relative humidity levels remain within recommended parameters. This level of monitoring is not always practicable in small museum properties with limited staff. Historic structures that lack modern insulation are also incredibly costly to heat and cool, and modern insulation of the entire building envelope is often not an option given possible negative impacts on historic materials.

Given these significant risks to the historic structure, many historic museum properties choose to forego climate control entirely. Drayton Hall—a National Trust for Historic Preservation property in Charleston, South Carolina—has chosen not to introduce modern climate control into the house, which has remained unconditioned since its construction in 1742. Like Worthington House, Drayton Hall is a masonry structure with historic single-pane sash windows. No historic furnishings or collections are stored within the house, but the National Trust is tasked with the preservation of ornamental plaster ceilings and painted finishes dating to the 18th century. Conservators performed paint conservation and consolidation work in 2003. Historic passive means of cooling are used to maintain relatively stable temperature and humidity levels within the house. Windows and doors are opened if the exterior temperature exceeds 75 degrees Fahrenheit. Box fans are used to provide additional ventilation if the temperature regularly exceeds 80 degrees Fahrenheit. Interior shutters are used to control sunlight, thereby limiting radiant heat gain and protecting significant historic finishes from UV damage. Drayton Hall reports very few conservation concerns with the system, the most severe being infrequent condensation on surfaces in the basement and stair hall after rapid changes in exterior

[21] American Society of Heating, Refrigerating, and Air-Conditioning Engineers, "Table 4: Classification of Climate Control Potential in Buildings," in *2007 ASHRAE Handbook: HVAC Applications* (Atlanta, GA: ASHRAE, 2007), 21.14.

temperatures.[22] It is important to note that while Drayton Hall experiences more extreme summer heat and humidity than Worthington House, winters in South Carolina are significantly milder than in Maryland.

Conservation Ventilation and Heating: Shelburne Museum

The most invasive climate control system recommended for Class III structures is one that employs summer exhaust ventilation and humidistatic heating in winter. Shelburne Museum in Shelburne, Vermont, utilizes this type of system—which the museum calls conservation ventilation and heating—to control humidity in its Class III historic structures. It should be noted that the Shelburne Museum buildings house historic collections, and that the methods used there have proven successful at preserving both collections and the historic structures themselves. The systems at Shelburne are intended to regulate relative humidity and only control temperature as a means of maintaining desirable humidity levels. The museum aims to keep building interior humidity above 35% to prevent drying out historic materials and collections, and below 65% to prevent mold growth. [23]

At Shelburne Museum, conservation heating is used to maintain humidity levels below 55% during the fall and spring. As heating is used to control humidity rather than achieve a specific temperature, the heating system is rarely used during winter. The building is then allowed to "go cold" to maintain humidity around 30%. Shelburne Museum opts not to humidify the interior during dry winter months, as this can lead to condensation within cold exterior walls. This condensation can cause historic materials to deteriorate.[24] If the interior spaces were heated during winter months, it would likely be necessary to introduce additional humidity because heating would likely lower interior humidity below 30%, causing historic materials to dry out and crack.

In a few instances, Shelburne Museum employs conventional HVAC systems in its Class III structures. In the summer, the cooling system is used to keep interior humidity levels below 65% rather than to achieve a certain temperature. It should be noted that Shelburne Museum only employs HVAC systems in Class III structures that house collections especially vulnerable to moisture damage and mold growth, such as textiles.[25]

All-Air HVAC: Heyward-Washington House

An all-air HVAC system, such as a heat pumps system, may offer more comfortable occupancy in the office space at Worthington House. Although ASHRAE standards do not recommend their use in Class III structures such as Worthington House, if carefully installed and closely monitored, all-air HVAC systems can achieve moderate climate control when necessary. HVAC

[22] Mariah C. Schwartz, 2012. "The Evolving Philosophy of Climate Control for Historic House Museums in Subtropical Climates: Recommendations for the Aiken-Rhett House, Charleston, South Carolina," *All Theses*, 1333, https://tigerprints.clemson.edu/all_theses/1333/.

[23] Richard L. Kerschner, "Providing Safe and Practical Environments for Cultural Properties in Historic Buildings… and Beyond," (20th Annual National Archives Preservation Conference: *Beyond the Numbers: Specifying and Achieving an Efficient Preservation Environment*, 16 Mar. 2006).

[24] Kerschner.

[25] Kerschner.

systems in Class III structures can also ensure stricter climate controls required for the conservation of vulnerable museum collections. Whether the goal is to ensure occupant comfort or to conserve valuable collections, it is necessary to operate any HVAC system conservatively to avoid damage to historic building materials. If an HVAC system is overutilized, it can cause more damage to a historic structure than allowing it to remain as unconditioned space.

At the Heyward-Washington House (1772) in Charleston, South Carolina, an all-air HVAC system is used in the interest of museum collections and to the detriment of the historic structure. The Heyward-Washington House installed its current HVAC system in the mid-1990s to maintain museum-level climate control in the brick structure. The interior is maintained at about 72 degrees Fahrenheit and 50% relative humidity. These levels are maintained in the interest of preserving a large collection of pre-1800 Charleston-made furniture, rather than the house and its decorative finishes. When the system was first installed in the 1990s, the sudden change in the building environment caused historic plaster to crack. The plaster did acclimate to the new environment and stabilize after about two years. However, as of 2012 there was continued plaster loss in the kitchen building, likely caused by the vibration of the mechanical equipment. Conditioning of the interior space also leads to condensation on the single-pane sash windows, which can result in moisture damage to historic fabric. This system is also extremely expensive to operate, with the Heyward-Washington House reporting monthly electrical costs as high as $4000.[26]

Geothermal: Kenmore Plantation

Kenmore Plantation in Fredericksburg, Virginia, provides an example of successful climate control within a historic house museum. It should be noted that Kenmore Plantation, with its intact plaster walls and ceilings, is more closely classified as a Class IV structure than Worthington House. The George Washington Foundation installed a state-of-the-art geothermal heat pump in 2008. All of the associated equipment is housed in a newly constructed underground vault on the property. Locating equipment away from the house ensures that mechanical vibrations will not damage historic materials. Climate control goals vary from season to season: 70 degrees Fahrenheit and 50% to 55% relative humidity during the summer and 66 degrees Fahrenheit and 30% humidity in the winter. Having a smaller differential between interior and exterior conditions decreases the likelihood of surface condensation while also allowing the system to operate at a relatively lower financial cost. The system also transitions gradually between the summer and winter ranges during the spring and fall. This avoids sudden environmental changes that could damage historic materials.[27]

Worthington House

Any climate control system installed at Worthington House should be as minimally invasive as possible. All equipment, ductwork, vents, and air returns must be strategically located and carefully installed to cause the least disruption to historic materials and the structure's historical appearance. The chief goal of any climate control system is to maintain interior relative humidity

[26] Schwartz, "The Evolving Philosophy of Climate Control for Historic House Museums in Subtropical Climates."
[27] Schwartz.

levels between 35% and 65%. Temperature control is of secondary concern for historic materials and is chiefly a requirement for occupant comfort.

Use of historically appropriate passive ventilation and cooling is the least invasive approach for climate control at Worthington House. At Worthington House, a passive ventilation system entails retaining louvered window openings where they exist and installing additional louvers in windows if needed. Data loggers would be installed in various locations inside the house to monitor interior temperature and humidity levels. Average humidity levels for nearby Baltimore, Maryland, range from 59% in March and April to 71% in August and September.[28] Relative humidity may dip as low as 46% in the spring and rise as high as 84% in summer. In summer months, passive ventilation alone may not be sufficient to maintain interior humidity levels below 65%. In this case, mechanical ventilation (such as box fans) would be necessary in addition to passive methods to maintain appropriate levels. Even if interior relative humidity levels exceed 65% in the more humid summer months, passive or mechanical ventilation has been shown to prevent mold growth up to 70% relative humidity.[29]

If the decision is made to install a full HVAC system, care must be taken to locate equipment and ductwork where it will have the least effect on the historic materials and structure. This system would employ both a thermostat and humidistat to maintain prescribed conditions. Data loggers would be installed in various locations inside the house to monitor interior temperature and humidity levels. Temperatures should be maintained between 60 and 75 degrees Fahrenheit, and relative humidity should be maintained between 35% and 65%. Interior temperatures should be allowed to fall slightly lower in colder months and slightly higher in warmer months to lower the differential between indoor and outdoor temperatures. This will prevent moisture condensation on cold surfaces, such as the single-pane windows, or within the masonry walls themselves. Rapid changes in interior conditions should be avoided. When the system is first installed, it should not be immediately set to cool or heat to the prescribed temperature range. The system should be gradually programmed to the desired temperature over a period of time. This will allow the historic materials time to adapt to the new indoor climate. Sudden changes in interior temperature or humidity levels are likely to stress historic materials that have acclimated to existing conditions over more than 150 years. These sudden changes could exacerbate existing plaster and paint failure. Likewise, changes in interior temperature levels between cold and warm months should happen gradually over a few days to avoid sudden changes in interior conditions.

Climate Control Recommendations

- Install humidity and temperature data loggers in various locations throughout Worthington House to establish baseline interior conditions. The results of the monitoring should be used to determine which intervention option will best suit Worthington House.

[28] Detailed data could not be found for average annual relative humidity in Frederick, Maryland. The closest relevant data could be found for Baltimore, Maryland, which lies 50 miles to the east.
"Monthly Humidity Averages for Maryland," 2019, https://www.currentresults.com/Weather/Maryland/humidity-by-month.php.
[29] Kerschner, 3.

- Assign a staff member to monitor interior climate data and make any necessary adjustments to the system to maintain prescribed conditions. This process will be necessary regardless of which type of system is ultimately used to control the interior climate.
- Low-Impact Option:
  - Use passive cooling and ventilation methods to control interior humidity. Passive cooling and ventilation methods include:
    - Opening windows or replacing windows with louvers or screens (which are already in place at Worthington House).
    - Using shutters to control entry of sunlight into the space.
  - Box fans may also be used to move air in the space.
- Medium-Impact Option:
  - Install a conservation heating/ventilation system to maintain humidity levels between 35% and 65%.
  - Take care to disrupt as little historic material as possible during installation.
  - Use a humidistat rather than a thermostat to control the system. The goal is to maintain desirable humidity levels rather than a specific interior temperature.
  - Allow interior humidity levels to vary depending on the season. In summer, the goal should be to keep interior humidity below 65%. In winter, humidity levels can drop as long as they do not drop below 30%.
- High-Impact Option:
  - Install an all-air HVAC system to maintain temperature and humidity levels for occupant comfort and material conservation.
  - Take care to disrupt as little historic material as possible during installation.
  - Allow interior humidity levels to vary depending on the season. In summer, the goal should be to keep interior humidity below 65%. In winter, humidity levels can drop as long as they do not drop below 30%.
  - Maintain temperatures between 60 and 75 degrees Fahrenheit throughout the year. Monitor temperature against dewpoints to prevent condensation.

<u>Landscape Recommendations</u>

- Follow recommendations in the CLR.
- Create accessible pathways from the parking area to the accessibility lift.
- Keep all vegetation at least 2 feet from the building envelope.
- Remove the tree on the south side of the house.

2. FARMHOUSE 2019 STRUCTURAL SYSTEM EVALUATION

Introduction

For the purpose of updating the 1995 HSR, Woods • Peacock Engineering Consultants, Inc. conducted a visual, non-destructive observation and structural survey of Worthington House. The structural integrity and stability of the house were also evaluated, and preliminary recommendations were provided for the repair of structurally inadequate areas. During the survey, approximately one-half of the floor members and the underside of the roof rafters were visible. Consequently, the floor and roof framing plans were updated to reflect the current condition of the house.

As with the 1995 HSR, the observations were limited to exposed areas of the existing structural framing. The dimensions of the exposed existing framing were spot-verified for size and spacing, and the results were consistent with the framing plans in the 1995 HSR.

Description of Structural System

Much of the existing framing has remained the same as presented in the 1995 HSR. The only exceptions are the areas where deterioration of the existing structure has worsened and areas where strengthening and repair have been completed since the writing of the 1995 HSR. These are listed below:

- Supplemental floor framing has been added to the existing joists supporting Room 102 (Photo S1). A 2x10 has been added spanning between the north brick retaining wall and the tree trunk post-supported beam that double-spans east-west across Room 102. Additionally, some 2x framing was sistered to the existing joists. The previous structural drawings, listed in Appendix H of the 1995 HSR, had indicated a broken/rotten joist.
- The original roof rafters above the attic are shown on the Roof Framing Plan (see Appendix H of the 1995 HSR) but do not show the extent of the rafter strengthening (Photo S2). Photo 37 of the 1995 HSR shows the referenced strengthening (which is sistered rafters) was in place during the survey.
- The east porch framing is constructed primarily of timber girders spanning east-west and bearing on the exterior brick bearing walls to the west and brick piers to the east. Secondary timber elements span north-south and are supported by the timber girders utilizing galvanized steel face-mount joist hangers. A wood plank subfloor spans east-west and supports the wood porch floor. The roof framing of the porch was not visible. See Appendix A for additional information.
- The west porch is an independent deck structure with 6x6 wood posts supporting parallel strand lumber (PSL) girders spanning north-south. Southern yellow pine joists span east-west and bear on the top of the PSL girders and wood decking spans atop the joist framing. Wood-framed railings and stairs complete the structure. See Appendix A for additional information.



Photo S1: Supplemental first floor framing at cut floor joist.



Photo S2: Strengthening of existing roof rafters.

Findings

Masonry Deterioration since 1995 HSR

- Room 000 – Brick and mortar on the west side of the north wall, north side of the west wall and south wall, and north end of the east wall have deteriorated (Photo S3).
- Room 000 – Compared to Photo 35 from the 1995 HSR, the chimney on the south wall has since been reconstructed. Spalling salmon bricks are still evident on the upper, recessed portion of the interior chimney face (Photo S4).
- Room 001 – Brick and mortar on the north side of the west wall, west side of the south wall, and partial areas on the north wall have undergone further deterioration (Photo S5).
- Room 002 – Exposed brick and mortar joints have extensive deterioration and spalling on all surfaces of the room. The deterioration includes the brick and mortar joints as well as the mortar joints of the stone foundation walls (Photo S6 through Photo S9).
- Room 103 – Brick and mortar and wood framing at the northwest corner have additional deterioration (Photo S10). New 2x wood framing has been added along with new wood floor subflooring.
- Room 200 – The brick below and around the existing window sill on the east wall shows signs of natural deterioration and also the removal of some bricks by hand (Photo S11).
- Room 200 – The brick and mortar joints on almost the full wall height of the west wall have undergone extensive deterioration with the exception of some areas south of the existing window. Additional spalling is evident on the west side of the north wall extending partially down the wall from the ceiling (Photo S12 and Photo S13).
- Room 202 – The area of deterioration has increased on the northwest corner wall surfaces, as well as under and around the window sill of the northern window on the east wall and the west side of the south wall (Photo S14 through Photo S16). The vegetation growth noted in the 1995 HSR was observed to be dead or dormant.
- Room 203 – The area of deterioration has increased on the northeast corner wall surfaces, especially on the east side, where full bricks have spalled almost completely off (Photo S17). Other areas of spalling were evident on the east side of the south wall, primarily below the existing window sill (Photo S18 and Photo S19).
- Exterior – Some brick spalling was evident in a number of locations on the exterior of the structure, primarily at each of the porch piers, but also evident on the exterior façade (Photo S20). The deteriorated areas showed peeling paint.
- Exterior – A wood-framed deck has been added at the rear of the house (Photo S21).
- Exterior – The wood-framed front porch has been reconstructed based on the structural drawings shown in Appendix A (Photo S22).



Photo S3: Brick and mortar spalling on the east wall in the south basement.



Photo S4: Reconstructed chimney on the south wall of the south basement.



Photo S5: Brick and mortar spalling on the west wall in the north basement.



Photo S6: Brick and mortar spalling on the south wall in Room 002.



Photo S7: Brick and mortar spalling on the north wall in Room 002.



Photo S8: Brick and mortar spalling on the east wall in Room 002.



Photo S9: Example of extent of mortar spalling on the west wall in Room 002.

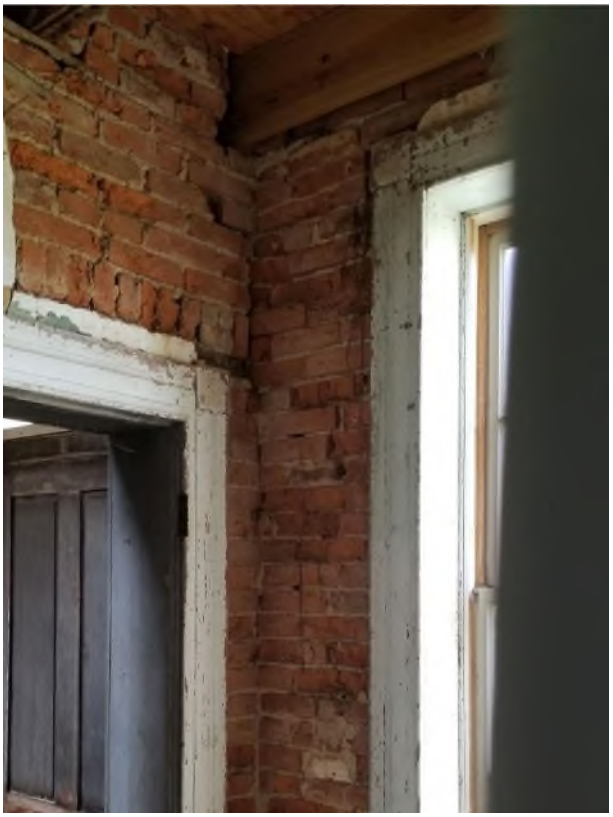

Photo S10: Brick and mortar spalling on the northwest corner of Room 103.



Photo S11: Brick and mortar spalling on the east wall of Room 200.



Photo S12: Brick and mortar spalling on the northwest corner of Room 200.



Photo S13: Brick spalling and mortar deterioration on west wall of Room 200.



Photo S14: Brick and mortar spalling on the northwest wall of Room 202.



Photo S15: Brick and mortar spalling below the window sill on the east wall of Room 202.



Photo S16: Brick and mortar spalling on the west side of the south wall of Room 202.



Photo S17: Brick and mortar spalling on the north wall of Room 203.



Photo S18: Brick and mortar spalling below the window sill on the south wall of Room 203.



Photo S19: Brick and mortar spalling below the window sill on the south wall of Room 203.



Photo S20: Brick spalling on the porch pier.



Photo S21: Wood-framed deck at the re-entrant corner of the house.



Photo S22: Reconstructed wood front porch on brick piers.

Wood Framing Deterioration since 1995 HSR

- Room 002 – There are indications of insect damage to the existing wood joist. The damage is located at the mid-span of the joist on the third joist east from the face of the west wall. Although not indicated in the 1995 HSR plans, the damage does not look recent and may no longer be an issue.
- Room 002 – On the east side of the room, on the north wall below the stair landing above, there is some moisture staining at the end bearing of the existing wood joists.
- Room 102 – As noted on the structural plans, there is a small, non-structural hole in the flooring.
- Room 103 – An additional area of plaster has deteriorated and fallen from the ceiling, and a new 2x wood joist spanning between the west wall and the brick chimney, as well as some new plywood subfloor (Photo S23 and Photo S24), was added. The moisture deterioration on the exposed wood joists is evident and significant.
- Room 103 – New 2x joists were sistered to the existing joists above the vestibule on the north side of the house; the sistered joists span north-south between the east-west-spanning header of the stair opening and the exterior brick bearing wall. The ends of the existing wood bearing were either completely deteriorated or cut off to allow the newly sistered joist to support the floor above and bear directly on the exterior brick bearing wall (Photo S25).
- Room 202 – Additional plaster has fallen from the ceiling in the northwest corner of the room. Additionally, 2x framing has been sistered with a couple of the existing deteriorating floor joists above. The southernmost of the two new 2x framing members is supported from the above the attic framing (Photo S26).
- Room 203 – The south end of the existing wood joists have significant deterioration and are in poor condition (Photo S27). These conditions were most apparent at the top of the stair landing and between the two windows on the south wall, which were also locations where the plaster and wood lath had fallen from the existing joists.



Photo S23: View from above the moisture-stained joists showing apparent signs of additional deterioration.



Photo S24: Repaired existing wood joist and subfloor above Room 103.



Photo S25: Repaired existing wood joist and subfloor above Room 103.



Photo S26: Repaired existing wood joist above Room 202.



Photo S27: Deterioration of the existing joist.

Code Capacity Defects

- As no species analysis on the existing wood framing was conducted, there are no additional items to add to this section. In summary, the maximum calculated live load capacities of from the 1995 HSR indicated a first floor live load capacity of 27 pounds per square foot and a second floor live load capacity of 29 pounds per square foot for the existing floor framing; this is less than the code-required live load capacity.
- Depending on the proposed solution, additional code defects may arise and will be presented.

Structural Recommendations

As mentioned above, the structural defects and code compliance deficiencies described in this report and in the 1995 HSR require repair before the house can be made available for public or private use. Before repairs to the wood framing are completed, material testing, lumber grading, and structural testing should be performed to further define the allowable load capacities of the floors and roof.

Masonry Deterioration Recommendations

- As indicated in the 1995 HSR, the brick and mortar deterioration are primarily the result of water infiltration. Although the 1995 HSR indicates that the main cause of the leaking was stopped with the addition of a new roof in 1983, it also states, "maintenance of the roof, gutter system, windows, doors, walls, and other elements which prevent water

infiltration is critical to the integrity of the house." Based on our recent survey, it is evident that additional water or moisture has infiltrated the house and further deterioration has occurred.

- The recommendations provided in this report are consistent with those presented in the 1995 HSR.

Wood Framing Deterioration Recommendations

- Replace rotted joists and stop any insect damage by treating the areas. This is consistent with the 1995 HSR.
- Evaluate deteriorated and non-deteriorated members based on the proposed use of the building and their ability to support the required live loads.

Code Deficiencies Recommendations

- Perform wood species and grade testing to determine the proper allowable design stresses to be incorporated into the evaluation of the existing framing.

3. FARMHOUSE EXISTING ELECTRICAL, MECHANICAL, AND PLUMBING SYSTEMS

Electrical

Since the 1995 HSR, some minor electrical work was done at the building. These updates were implemented as part of a stabilization project performed in 2004. Below is a list of the renovations and updates that were implemented:

- New underground 240/120V, 100A electrical service was brought to the building. The main electrical service panel is located in the basement (Photo E1), and its capacity is adequate for present use of electrical systems in the building.
- An intrusion detection system was installed. The control panel for the intrusion system is located in the basement of the building.
- A telecom service was brought to the building to support the fire alarm system and the intrusion detection system (Photo E1 and Photo E2).
- A lightning protection system was installed to protect the building structure (Photo E3).
- Fluorescent light fixtures were installed in the basement, where the electrical panel is located (Photo E4).



Photo E1: Electrical and telecom panels. A) Electrical panel. B) Telecom panel.



Photo E2: Inside of telecom panel.



Photo E3: Lightning protection on roof. A) Air terminal on chimney.



Photo E4: Fluorescent fixtures in basement.

Mechanical

Five of the six fireplaces original to the house remain visible: two in the basement, two on the first floor, and one on the second floor. The sixth fireplace, located on the north side of the first floor, has been filled in with CMU. The chimney associated with the south fireplace on the first floor has been sealed off right above the fireplace. The south and west fireplaces located in the basement were repaired in 2002. The three previously removed chimneys on the roof were reconstructed the same year. These repairs were completed for aesthetic purposes, as the fireplaces and chimneys are not used for heating. Original thimble and hole connections to the fireplace chimneys are still visible throughout the house. Similarly, openings in the wood flooring, originally put in place to run pipes when freestanding stoves were used for heating, still remain.

In July 2002, the lower sashes were replaced with wooden louvers at several windows to increase ventilation. New shutters were also installed. Shutters at louvered openings are kept in the closed position for added security.

The range in Room 104 still remains, but there is no indication of an existing gas source serving the house. Photo M1 shows the northwest corner of Room 104.



Photo M1: Room 104 (northwest corner)
A: Thimble / opening at fireplace chimney
B: Existing gas range
C: Existing screen panel with closed shutters

Plumbing

The protruding pipe segment at the northwest corner of Room 104, referenced in the 1995 HSR, is no longer visible. Some shelving/woodwork currently resides in that corner of the house, implying that the pipe has most likely been removed.

The well in the west yard of the house is capped with a concrete pad (Photo P1).

The housing originally containing the outdoor electric water pump no longer exists. The pump currently sits on a concrete pad and is exposed to the elements (Photo P2). It remains inoperable.

In July 2002, a new gutter and downspout system was installed. Metal gutters were installed around the perimeter of the house. A new porch roof and metal downspouts were installed in their historic locations and configurations. Since the house sits on a hill, most rain water naturally drains away from the house. Flexible corrugated HDPE piping was added to the ends of downspouts that are located above flatter land to route rain water away from the house more effectively. Visually, the existing gutter and downspout system appear adequately sized.



Photo P1: Existing concrete well cap.



Photo P2: Existing electric water pump.

4. FARMHOUSE EXISTING LIFE SAFETY SYSTEMS

The existing house is not occupied on any floor, and no furnishings and very few decorations/finishes remain in the interior. A full-length porch (a re-creation of the historic porch) has been added to the east exterior side.

The servant stair connects the basement, first floor, and second floor in the ell section. This stairway is open on all levels between the basement and second floor (Photo FP1). The main monumental switchback stairs connect the first and second floors of the main section of the building. Non-fire-rated partitions enclose this stairway on the second floor only.

Construction is Type VB, unprotected wood frame. No fire-rated construction exists. Typical walls and ceilings are wood lath and plaster on wood beams supported by load-bearing brick/masonry walls.

The basement level has an exterior door on the west wall. This door has 66 inches of clear headroom, which is insufficient headroom to allow egress per National Fire Protection Association (NFPA) standard 101-7.1.5, which calls for a minimum of 80 inches of headroom for doors in existing buildings. No handrail exists along the stair down to this door from the exterior as required by NFPA 101-7.2.2.4.1. See Photo FP2.

Also, a second exterior opening on the south wall of the ell (exiting under the west side deck) has been walled in. This second exterior opening has 72 inches of clear headroom. The two exit access doors in the interior of the basement have 72 inches of headroom, insufficient for egress. Headroom in general for the basement ceilings is at least 84 inches, which is compliant with NFPA 101-7.1.5(1).

Ceilings and door frames on the first floor all exceed 80 inches of headroom, which meets NFPA 101-7.1.5. Headroom on the second floor is adequate for all areas except the door from the south end into the monumental stair area. This door from the second floor south side has a height of approximately 78 inches.

The servant stair has multiple egress deficiencies that still apply if the change in occupancy under consideration in this report is put into practice. Egress deficiencies for this stair include the following:

- The former handrail (removed during this visit) did not meet requirements for width and clearance from the wall.
- Tread depths (8 inches) and riser heights (8-3/4 inches) are not compliant with NFPA 101 T-7.2.2.2.1.(b) requirements for existing stairs.
- Headroom throughout the flights from the basement to the second floor is less than the 80 inches required by NFPA 101-7.1.5.3.
- The width of this stair connecting the basement to the first floor is 30 inches, which is less than NFPA 101-T-7.2.2.2.1 (b) requirement of 36 inches for existing stairs.

The servant stair is open on all levels between the basement and second floor. NFPA 101-13.3.1(3) and (5) and NFPA 101-8.6.5 call for the basement level of this servant stair to be separated from the adjacent basement floor by at least wood lath plaster walls in good condition

and a solid wooden door. A door would need to be provided at the basement level of this stair, which appears achievable.

The stairs from the back deck and front porch have compliant stair treads and handrails, and appear usable for egress. The capacity of these two stairs is sufficient for the occupant loads under consideration for this museum space, including the expected occupant loads of the deck and porch. The existing stair from the east side porch is 79 inches wide, which complies with NFPA 101-7.2.2.4.1.2(2a), such that this stair does not require an intermediate handrail.

The International Existing Building Code (IEBC) standard 1204.11 allows existing stairs and guards in historic buildings of less than 3,000 sf that are undergoing a change in occupancy to remain. Based on the IEBC Commentary, this standard allows open stairs and other deficiencies to exist given the small size of these buildings and relatively fast egress times. The Commentary does indicate that existing structural or dangerous conditions need to be fixed (such as the missing handrail for the monumental stair).

Applicable Codes

Based on the scope of work statement, the following codes apply to this project:

- International Building Code (IBC), 2018 edition
- International Fire Code (IFC), 2018 edition
- International Existing Building Code (IEBC), 2018 edition
- International Mechanical Code (IMC), 2018 edition
- International Plumbing Code (IPC), 2018 edition
- International Energy Conservation Code (IECC), 2018 edition
- National Fire Protection Association (NFPA) 101, Life Safety Code, 2018 edition
- NFPA 13, Installation of Sprinkler Systems, 2016 edition
- NFPA 20, Installation of Stationary Fire Pumps for Fire Protection, 2016 edition
- NFPA 22, Water Tanks for Private Fire Protection, 2018 edition
- NFPA 70, 2017, National Electrical Code[30]
- ABAAS, Architectural Barriers Act Accessibility Standard, current edition.

Fire Protection and Fire Alarm

There is no public or private water supply to this site, and no fire suppression is provided in the house. There is a small well that is noted in the 1995 HSR as not being able to directly support a fire suppression system. Based on the survey, this well would need significant improvements to be a re-filling water source for an on-site fire water storage tank.

A heat detection system is installed throughout all levels, and manual pull stations are provided at some of the exit doors. No fire alarm system notification appliances were noted. A digital annunciator panel is provided at door D13. The alarm system (Photo FP3) appears to be designed only to alert an off-site monitoring station of a fire in the house.

[30] NOTE: The International Electrical Code is no longer published; therefore NFPA 70 now applies.



Photo FP1: Servant stair.



Photo FP2: West side basement entrance door.



Photo FP3: Fire alarm control panel.

Use of the Worthington House as a Single-Family Residence

Not applicable in 2019.

Use of Worthington House as House Museum / Offices

Electrical Requirements

To use the building as an exhibit house, the following electrical upgrades will need to be performed:

- Upgrade the electrical service with adequate service capacity to support the HVAC, lighting, plumbing, and a fire pump that will be required for the building. New service is preferred to be a 208/120 volt, three-phase, four-wire system. New utility power needs the approval of the power company.
- Provide an emergency generator for backup power for the fire pump. A 100 kilowatt generator operating on diesel fuel should be adequate as the emergency backup power.
- Install new light-emitting diode (LED) lighting fixtures throughout the house. The new LED lighting fixtures should be compatible with the historic character of the building.
- Ensure that all egress lighting is backed up by an emergency power source. These lights are to remain in the *on* position at all times.

- Install new exterior LED lighting fixtures that are compatible with the historic character of the building; these fixtures should operate with a photocell or programmable timer switch.
- Assess the telecom service to determine if it will be adequate for the services that will be performed at the exhibit house. Bring a new data line into the building to provide high speed data service.
- Reconfigure the security system to accommodate the final architectural layout.

Mechanical Alternatives and Recommendations

To use the building as House Museum / Offices, a source of heating is required. Given that there are no nearby existing utilities that would provide a direct heat source, an electric heating system is recommended. A combination of electric resistance finned tube radiation and electric unit heaters would be the least intrusive to the historic structure and easiest to install. Finned tube radiation can be provided in areas that are expected to be frequently visited. Unit heaters can be placed in less frequented areas such as storage areas. Although not as efficient as hydronic heating systems, current electric resistance heating equipment is significantly more efficient than it was 20 years ago. Additionally, by implementing some measure of digital control, the heating system can be made to run more efficiently. It is important to note that the size and efficiency of any heating system to be installed is directly proportional to the house's thermal envelope. If the leakage in the house is minimized and insulation is added throughout, the heating system can be reduced in size and will be more efficient.

Although not as critical as having a heating system, it is strongly recommended that air conditioning be provided. Air conditioning will help mitigate humidity issues that could arise during the warmer months. While visitors to the house would not be subjected to discomfort from humidity given the relatively short time they would be expected to be in the house, maintaining some level of humidity control would help preserve interior finishes and any interior exhibit pieces. As with heating, an electric cooling system is the recommended option. Strategically placed window air conditioning units would be the least intrusive and easiest to install, although they will have an impact on the historical wood window frames and require a power source at each location. Electric "spot-cooler" type air conditioning units could also be used; however, a flexible heat reduction duct would be required to expel air from the building via a window or other means.

If the aesthetic of having window units is not ideal and the outdoor space can accommodate it, an electric direct expansion (DX) split system comprising indoor and outdoor units could be provided to cool the house. The indoor units could be placed in concealed areas such as beneath stairways and within fireplace cavities. The outdoor unit(s) could be concealed beneath any of the wooden porches surrounding the house or installed adjacent to the proposed emergency generator. If a split system is a feasible option, then upgrading the outdoor condensing units to heat pumps to provide cooling and heating would be recommended. One outdoor heat pump can serve several indoor units throughout the house; therefore, the amount of outdoor area required to accommodate the heat pumps would be minimal. The only intrusive installation aspect of the

system would be the small refrigerant piping system connecting the indoor and outdoor equipment and the cooling condensate piping associated with each of the indoor units.

A high velocity, small duct air-side system is an option for providing central air throughout Worthington House; however, it is not recommended over the heat pump system option described above. These systems provide relatively low noise and draft-free, even temperatures; however, these features would be top priorities for a residence and not House Museum / Office space, where occupancy is intermittent. Additionally, high velocity, small duct air-side systems would be more intrusive to Worthington House than the heat pump system. The following is a list of disadvantages associated with high velocity, small duct air-side system that do not make it an ideal option for Worthington House:

- Interior space is required to house air handling units. Each air handler is limited to 4 tons in capacity, which would mean multiple units to serve the house.
- It still requires an outdoor heat pump to feed cooling and heating coils at each air handler.
- Each room will require multiple air outlets (6 to 12 outlets per room). Each outlet would be fed by an individual 2-inch to 3-inch round duct that would have to be concealed within a wall cavity or ceiling space.

If NPS prefers to reduce operational costs and can accommodate higher first costs, a geothermal heat pump system could be a viable option. A geothermal system is made up of a ground heat exchanger, indoor heat pump unit, and an air delivery system. The ground heat exchanger would be composed of an underground piping system near the house that would circulate a mixture of water and refrigerant through the pipes to absorb or relinquish heat within the ground. The heat pump removes heat from the heat exchanger and pumps it into the house in the winter and removes heat from the house interior and transfers it into the heat exchanger in the summer. An added benefit is that the heat removed from the heat exchanger can also be used to heat water that can be used for space heating via radiators or to heat domestic water. This system would require land area to accommodate the underground heat exchanger, interior space to accommodate the heat pump, and, as with a conventional heat pump system, some level of intrusion into the historical structure to route piping should be expected. The use of a geothermal system would also require archaeological investigation.

Energy Conservation Alternatives and Recommendations

There is no heating system in the house. To remediate this, the thermal resistance of the opaque exterior envelope (walls, roof) can be improved by adding insulation and/or air barriers. Thermal performance of glazing can also be improved. A new heat pump split system consisting of outdoor condensing units and indoor evaporator units could be installed to provide an energy efficient heating system.

Alternatively, a new electric resistance finned tube radiation system could be installed around the interior perimeter of the house in spaces where permanent/temporary occupancy is anticipated. New electric resistance unit heaters and cabinet unit heaters can be installed in spaces anticipated to be primarily unoccupied, such as storage areas. A high velocity, small-duct airside system

paired with an outdoor heat pump or a new geothermal heat pump system could also be installed to provide heating. However, these alternatives, although effective, are not complementary to the historic character of Worthington House.

There is no air conditioning system in the house. Thermal resistance of the opaque exterior envelope (walls, roof) can be improved by adding insulation and/or air barriers. Thermal performance of glazing can also be improved. Additionally, a new DX or heat pump split system consisting of an outdoor condensing unit and indoor evaporator units could be installed.

Alternatively, new window air conditioning units can be installed. The existing architectural layout of the house separates each floor into essentially three spaces; therefore, approximately nine air conditioning units would be required to cool the entire house. The attic space can be provided with an exhaust fan to mechanically ventilate it.

We recommend installing a geothermal heat pump system. The existing natural ventilation system could be upgraded to a mechanical ventilation system. This could be done by introducing strategically placed new fans to help direct airflow throughout the house and maximize ventilation efficiency.

If no mechanical upgrade can be made, at a minimum the thermal performance of the building envelope can be improved to minimize air leakage and limit high humidity build-up during the summer. Existing window shutters, wooden louvers, and screen panels should be cleaned and repaired to maintain proper natural ventilation throughout the house.

Plumbing Alternatives and Recommendations

There is no domestic water distribution system in the house. A new well and pumping system can be provided to distribute cold water to plumbing and fire protection systems. The new fire protection system may require a dedicated fire water storage tank to be connected to the new well. Refer to the discussion on fire protection system recommendations for additional information. Alternatively, restrooms can be provided outside as part of a standalone structure to avoid disturbance to the historic structure.

There is no sewage disposal system in the house. A new septic system for sewage disposal would be needed if toilet rooms are installed either inside or outside the house. This would require disturbing the land outside the house to accommodate a new septic tank, drainfield, percolating soil, and piping. The total field area required for the entirety of the system will depend on the quantity of plumbing fixtures installed in the house and anticipated usage.

In the event that NPS would like to incorporate restroom facilities within the house, a new water distribution system and sewage disposal system would be required. Restrooms would require a sink and toilet. A water fountain could also be provided adjacent to the restrooms.

To be able to accommodate plumbing fixtures and fire protection system water requirements, a new well would have be drilled and new pump installed to properly distribute the water to plumbing and fire protection systems. The well depth would be based on the water level elevation at the site, the anticipated water usage of the house, and the size of the fire protection

system. Domestic hot water can be provided via electric water heater(s) that can be concealed within a small storage space or beneath a sink for point-of-use hot water needs.

A new septic system is the recommended system for sewage disposal. Land area outside the house would need to be modified to accommodate a new septic tank, drainfield, percolating soil, and piping to and from these components. The total field area required, however, would be smaller since the house would not contain a kitchen or a shower/bath. The new septic system would not be located closer than 100 feet to the location of the new well or any other existing well within the vicinity.

No plumbing would be required to use Worthington House as House Museum / Office space if restroom facilities are located externally.

Life Safety and Fire Protection Alternatives and Recommendations

To serve the public, a wheelchair lift would need to be provided to facilitate access for persons with mobility impairments. It is proposed that this lift provide access to the first floor and the basement. Access for people with mobility impairments is not proposed for the second floor, which would be limited to persons without impaired mobility. Providing compensating space in a different building should be considered.

The west side exit door in the basement and the exit door from the ell at the basement level have insufficient headroom clearance for egress requirements. Headroom for these doors should be increased by a combination of lowering the floor and raising the door frame so a minimum of 6 feet and 8 inches of headroom exists. No handrail exists for the exterior stair to the west side basement exit door. Handrails should be provided on both sides of the exterior stairs at this door.

The servant stair has several egress deficiencies. This stair should be roped off and marked "NOT AN EXIT." The main monumental stair does not have a handrail or guard. The former handrail for the main monumental stair should be re-installed. This handrail should be inspected to confirm that it complies with NFPA 101 and/or IEBC requirements and allowances for existing handrails.

No fixed fire protection system exists in this building. Provision should be made for:

- A fire water storage tank, sized at approximately 11,000 gallons, located in the yard.
- An electric fire pump to supply sprinkler systems on each level.
- A well pump to re-supply the fire water storage tank within 8 hours.
- One yard fire hydrant.
- Dry pipe sprinkler systems with one dry pipe valve in the basement serving all levels.

Life Safety and Fire Protection Requirements

- Provide fire alarm horn/strobe appliances on all occupied levels.
- Provide a pull station near the utility room exit door and a smoke detector at the main fire alarm control panel.
- Provide a new fire alarm control panel to control these systems.
- Provide one fire extinguisher on each level of the building.

5. FARMHOUSE COMPLIANCE WITH BUILDING CODES AND REGULATIONS

Life Safety Code Analysis

Based on the NFPA 101 definition of Level of Exit Discharge, the basement will be the level of exit discharge if a compliant exterior exit is provided from this level. NFPA 101 allows Assembly occupancy on the first floor and/or basement without a sprinkler system based on table T-12.1.6. NFPA 101 has no special requirements to provide sprinklers in Business occupancies based solely on the location of that occupancy.

Planned Occupancy

IEBC 1201.3 is written to apply specifically to a situation that could exist in the basement and/or on the first floor. This code section states that when a building in Group R-3 (residential single-family house) is used for Group A or B, such as museum tours, exhibits, or other public assembly activities, or for museums less than 3,000 sf (this is interpreted as 3,000 sf per floor level), the code official may determine that the occupancy is Group B where life safety conditions can be demonstrated in accordance with IEBC Section 1201.2. Section 1201.2 calls for writing a report similar to the HSR. Section 1201.3 calls for maintaining adequate means of egress by administrative measures such as maintaining doors in an open position, limiting occupant load on certain floors, or supervision by a person knowledgeable in emergency exiting procedures, which appear valid options for this building.

This update is written based on Business occupancy for the basement and first floor. The second floor is under consideration for use as an office, i.e., B Occupancy per IBC 304.

The attic is not planned to be occupied.

Means of Egress

Based on the change in occupancy to Assembly and/or Business, egress conditions were evaluated based on NFPA 101. Where applicable, the allowances in NFPA 101 for existing buildings were applied. Also, where applicable, the allowances in IEBC Chapter 12 were applied.

IEBC Section 1203.3 for historic buildings indicates that existing door openings that are smaller than current code-required dimensions can be approved by the Authority Having Jurisdiction, if in the Authority Having Jurisdiction's opinion, the door has sufficient width and height to allow a person to pass through the door, where the door(s) can accommodate the expected capacity, or where operational controls are implemented to limit the occupant loads in the space. The word "door opening" in this code section is interpreted to apply to both the height and width of a door opening.

The door into the south room from the top landing of the main stair on the second floor provides 78 inches of headroom, which does not comply with NFPA 101-7.1.5. It does appear likely, however, that this door could be accepted for egress based on IEBC Section 1203.3, discussed above for the basement doors, but this is the decision of NPS's Authority Having Jurisdiction.

IEBC 1204.11, as applicable to a change in occupancy for a historic building, allows existing stairs and guards to remain in their existing condition for a building of less than 3,000 sf, regardless of occupancy.

However, if the occupancy of a floor is Business, NFPA 101-38.2.4.6 allows a single means of egress from a sprinklered two-story tenant space or building where total travel distance to the outside does not exceed 100 feet.

Accessible means of egress is not required for an existing building in accordance with NFPA 101-7.5.4.1. It is a general requirement of the scope of work to provide accessibility to the first floor and basement. IEBC Section 305.4 states that an existing building that undergoes a change in occupancy needs to be provided with one accessible building entrance. It appears technically feasible to provide at least one ramp up to the first floor on the west side and to make the entrance into the existing basement level door an accessible ramp.

The scope of work calls for providing a fire protection system in this building. All of the analysis and recommendations in this report are based on the provision of a fire suppression system that is acceptable to the Authority Having Jurisdiction as providing at least equivalent protection to an NFPA 13-type sprinkler system.

Emergency lighting is required by NFPA 101-12.2.9.1 in the basement and on the first floor for Assembly occupancy, through all exit access areas, and outside the house to a distance considered safe. Emergency lighting would not be required for the limited occupant loads associated with Business occupancy on the second floor based on NFPA 101-38.2.9.1.

Exit signs are required for the basement and first floor by NFPA 101-12.2.10, and for the second floor by NFPA 101-38.2.10. IEBC Section 1205.12 makes an allowance for providing alternative exit sign locations where normal exit signs would damage the historic character of the building. It is recommended that IEBC 1205.12 be followed, and exit signs not be provided, considering the limited size of this building and the fairly obvious locations of exits directly outside.

The stairs from both exterior decks have compliant stair treads and handrails, and appear usable for egress. The capacity of these two deck stairs is sufficient for the Assembly occupant loads calculated for the first floor, including the occupant loads of both decks. The existing stairs from the east side deck is 79 inches wide, which complies with NFPA 101-7.2.2.4.1.2(2a), such that this stairway does not require an intermediate handrail.



Photo FP4: East side porch stair.

Second Floor Egress

Based on the scope of work document, the second floor is not to be considered for occupancy, but based on initial conversation with NPS, there is interest in possibly occupying this space for offices.

As noted previously, the servant stair is not compliant as an egress stair on any level. The main monumental stair is generally compliant as an existing stairway based on NFPA 101-T-7.2.2.2.1(b). As discussed in the 1995 HSR, this monumental stair will need a handrail on the interior side of the stair. Also, NFPA 101-38.2.4.6 allows a single means of egress from a story in a sprinklered building with total travel distance to the outside is less than 100 feet. Travel distance from the far corner of Room 104 to door D10 is less than 100 feet. The intent of this NFPA 101 section is to allow buildings like this residence to be converted into Business occupancies and use a single stairway; occupants do not need to reach grade or a public way, only to get out of the house. Based on this, it appears compliant, with respect to egress, to occupy all but the south end of the second floor as Business occupancy. If NPS desirers to occupy the south end of the second floor, a request should be made to NPS's Safety Department to accept the headroom of the doorway that has generally sufficient headroom for a person of average height to egress through, but is several inches short of code minimum headroom. This situation is in accordance with IEBC Section 1203.3.

Vertical Openings

NFPA 101-8.6.8 allows a vertical opening connecting only two adjacent stories to be open to one of the two stories. The monumental stair appears compliant with this requirement, as it is

enclosed on the second floor. This NFPA section does not specify that any fire rating is needed for this enclosure. Corridors in sprinklered Assembly and Business occupancies are not required to be fire rated, and this level of protection at the second floor enclosure would not need to be fire rated.

The servant stair is open on all levels between the basement and first floor. NFPA 101-13.3.1(3) and (5), and NFPA 101-8.6.5 require the basement level of this servant stair to be separated from the adjacent basement floor by at least wood lath plaster walls in good condition and a solid wooden door. A door would need to be provided at the basement level of this stair, which appears achievable.

IEBC 1204.11 allows existing stairs and guards in historic buildings of less than 3,000 sf that are undergoing a change in occupancy to remain. Based on the IEBC Commentary, this section allows open stairs and other deficiencies to exist with these stairs, given the small size of these buildings and relatively fast egress times. The Commentary does indicate that existing structural or dangerous conditions need to be fixed (such as the missing handrail for the monumental stair).

Energy Conservation

The house exterior envelope assembly has not changed. Exterior walls are primarily masonry and lack insulation. The approximate exterior wall R-value remains below 4.0. Similarly, no envelope improvements have been made to the roof. Its thermal resistance remains approximately R-4.

The thermal envelope requirements per the 2018 IECC are as follows:

- Residential Use: Exterior wall assembly requires a minimum thermal resistance of R-13. Ceiling assemblies require a minimum thermal resistance of R-38.
- Exhibit House Use: Exterior walls require a minimum thermal resistance of R-9.5 using continuous insulation in the wall assembly. The roof requires an assembly with minimum thermal resistance of R-38.

Security

The existing security system is configured to serve an unoccupied space. Refer to the Electrical Existing Conditions narrative for additional information on Existing Security measures.

Accessibility

Refer to the Means of Egress section under Life Safety Code Analysis addressing accessibility to the first and second floors. Refer to the Architectural section for additional existing accessibility analysis.

Building Code Compliance

This construction type complies with IBC Table 506.2 (Allowable Areas) for A-3 occupancy without a sprinkler system. This table allows 6,000 sf per floor of A-3 occupancy without a sprinkler system. Also, Table 504.4 allows A-3 occupancy on one story above grade.

IBC Section 903.2.1.3 calls for providing a sprinkler system on a floor of A-3 occupancy located on other than the level of exit discharge. The first floor of Worthington House is the level of exit discharge, and the stairs down from the porches are part of the exit discharge. Assuming a compliant exit at grade from the basement is provided, this level will also be a Level of Exit Discharge. Based on the above statements, this building could comply with IBC Chapter 9 requirements for fire protection systems without a sprinkler system on any level.

Based on a plan to occupy the basement and first floor as A-3 occupancy, this building would comply with the Heights and Areas tables, and with the Fire Protection Systems section of the 2018 IBC without a sprinkler system.

Fire Systems Analysis

IFC Section 507.1 calls for providing a water supply (hydrants, etc.) for buildings newly constructed or relocated into the jurisdiction. However, since Worthington House is an existing historic building, IFC 507.1 does not apply. Based on this, it is not planned to provide fire flow quantities for options that would provide hydrants. Hydrants, if provided, would be sized to supplement installed sprinkler protection only.

No standpipe or hose connections are required for this two-story building.

It is a scope of work requirement to provide a fire suppression system for this building. The 1995 HSR discusses some options for fire suppression. Since the completion of the 1995 HSR, there have been some advances in the fire protection field, and there are different options available than those discussed in the HSR to protect this building. Gaseous suppression systems (halon) were discussed in the 1995 HSR. However, halon systems are no longer typically used due to environmental concerns. Halon substitutes are available and commonly used, but are not considered an option for this building due to the need to provide a relatively airtight enclosure to contain these gases during a fire. Options that are considered viable for this building are presented here.

1. Water Mist Fire Suppression

Water mist fire suppression systems consist of a fixed amount of water stored in a tank that discharges through very small outlet nozzles to produce a very fine mist of water that extinguishes a fire. These systems use high-pressure (150 to 1,500 pounds per square inch) gas cylinders and/or electric or gas-driven pumps to produce high water pressures when the system is actuated. These systems discharge significantly less water overall than traditional sprinkler systems, and do not require relatively airtight sealing of the spaces to function.

Advantages of these systems are as follows:

- Water mist systems are package systems and include the water supply, gas charging cylinders, and pumps. The amount of water needed for these systems is significantly less than a sprinkler system, on the order of 1,500 gallons total or less. The water supply could be stored in the basement of the house, and pumps can be driven by the gas cylinders. It is not necessary to provide a large tank and fire pump outside the building

for these systems. The pump and cylinders are typically pre-mounted on a skid. No backup power generator is required to operate this system either.

- Water mist systems discharge significantly less water in a fire situation than ordinary sprinklers, and may cause less water damage due to discharges from a fire event. This is a significant advantage in a historic building with non-replaceable antique finishes and furnishings. The water from these types of systems is also self-contained, high purity water, not public water that can be dirty and damaging.
- Piping to water mist systems is generally smaller than for a typical sprinkler system; typical branch line sizes are 1/2 inch diameter copper or stainless steel, which can be more easily concealed or integrated into a building such as a house than traditional sprinkler system piping.
- These systems can operate without a separate detection system, which increases reliability, saves money, and reduces the amount of visible fire system hardware within the historic rooms. These systems can operate as wet, dry, or pre-action systems.
- These systems have been available for more than 20 years, and a published NFPA standard, 750, gives detailed design and installation requirements for the installation of these systems. There are also water mist systems specifically listed by Underwriter's Laboratories (UL) and approved by Factory Mutual (FM) for protection of non-storage/residential type occupancies such as this house.
- Dry or pre-action systems are available for protection of the attic and covered deck spaces, which will likely not be heated.

Disadvantages of water mist systems include the following:

- Water mist systems are not sprinkler systems; they are not designed in accordance with NFPA 13 or 13R. Although a sprinkler system is not required in this building to comply with IBC requirements for heights and areas or the anticipated occupancies, a number of NFPA 101 egress allowances for exit separation, travel distance to exits, and for the vertical openings as discussed above are based on a building with a sprinkler system. These sections of NFPA 101 specifically require providing a sprinkler system designed in accordance with NFPA 13 or 13R requirements. Based on this, a judgment by an Authority Having Jurisdiction would be needed to consider a water mist system to be equivalent to an NFPA 13 type sprinkler system.
- An additional judgment that this building is still "Residential Occupancy" as relating to fire suppression system requirements is also needed. In accord with NFPA 750, water mist systems in Residential occupancies are exempt from needing to provide a hose stream allowance as part of the water supply in addition to the operating nozzles. But if the occupancy is classified as another light hazard occupancy, a hose stream allowance is required by NFPA 750. Providing a limited hose stream as called for by NFPA 750 still significantly increases the amount of fire protection water that needs to be stored.
- The water tank and gas cylinder skid would take up a significant portion of area in one room, typically in the basement. Room 002 is the most likely location for these systems, and the occupancy of this room will need to be coordinated with other disciplines.

- The water tank may need to be assembled in the room depending on its final size.
- Mist systems are relatively expensive per floor area compared to a sprinkler system, and fewer suppliers are available, mostly foreign.
- The water mist discharge nozzles of these systems do need to be located at the ceiling within each room. No UL- or FM-listed sidewall nozzle was identified. Spacing of these nozzles ranges from 9 to 16 feet, mounted on the ceiling, so there will likely be exposed piping.
- It is not practical to provide exterior private hydrants for this type of self-contained system.
- These systems are somewhat exotic, and would likely require specialized maintenance.
- A reserve water supply is required by NFPA 750 if the primary supply cannot be replenished within 24 hours.

2. Fire-Cycle Sprinkler System

This is a pre-action type sprinkler system that operates when an installed detection system detects a fire by opening the solenoid of the pre-action control valve to let flow water to the fire. By use of specialized heat detectors that instruct the solenoid valve to close if/when the heat detectors cool down to a set temperature, these systems shut off if the fire is extinguished or sufficiently controlled.

Advantages of a fire-cycle sprinkler system:

- This is a UL-listed fire sprinkler system designed in accordance with NFPA 13 requirements, and should require no special judgment from the Authority Having Jurisdiction to accept this system. These systems have been listed by UL for more than 10 years.
- Locating the water supply outside will leave more space inside the basement for other mechanical equipment/exhibit space (as compared with a water mist system).
- The ability of this system to close the solenoid valve and stop the flow of water automatically can significantly reduce water damage in the event of an extinguished fire.
- As is the case with any pre-action type sprinkler system, in order for water to be discharged from the sprinklers, it takes both operation of the solenoid/pre-action valve and fusing/melting of a sprinkler to discharge water. Thus, in the event of a malfunctioning detection system, the piping could fill with water, but water should not discharge out of the sprinklers.
- Since an external water supply will be needed, an option exists to provide an external private hydrant for the water supply.
- Sidewall type sprinklers could be provided, which allows the piping to be covered with a crown molding in some rooms, if desired. Crown moldings were not typically noted in the rooms of this house, however, and this could change some of the historic character in some rooms.

Disadvantages of a fire-cycle sprinkler system include the following:

- A water supply tank needs to be provided, and this would most likely need to be external to the house. This tank would need to be sized at 7,500 to 11,000 gallons, depending on whether an external hydrant is desired. Internal dimensions of a cylindrical 11,000 gallon tank are approximately 12 feet in diameter and 13 feet deep. The tank will need a fill source, typically from the well pump. The existing well pump will need to be improved to provide this function. This tank will need to be heated, unless it is buried beneath the frost line (approximately 3 feet deep).
- A fire pump would be needed. An electric pump would be recommended, similar to what was provided for the Thomas House at this site. If power is not reliable as defined by NFPA 20 and NFPA 70, an emergency generator is also required to supply the pump. An electrical service line will be required to supply power to this pump from the main house electricity supply line, with a separate isolating switch. This pump will need to be located within an insulated, heated enclosure. If the pump is located on top of the tank, it would need to be a vertical pump to draw water from the tank.
- An underground water main to supply the sprinkler water and at least one yard hydrant is planned from the location of the tank to the house basement.
- Ceilings of the rooms in this house are mostly wood lath and plaster on solid wood joists. Routing sprinkler piping through the wood joists would be a significant constructability challenge if it is desired to avoid exposed piping. Exposed steel piping a minimum of 1 inch in diameter with fittings would be somewhat detrimental to the historic character of this house.
- A detection system would be needed throughout all spaces. It would not be practical to re-use the existing heat detectors for this system, Fire-cycle systems use specialized detectors. These would be exposed to view and affect the historic character of the house.
- These systems are more expensive than ordinary sprinkler systems due to the specialized components. There is only one vendor of these systems in the UL Design Guide.

3. Wet/Dry Pipe Sprinkler Systems

These systems consist of pipes filled with water under pressure. The water is provided by a fire pump that takes suction from a tank. Sprinklers that fuse/melt during a fire release water over the fire area to control the fire.

There are two sub-options within this option: an NFPA 13 system and an NFPA 13R system, as summarized below.

NFPA 13 system: This type of sprinkler system is used to protect buildings of Business and Assembly occupancy, which are the occupancies under study for this house. This type of sprinkler system requires a tank sized at 7,500 to 11,000 gallons, depending on whether external hydrants are provided.

Advantages of an NFPA 13 sprinkler system include:

- It is compliant for protection of the occupancies with no special judgment required from an Authority Having Jurisdiction.

- These systems are reliable, numerous local installers are available, and can likely be maintained by in-house personnel, or by the person who maintains the system in the Thomas House.
- These systems are generally less expensive per square foot to install than Options 1 and 2 of this report.
- Dry system options are available to protect the unheated spaces such as attics and porches/decks.

Disadvantages of an NFPA 13 sprinkler system include the following:

- The need to provide an external water supply exists. This is the same issue discussed under Option 2.
- A higher possibility of water damage exists than in Option 2, as at least part of the piping is normally filled with water under somewhat high pressure.
- The likely need to provide exposed piping in historic spaces exists, similar to that discussed under Option 2.

NFPA 13R system: This type of sprinkler system is used to protect Residential occupancies of four stories or less. This building was constructed as a residence, and the combustible loading will likely remain consistent with that occupancy, but this option requires judgment from an Authority Having Jurisdiction to allow this type of sprinkler system as an equivalency to an NFPA 13 sprinkler system.

This NFPA 13R system has all the same issues noted above for an NFPA 13 system, with the following advantages:

a) It is not necessary to provide sprinklers within an unoccupied attic space with non-fired ventilation systems only, or for the attached porches/decks.

b) The demand flow for a given fire that needs to be calculated and provided as a water supply for an NFPA 13R system is smaller than that of an NFPA 13 sprinkler system.

c) Based on the above, the water supply volumes to support an NFPA 13R type sprinkler system could be reduced to approximately 2,000 to 3,000 gallons, assuming no hydrant is planned to be provided. A smaller fire pump would still be needed, and possibly a generator.

Fire Detection and Alarm Systems

As noted above, a heat detection system and some pull stations are provided in the building. If any of the three types of fire suppression systems discussed above is provided, these systems function as a heat detection system throughout all areas where they are installed.

Fire detection and alarm systems are not required for any of the proposed occupancies by the IBC or NFPA 101. Consequently, the existing heat detection system could be removed or kept in the attic if an NFPA 13R sprinkler system is accepted.

NFPA 101-12.3.4.4 calls for a carbon monoxide detection and alarm system where Assembly spaces are located in spaces served directly by fuel-fired HVAC systems. HVAC systems are under study for this building. It is recommended this protection be provided for any rooms served directly by the planned HVAC system if it is fuel-fired.

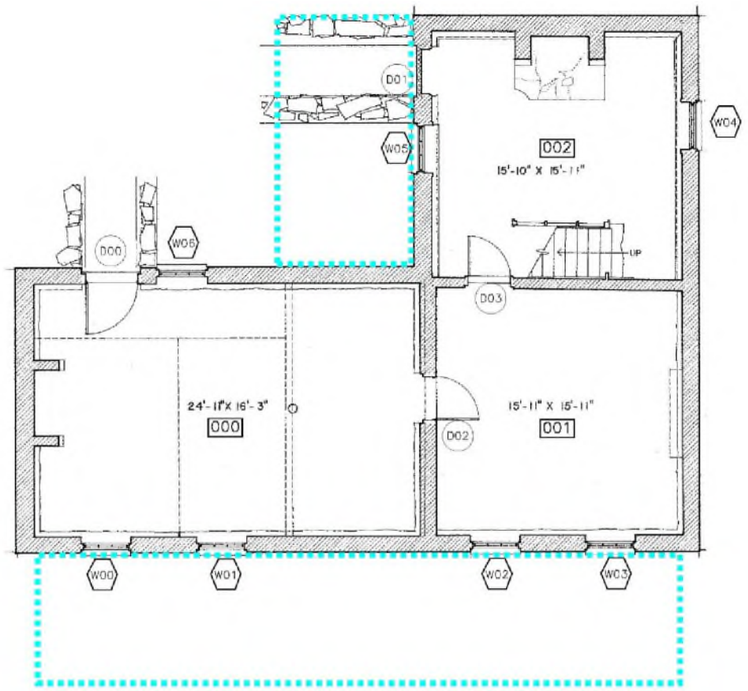
Portable Fire Extinguishers

Portable fire extinguishers are required for Assembly and Business occupancies by IBC 906.1 and IFC 906.1, and no IEBC allowance to delete these was noted. Travel distance to an extinguisher is limited to 75 feet.

6. FORCES AFFECTING THE PRESERVATION OF THE FARMHOUSE AND SITE

Reference 1995 HSR for analysis.

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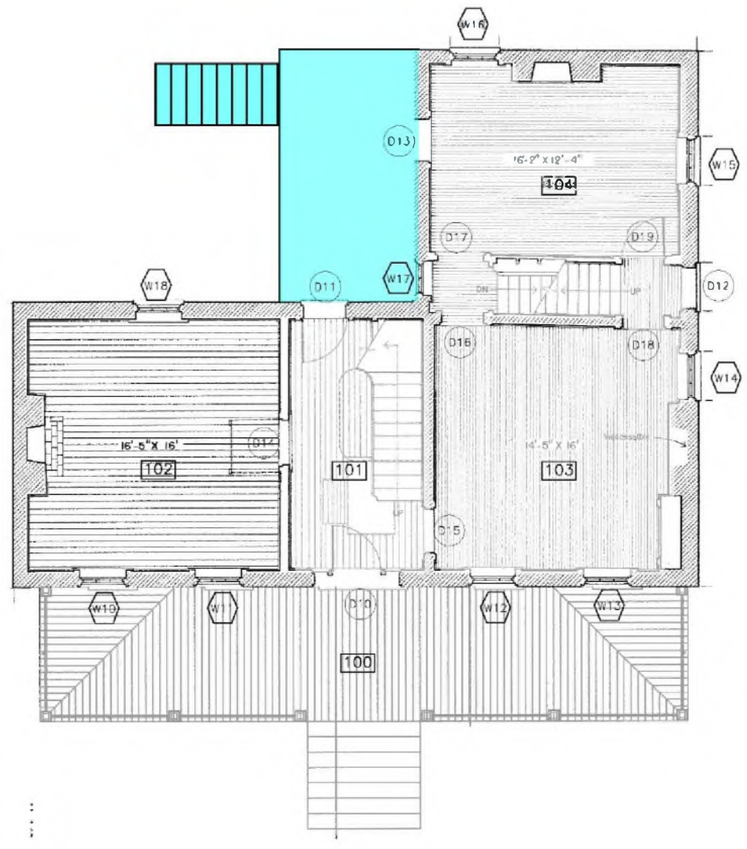
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N.T.S.

BASEMENT FLOOR PLAN

Existing Plan

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WORTHINGTON HOUSE - FREDERICK, MD

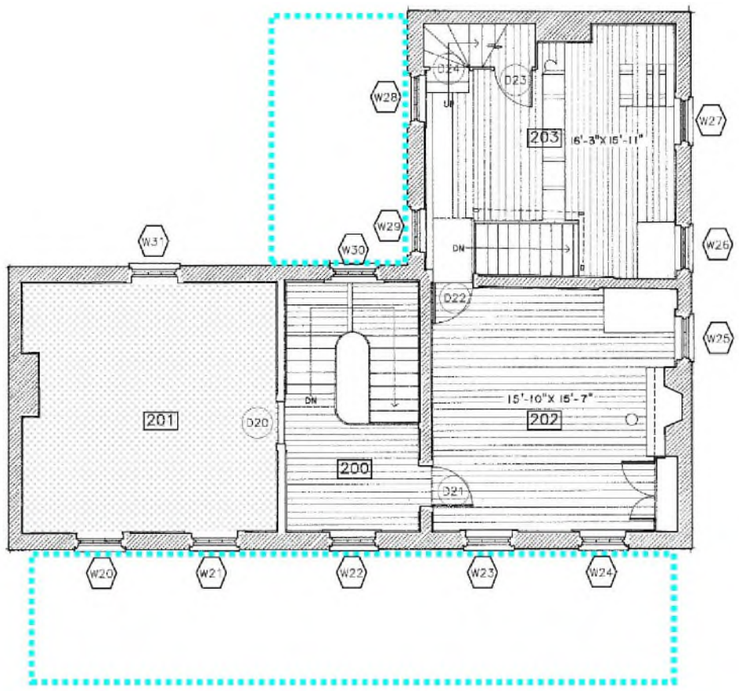
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FIRST FLOOR PLAN

Existing Plan

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WORTHINGTON HOUSE - FREDERICK, MD

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BASEMENT FLOOR PLAN

Existing Plan

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PART 2. TREATMENT AND USE

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PART 2. TREATMENT AND USE

A. JUSTIFICATION FOR RECOMMENDATIONS

Representatives from NPS-NCR, Monocacy National Battlefield, and the design team met on December 11, 2018, for a charrette to discuss design options for Worthington House. Based on the findings of this meeting, the stakeholders identified seven design drivers for the future use of Worthington House. These are listed in order of priority:

1. Water Infiltration Mitigation
2. Stabilization
3. House Museum
4. Layered History
5. 20-Person Occupancy
6. Interpretation
7. Rehabilitation for Office Use

The highest priorities for the building program are to stabilize the building against continued water infiltration and to prevent future damage to historic fabric. The most economical treatment of the historic building is stabilization as opposed to restoration. NPS-NCR strongly supports a museum use for the building and encourages treatment that is respectful of the historic material while emphasizing the building's layered history. Therefore, retaining building elements that date outside of the period of significance is acceptable for interpretation purposes. The museum's focus is to reflect the layered history, including 19th century farming and family life, the Civil War, and migrant tenant farming.

It is best to concentrate public access for the museum on the first floor and basement of Worthington House. The expectation is that tours will be limited. The design concept should account for an approximately 20-person occupancy and accessible spaces that comply with ABAAS. In particular, NPS-NCR desires an accessible lift on the rear of the building to provide public access to the basement and first floor. A desire to maintain the historic appearance of Worthington House requires situating the lift within the footprint of the rear porch. The location of the lift cannot prevent construction of a rear access stair from the porch to grade.

Secondary to water infiltration mitigation, stabilization, and museum adaptation, NPS-NCR desires rehabilitation of the second floor for office and conference room use. Conversion of Rooms 201 and 202 into offices requires adding insulation within only 4 inches of furring and providing ambient temperatures close to current office standards. The design concept shows treatment options for retrofitting the HVAC to provide comfort to the office occupants as well as to improve stabilization of the historic materials. While the new system must narrow the existing wide swings in temperature and humidity to support the building finishes, NPS-NCR does not require the system to meet current American Alliance of Museums Standards because the building will not be fully insulated. The new building program requires a new restroom in Room 203 for staff and an optional ABAAS-compliant restroom in Room 104 to accommodate visitors. For comparison purposes, the design concept also includes an option that shows the treatment of the building if the offices and restrooms were omitted from the program.

Continued water infiltration into the building interior suggests the existing roof gutter system is inadequate. To maintain the building's historic appearance, a new gutter and downspout design must meet drainage calculations without adding additional downspouts. Another parameter for consideration in regard to water management is the reconstruction of historic porches. The reconstruction of the historic porches serves two distinct purposes: (1) it returns Worthington House to a closer approximation of its historic appearance, and (2) it potentially mitigates water infiltration into the building envelope. The porches at Worthington House have been poorly documented throughout the building's history, but evidence of water infiltration in their proximity suggests they could serve an important role in diverting water away from the building. Sufficient physical evidence exists to inform the appropriate reconstruction of a simple, contextual porch on the west side of the building. Construction of a small side porch on the north elevation is inappropriate given the lack of existing physical evidence for the original porch. In the future, further investigation into a vernacular precedent may provide enough information to reconstruct this north porch.

Secretary of the Interior's Standards for the Treatment of Historic Properties

The Secretary of the Interior currently recognizes four primary treatment alternatives for historic properties: preservation, rehabilitation, restoration, and reconstruction. These are defined and discussed in Title 36 of the Code of Federal Regulations (CFR) Part 68 and the NPS document, The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring &Reconstructing Historic Buildings, with illustrated guidelines for the treatment of historic properties, updated in 2017. The following definitions are from 36 CFR § 68.2.

Preservation is the act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses on the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

Rehabilitation is the act or process of making a compatible use for a property possible through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.

Restoration is the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by removing features from other periods in its history and reconstructing missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

Reconstruction is the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

Based on the interpretive, functional, and programmatic needs established from research, site survey, and a design charrette, rehabilitation is recommended as the most appropriate treatment for Worthington House. Under the umbrella of rehabilitation, a preservation mindset is preferred over restoration. Significant materials and finishes will therefore be stabilized and conserved in their existing condition. More restorative practices, such as reconstruction of stairs or repainting of wood trim, will only take place when necessary to accommodate the proposed building use or prevent further deterioration of historic materials. This approach allows the site's historic character and resources to be protected while carefully addressing limited enhancement of interpretive opportunities and adaptation of the second floor for office space.

Other treatment alternatives were deemed inappropriate for the following reasons:

- Preservation is overly restrictive because it does not allow enhanced interpretation and adaptive reuse to meet NPS goals for the site.
- Strict restoration is inappropriate as it would destroy the layered history that NPS values as an interpretable piece of the Worthington House narrative.
- Finally, reconstruction is never a viable option for wholesale treatment of an extant structure. Reconstruction of some elements, such as the west porch, are desirable at Worthington House only when they enhance interpretation of the site or are beneficial to the preservation of the overall site. Reconstruction is only recommended where sufficient physical or documentation evidence exists to make a reasonable conjecture about the appearance and configuration of a missing historic element.

Secretary of the Interior's Standards for Rehabilitation

The following section summarizes the standards for rehabilitation espoused by the Secretary of the Interior for historic properties. The 10 basic principles that comprise the standards are intended to help preserve the distinctive character of a site while allowing for reasonable change to meet new needs. The standards (36 CFR Part 67) apply to historic properties of all periods, locations, sizes, conditions, and uses. These standards create a baseline of guidance to which intended changes to the historic property must be compared. These standards are neither technical nor prescriptive, but promote responsible preservation practices:

1. A property will be used as it was historically, or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.
2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.

1. OPTION I

2. OPTION II

3. OPTION III

4. OPTION IV

5. BASE DESIGN CONCEPT: STABILIZATION / HOUSE MUSEUM / OFFICES

Exterior Base Concept Parameters

Architecture

Previous repair campaigns have stabilized the exterior building envelope. These have included installing a new roof, providing new window screens to prevent pests, repointing exterior masonry, and repainting exterior masonry and wood trim. The condition assessment indicates that these mitigation efforts—especially installation of the new roof—have significantly slowed water infiltration and the resulting deterioration of interior finishes. However, water is still penetrating the building envelope, and no steps have been taken to correct past water damage to historic materials. The areas most affected on the interior align with the roof intersection between the main building and the ell and with the flashing of the east porch roof. Gutter calculations indicate undersized gutters are a contributing water source and a new re-sized system is required.

Water infiltration appears to be most severe on elevations where historic porches have been lost or removed. Reconstructing porches may divert water away from the building; however, it is not advisable to reconstruct porches where there is little evidence of their original design. The north porch should not be reconstructed unless vernacular precedent can be established. The east porch will require repainting and repairing open joints in the woodwork. Continued water infiltration into the basement in Room 000 suggests that exterior waterproofing should be considered below grade at the foundation of the inside corner of the ell intersection.

An exterior wheelchair lift is required to provide full accessibility to interpretative space, which will occupy the basement and first floor. To maintain the historic appearance of the house from the most prominent viewsheds, a two-sided lift should be installed in the west yard within the footprint of the west porch. The lift will have three stops, one at the basement, one at grade, and one at the first floor, with a path leading to the lift from the yard. The accessible tour will begin on the first floor and follow the same tour route as the other visitors, ending in the basement.

Replication and installation of the double-hung sash windows will return the building to its original appearance.

Plumbing

A new domestic water source and water distribution system is necessary to accommodate Worthington House water requirements. It will be necessary to drill a new well to accommodate toilet room, fire protection, and humidifier water requirements. Well depth will be dependent on anticipated usage as well as site water level and make-up. It is anticipated that that the new well depth will be approximately 300 to 500 feet deep. A new electric pump should be provided to properly distribute water to humidifiers, plumbing fixtures, and fire protection systems. The new pump must be capable of distributing water at a rate of approximately 30 gallons per minute (gpm). The domestic water distribution system must include a pressure tank to deliver a minimum of 40 pounds per square inch gauge of water pressure to the aforementioned systems.

A new septic system should be installed for sewage disposal. The new system must include a septic tank, drainfield, percolating soil, and piping to and from system components. The septic tank size should be approximately 750 gallons. The septic system should be located a minimum of 10 feet away from Worthington House and at least 100 feet away from the new well.

Electrical

The electrical service should be upgraded with adequate service capacity to support the HVAC, lighting, plumbing systems, fire pump, and accessibility lift that will be required for the building. It is preferred to have new 208/120 volt service for the building. It will be necessary to provide power to the proposed new lift. Install a new data line to the building to provide high speed data service. The security system should be reconfigured to accommodate the final architectural layout. Exterior LED lighting fixtures will need to be provided to meet the code requirements for means of egress and should be compatible with the historic character of the building. Exterior lighting must operate on a photocell or timer switch.

An emergency generator will be required to provide backup power for the fire pump and life safety systems. The new generator should be approximately 100 kilowatts in capacity and operate on diesel fuel with a built-in belly tank. The generator should be located outside with weather-proof housing. A new automatic transfer switch is required with the new generator to transfer power to emergency when normal power is not available. This equipment should be located away from the building to avoid obstructing the views of and from the building.

Life Safety

One goal of this project is to provide accessible means of egress compliant with Life Safety Code requirements for the planned occupancy while maintaining the historical fabric of the building. Another goal of this project is to provide a fire protection system for the building and a fire alarm system for the new occupancy.

Construction of a west porch with stairs exiting from the first-floor kitchen is necessary to improve egress conditions. The stairs require 7-inch risers and 11-inch treads, handrails, guards, and typical stair equipment.

Interior Base Concept Parameters

Architecture

Interpretation of the house as a museum will be limited to the basement and first floor, reserving the second floor for staff offices. The tour should begin at the east porch to experience the house first from its formal entry. The tour path can move through the first-floor rooms to the servant stair in the ell toward the basement. All previous tenant partitions can be removed in their entirety to allow better circulation. The basement should serve as the primary exhibit space that tells the vital stories of Worthington House. The focus of the interpretive space is window W00 from which the Worthington Family witnessed the Battle of Monocacy in 1864. The tour path can exit the basement through doorway D00 to the west of the house.

In contrast to the public spaces in the basement and first floor, the upper floor Rooms 201 and 202 can be converted to office space and a conference room, respectively. The conference room is best situated in Room 202, as it has two uninterrupted walls to the south and west for projection and document pin-ups. Room 201 can accommodate at least three desks and will be easily accessible from the main stair hall even when the conference room is in use. The north side of Room 203 can be converted to a staff restroom. With the restroom in 203 as opposed to 202, it can be accessed via the servant stair when the conference room is in use. The south side of Room 203 contains circulation spaces and pencil drawings on the wall from 1953, when Jenkins Brothers, Inc., used Worthington House for migrant farm worker housing. While the pencil drawings are not original to the house, they do help to interpret the evolution of the building use over time. It is therefore not suitable for conversion. Walls in all three rooms can be furred out and insulated to allow climate conditioning for current comfort standards. To insulate the new offices, blown insulation can be installed within the attic above occupied space, and padding and carpet can insulate the floor.

HVAC should be installed to address occupant comfort in the office space as well as conservation of historic materials and finishes throughout the interior. HVAC equipment must be strategically located and carefully installed to have the smallest impact on interior finishes. Museum employees must closely monitor and adjust the system to maintain temperatures between 60 and 75 degrees Fahrenheit and relative humidity between 35% and 65%. Since the building has never had anything but passive cooling with fireplaces and stoves for heating, any mechanical climate regulation must occur gradually to avoid shocking existing materials, which could result in additional material loss.

Stabilization is the highest priority for all interior finishes. All interior brick and stonework require repointing mortar and replacing missing or failed bricks to stabilize the walls. The plaster in Room 000; the decorative painted plaster in Rooms 101, 102, and 200; and the plaster in the unmodified section of Room 203 require conservation to retain as much historic plaster as possible. These areas are critically important to the interpretation of the building and are more meaningful in a conserved state rather than fully restored, as they will express the age, fragility, and craftsmanship of the materials. Wet plaster repairs in the areas of decorative paint are not recommended because the risk to the paint system is too great. Instead, the areas of missing plaster should be infilled with gypsum board and painted the wall field color to blend. All other

plaster on the first floor and plaster ceilings on the second floor should be reattached, consolidated, and repaired to a unified appearance. Interior woodwork must also be repaired or replaced in kind. In particular, the main stair and servant stair require significant stabilization and repairs, including replication of missing elements. Once repaired, all woodwork must be cleaned and either painted or treated with a protective wax finish.

The 1995 HSR included a partial paint analysis, but a more in-depth analysis is required to answer questions about the historic paint palette and binder composition in the interpreted spaces. It is unknown if the visible paint in the rooms without decorative paint is original or not. All paint in these spaces should remain, but treatment including clear encapsulation (if lead-based) or repainting can be considered depending on the results of additional paint analysis. The treatment of the decorative paint depends on whether it is water-soluble. FTIR analysis of samples taken from Rooms 101 and 102 can determine the organic binder composition. Depending on the results of the analysis, more in-depth testing may be required to determine the best method of consolidation.

Pencil drawings in the stair hall should be documented and then either removed or in-painted. These are minor drawings and detract from the historic ornate decorative painting in the stair hall. Once the pencil drawings are consolidated with the decorative paint, they cannot be removed. This should be considered before any consolidation of the decorative paint occurs in Room 102. The pencil drawings in Room 203 do not require consolidation, as the wall is fairly stable. However, should the second-floor walls be encapsulated, careful testing is required to determine if the pencil drawings can be faced with another reversible coating prior to encapsulation to maintain reversibility.

Mechanical

Any mechanical upgrades should maintain ambient conditions that ensure the preservation of historic materials within Worthington House. In addition, ambient control will allow building occupants, including work staff and visitors, to feel more comfortable throughout their stay. It is worth noting that without substantial improvements to the building envelope in the form of additional insulation and/or an air barrier, it will be difficult to maintain ideal temperature and humidity levels. To compensate for the deficiencies of the current building envelope, the HVAC equipment would have to be substantially larger than it would otherwise have to be. Additionally, higher energy consumption should be expected. The concept described below provides heating, cooling, and humidity control to all museum spaces and heating and cooling to office spaces in Worthington House. Selected systems are least intrusive to the building structure. The concept proposes mini split heat pump systems that provide individual heating and cooling control for the space(s) where they are located. These systems can dehumidify during the summer fairly effectively, but they cannot maintain minimum humidity levels during the winter months. As such, stand-alone humidifiers should be provided to humidify Worthington House in the winter. With these systems installed, the following target indoor temperature conditions would be met:

- Summer space cooling set-point: 75 degrees Fahrenheit.

- Maximum temperature swing during summer months: 10 degrees Fahrenheit (70 to 80 degrees Fahrenheit).
- Winter space heating set-point: 65 degrees Fahrenheit.
- Maximum temperature swing during winter months: 10 degrees (60 to 70 degrees Fahrenheit).
- Minimum space relative humidity: 30% (winter).
- Maximum relative humidity swing during summer months: 10% (50 to 60% relative humidity).
- Maximum space relative humidity: 60% (summer).
- Maximum relative humidity swing during winter months: 10% (30 to 40% relative humidity).

Refrigerant piping should be routed to and from each indoor unit to the outdoor condensing units (heat pumps). Outdoor heat pump units should have integrated inverter variable-speed compressor technology for optimal energy efficiency. They should feature quiet operation, automatic defrosting, and quick warming functions for better performance in low ambient conditions. These units can be concealed beneath one of the existing porches as long as there is enough clearance for adequate air circulation. Each condensing unit can serve up to five indoor units; however, each is limited in capacity to 4 tons of cooling and/or 48 thousand BTUs per hour (MBH) of heating. With the approximate total cooling requirement of 18 tons, approximately five condensing units will be needed to serve the entire house. Each condensing unit would be approximately 24 inches high x 44 inches wide x 20 inches deep. Two of these units can be stacked to preserve outdoor footprint space. Cooling condensate from each indoor unit would be routed outdoors. Piping can be concealed within existing cavities such as existing fireplace shafts or can be run tight against corners to minimize their appearance.

Electrical

New lighting fixtures should be provided throughout the house. All lighting fixtures should be energy efficient LED type fixtures, and fixtures should be compatible with the historic character of the building. All egress lighting should be backed up by an emergency power source for 90 minutes. All lighting and conduits should be surface mounted in a discreet manner so as not to detract from the historic nature of the building and decorative paint. General purpose receptacles should be provided in the basement, first floor, and second-floor office area. Receptacles within 6 feet of any sink must be ground fault circuit interrupter type.

New exit signage should be provided as permitted by the IEBC for this historic house. Signs must be illuminated exit signs per NFPA 101. These self-illuminated signs use tubes filled with tritium gas, a natural isotope of hydrogen.

Fire Protection

A dry pipe sprinkler system should be installed throughout each level of the building, including over decks and in the attic. One main dry pipe valve located in the proposed basement utility room should control these systems. A fire water tank located in the yard west of the house and an

electric fire pump should supply these systems. One portable fire extinguisher is proposed on each level of the building.

A new fire alarm control panel will replace the existing panel. This new panel will monitor the fire protection system and notify someone of a fire event. Horns/strobes are proposed throughout all occupied levels.

The servant stair must be eliminated as an egress element above the first floor. This can be achieved by placing barriers at the entrance to this stair on the first and second levels. In addition, the balustrade and handrail formerly provided for the main monumental stair must be rebuilt. A wheelchair lift connecting the basement and first floor at the south ell entrance is necessary to provide accessible egress.

TREATMENT

The following section defines the treatment of the exterior and each floor based on the parameters established in the above section. These treatments are also illustrated on annotated floor plans and organized around the primary design drivers for the concept. Annotated floorplans are included at the end of this section.

Base Treatment: Exterior

Architecture

A new gutter and downspout system are required to mitigate water infiltration associated with overflow during heavy rain. The system must have, at a minimum, 7-inch half-round gutters to retain only four downspouts in their current locations. The downspouts should also be increased to 4 inches in diameter to accommodate the larger gutter.

Reconstruction of the west porch will also improve water drainage at the west elevation south of the ell. The design of the porch will maintain the size and shape of the original porch in a simplified style to avoid potentially inaccurate embellishments. For the north porch, a portico should only be installed if vernacular precedent can be established. The east porch and piers can be maintained by repairing open joints and repainting.

To provide ABAAS access to the house museum, a two-door wheelchair lift should be installed within the footprint of the reconstructed west porch. In order to accommodate wheelchairs that have to turn into the basement entry at D01, it will be necessary to document, deconstruct, and salvage the east retaining wall and excavate to the door grade. To allow room for the lift, D11 should be fixed in place, so there will not be an exit at this location onto the porch. The lift should have three stops, one at the basement, one at grade, and one on the first floor, with a path leading to the lift from the yard.

Replicated double-hung sash windows should be installed to return the building to its original appearance. Rotten sills should be repaired. Repointing is required under each window sill to prevent water infiltration.

Base Treatment: Basement

Architecture

The basement will comply with ABAAS by installing level access throughout the interpretation space. Concrete slabs should be placed in all of the rooms to provide an even surface for exploring the exhibits and the rooms. Interpretation within the museum focuses on themes surrounding the layered history of the house, including vernacular architecture and ways of life, enslaved peoples, the 1864 Battle of Monocacy, the Worthington family legacy, and migrant farm laborers. The main focus of the interpretive space is the view of the battlefield from the southeast window as described in Glenn Worthington's personal account. The basement finishes will be stabilized in their current condition, meaning brick, stone, and partial plaster ceilings remain. In the ell, the servant stair should be rebuilt to make the stair structurally sound using as much of the original materials as possible. Supplemental 2x wood joists between existing joints should reinforce the ceilings. Where existing plaster remains in the south room, the joists should be reinforced from above after salvaging the historic first-floor flooring for reinstallation.

Mechanical

A new heat pump split system consisting of dedicated, compact, wall-mounted indoor units should provide heating and cooling in each room. The individual units will share one outdoor heat pump. Two wall-mounted electric humidifiers should humidify the space. The basement level will require approximately 5 tons of cooling and 60 MBH of heating. Humidification at a rate of approximately 10 pounds per hour (lbs./hr.) will be required to maintain a minimum 30% relative humidity in the space.

Indoor units should be ductless with built-in filters and should be located above room doors. Indoor units should be approximately 14 inches high x 42 inches wide x 10 inches deep. A wall-mounted thermostat should be provided. A wall-mounted humidistat should also be installed. Wall-mounted humidifiers should be approximately 24 inches high x 12 inches wide x 8 inches deep.

Plumbing

Domestic cold water should be piped to each humidifier serving the basement. New domestic water supply piping to each humidifier should include a shut-off valve. A new drain connection should be provided at each humidifier and be sloped to the exterior away from Worthington House at a location not frequented by site visitors or personnel. Domestic cold water and drain piping should exit the house near the interior corner of the ell to the southwest of the house.

Base Treatment: First Floor

Architecture

The first floor will be interpreted as part of the house museum. The wheelchair lift at the south porch will provide accessibility access through door D13, while other visitors will begin the tour through the front door, D10. Door D11 should be fixed in place to prevent egress to the porch and the lift location. Once returned to functionality, the center hall will exhibit the different levels of preservation: from conservation of the decorative painting to reconstruction of the

historic stair. The decorative painting in Rooms 101/200 and 102 should be conserved to stabilize the surfaces without damaging the paint composition. The pencil drawings in Room 102 should also be conserved and interpreted as part of the layered history throughout the house. All remaining plaster on the first floor should be reattached and/or infilled with compatible materials to correct years of water damage. If the original paint is visible in Rooms 104 and 103 as determined by paint analysis, the walls should be encapsulated with a clear matte finish to contain lead while preserving the original design intent. If paint analysis reveals an original paint scheme that predates the existing finish, the walls should be encapsulated and repainted to reflect the original colors. To keep the paint history intact, no tightly adhered paint should be removed from the walls. The wood trim should be repaired, replaced, and painted to protect the wood from further deterioration. The wood floors should be unified by removing second generation flooring to expose the original flooring. The wood floors should be repaired, cleaned, and waxed.

Mechanical

A new heat pump split system consisting of dedicated, compact, wall-mounted indoor units should provide heating and cooling in each room. The individual units will share one outdoor heat pump. Two wall-mounted electric humidifiers should humidify the space. The first floor will require approximately 6 tons of cooling and 70 MBH of heating. Humidification at a rate of approximately 10 lbs./hr. will be required to maintain a minimum 30% relative humidity in the space.

Indoor units should be ductless with built-in filters and should be located above room doors. Indoor units should be approximately 14 inches high x 42 inches wide x 10 inches deep. A wall-mounted thermostat and a wall-mounted humidistat should be installed. Wall-mounted humidifiers should be approximately 24 inches high x 12 inches wide x 8 inches deep.

Plumbing

Domestic cold water should be piped to each humidifier serving the first floor. New domestic water supply piping to each humidifier should include a shut-off valve. A new drain connection should be provided at each humidifier and be sloped to the exterior away from Worthington House at a location not frequented by site visitors or personnel. Domestic cold water and drain piping should be routed downward near the interior corner of the ell (southwest of house) to the basement level, where the piping would exit the house.

Base Treatment: Second Floor

Architecture

The second floor will not be open to the public and will be used for office space only. The floors in all the rooms should be salvaged for reinstallation so that the plaster ceilings below can be stabilized and the joists reinforced with 2x supplemental joists. Rooms 201 and 202 will function as an office and conference room, respectively. A staff toilet room can be constructed in the north half of Room 203. The walls in these occupied spaces should be furred out to provide a cavity for R-19 insulation and conduit. The wood furring studs should be turned on their sides and faced with 5/8-inch gypsum board to achieve furring that is less than 4 inches thick. In addition, 1½-inch rigid insulation should be installed within the wall cavity. The attic space

above the insulated spaces should also be insulated to an R-30 level, and the floors will receive padding and carpeting for additional insulation. Padding should be attached with tacks instead of adhesive so that the treatment can be more easily reversed. These rooms should be conditioned separately from the rest of the house to provide the most comfort to the staff. The plaster and base trim behind the furred walls should not be stabilized prior to the new construction, but the window trim remains exposed in the new rooms.

In the staff restroom, the toilet and sink can be located along the partition wall so that plumbing runs through a modern wall rather than historic. Plumbing should run through the floor of the toilet room and the ceiling of Room 104. It will be exposed along the ceiling of Room 104 to the shaft of the fireplace, where it will exit the building. Penetrations in the plaster ceiling should be kept as minimal as possible.

The exposed plaster in the ell should be stabilized and reattached, but the missing areas of plaster should not be repaired. The exposed wood trim in the ell should be repaired and painted. All of the salvaged wood floors should be repaired, reinstalled, cleaned, and waxed.

Mechanical

A new heat pump split system consisting of dedicated, compact, wall-mounted indoor units should provide heating and cooling in each room. The second floor will require approximately 6 tons of cooling and 70 MBH of heating inside the offices and approximately 1 ton of cooling and 10 MBH of heating outside of the offices. Outside of the offices, humidification should be provided by one wall-mounted electric humidifier. The second floor will require humidification at a rate of approximately 3 lbs./hr. to maintain a minimum 30% relative humidity in the space.

Indoor units should be ductless with built-in filters and should be located above room doors. Indoor units should be approximately 14 inches high x 42 inches wide x 10 inches deep. A wall-mounted thermostat and wall-mounted humidistat should be installed. Wall-mounted humidifiers should be approximately 24 inches high x 12 inches wide x 8 inches deep.

For the toilet room, an architectural wall-mounted electric unit heater should be installed to heat the space during winter. The electric heater should have a built-in thermostat and disconnect switch, fan delay switch, and rugged steel grille. The recommended room heating temperature set-point is 68 degrees Fahrenheit. The electric heater should have an integral whisper quiet axial fan.

The toilet room will also require a ceiling fan. The ceiling exhaust fan should have a corrosion-resistant galvanized steel housing, sound-absorbing insulation, and built-in backdraft damper at the outlet duct collar. A time delay switch and interlock fan operation should be integrated with the light switch. The associated exhaust duct should be routed to the exterior through the roof directly above. Note that no air conditioning would be provided in this space, as it is a transitory space. During warmer months, the toilet room should be ventilated via the new exhaust fan, and make-up air to the room should be drawn in through the door undercut.

Plumbing

A new, compact, electric point-of-use water heater should be wall-mounted beneath the sink in the new toilet room. The unit should include an over-temperature protector, automatic thermostat to keep water at the desired temperature, and a temperature/pressure relief valve. New domestic water piping should lead from the new well/electric pump. New sanitary waste and vent piping should be installed and routed to the new septic system. New vertical domestic cold water and sanitary piping serving the toilet room can be concealed within the east fireplace shaft cavity.

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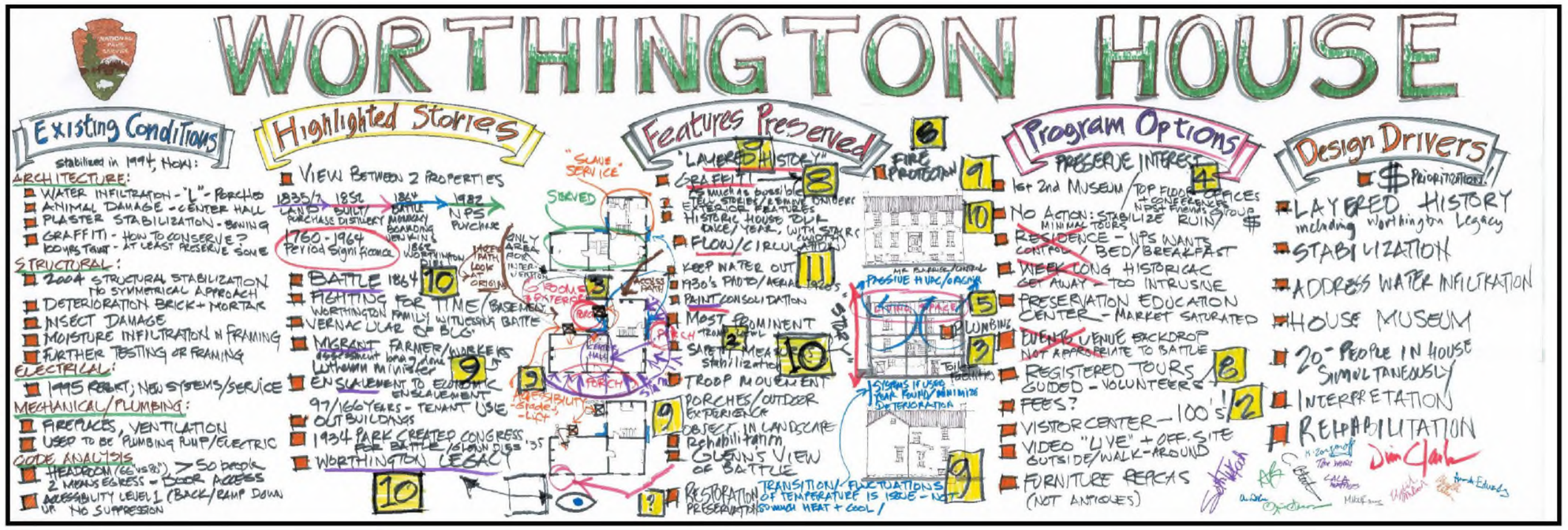
WORTHINGTON HOUSE | BASE DESIGN CONCEPT

On December 11, 2018, representatives from the National Park Service-National Capital Region (NPS-NCR), Monocacy National Battlefield, AECOM, and JMA Preservation met to discuss design options for Worthington House in Frederick, MD. Based on the findings of this meeting, which are summarized in the graphic below, the collected party identified seven design drivers. These are listed to the right according to decreasing priority. The greatest significance was placed on arresting active processes of decay (Driver #1) and preventing future damage to historic fabric (Driver #2). The resulting design concept specifically favored stabilization as an economical treatment that is respectful of historic material while emphasizing the building's 'layered' history rather than a strict restoration. After addressing the condition of existing historic fabric, the highest priority was placed on adapting the basement and first floor of Worthington House for use as a house museum (Driver #3). Lesser priorities within the umbrella of the house museum included preserving the layered history of Worthington House (Driver #4), providing access - including ABAAS access - for up to 20 visitors at one time (Driver #5), and introducing exhibits that interpret the history of Worthington House (Driver #6). Finally, rehabilitation of the second floor as office and conference space was desirable only if it did not divert resources away from water mitigation, stabilization, and adaptation for a house museum. The following concept drawings give an overview of how best to accomplish these design drivers while preserving the architectural integrity and historic significance of Worthington House.

DESIGN DRIVERS
BY DECREASING PRIORITY

1. WATER INFILTRATION MITIGATION
2. STABILIZATION
3. HOUSE MUSEUM
4. LAYERED HISTORY
5. 20-PERSON OCCUPANCY
6. INTERPRETATION
7. REHABILITATION FOR OFFICE USE

Graphic: This graphic represents the results of the concept design charrette where numbers in boxes represent levels of priority from highest (10) to lowest (1).



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ACCESSIBILITY | MUSEUM HOUSE

- Install two-door wheelchair lift to provide access to the restored west porch
- Install lift within the footprint of the reconstructed porch to minimize its visual impact.
- The lift will descend to the basement level and ascend to the porch level from grade

ABAAS Tour Route
General Tour Route

ACCESSIBILITY

- Document, deconstruct existing retaining wall and salvage for future reinstallation

STABILIZATION

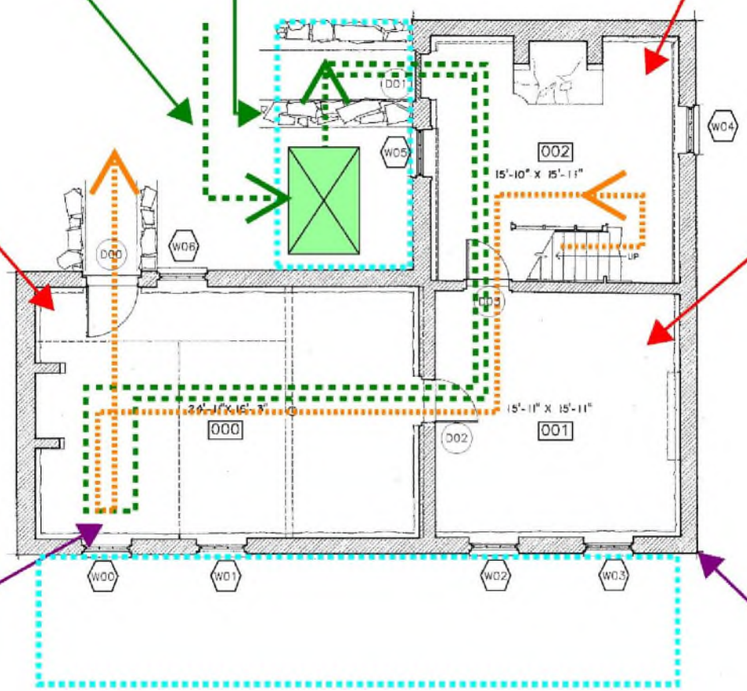
- Perform paint analysis. Protect existing coatings and stabilize per results of analysis.
- Replace bricks that are missing or deteriorated 1/2 of one wythe or more.
- Repoint all joints in brick and stone where mortar is missing or failed.
- Replicate original exterior door and restore door trim.
- Rebuild staircase
- Provide level concrete floor for ABAAS access.
- Install replicated glazed sashes at all window openings to allow for air-conditioning and mechanical ventilation in all interior spaces.
- Provide supplemental 2x wood joists.

STABILIZATION

- Perform paint analysis. Protect existing coatings and stabilize per results of analysis.
- Replace bricks that are missing or deteriorated 1/2 of one wythe or more.
- Repoint all joints in brick and stone where mortar is missing or failed.
- Replicate original exterior door and restore door trim.
- Conserve and stabilize plaster ceiling and lath. Do not restore the plaster ceiling in the basement so that visitors to the house museum can better understand 19th-Century construction practices.
- Repair concrete floor
- Installed replicated glazed sashes at all window openings to allow for air-conditioning and mechanical ventilation in all interior spaces.

STABILIZATION

- Replace bricks that are missing or deteriorated 1/2 of one wythe or more.
- Repoint all joints in brick and stone where mortar is missing or failed
- Restore door trim. Prepare, prime, and repaint.
- Provide level concrete floor for ABAAS access.
- Catalog stored architectural elements and move to another location on site
- Install replicated glazed sashes at all window openings to allow for air-conditioning and mechanical ventilation in all interior spaces
- Provide supplemental 2x wood joists.



LAYERED HISTORY | INTERPRETATION

- The window from which the Worthington Family witnessed the Battle of Monocacy in 1864 is the climax of the house tour.
- Install an interpretative exhibit at this area to provide information about the battle and the Worthington Legacy
- Exhibit material to be unobtrusive to avoid detracting from the visitor experience of viewing the battle field as the Worthington Family did in 1864

STABILIZATION: EXTERIOR

- Point joints below window sills
- Install 7" half round gutter and replace 3" leaders with 4" leaders.
- Repair rotted window sills.
- Repair seams at porch columns.
- Repaint brick piers

LAYERED HISTORY | INTERPRETATION

The three rooms on the basement level will house interpretative exhibits that tell the vital stories of Worthington House:

- Vernacular Architecture and Ways of Life.
- Enslaved Peoples
- 1864 Battle of Monocacy
- Worthington Legacy
- Migrant Farm Laborers

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BASEMENT FLOOR PLAN

Base Design Concept - Architectural

WORTHINGTON HOUSE - FREDERICK, MD

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WATER INFILTRATION | INTERPRETATION

- Reconstruct the west porch to divert water runoff and prevent water infiltration at the south elevation of the ell and west elevation of the main house.
- Reconstruct porch to allow visitors to experience Worthington House in a closer approximation of its appearance in 1864.
- Porch design to be a simplified contextualized form. Retain a stair from porch to grade.
- Excavate fill below porch for lift foundation. Expose building foundation for exterior waterproofing.

STABILIZATION

- Salvage wood floors for reinstallation. Stabilize plaster ceiling, lath, and keys.
-Provide supplemental 2x wood floor joints between the existing joists.
- Reinstall wood floors, clean and wax.
- Reattach plaster walls with adhesive.
- Infill areas of plaster loss with gypsum board. Do not use any wet plaster repairs near paint, which will cause tide lines in decorative paint.
- Clean and consolidate decorative paint.
- Paint gypsum board infill to match field colors.
- Prepare, prime, and repaint wood trim.
- Provide new mantel using the existing ghost mark as a guide. Keep detailing simple and period appropriate.
- Install replicated glazed sashes at all window openings to allow for air-conditioning and mechanical ventilation in all interior spaces.

LAYERED HISTORY | INTERPRETATION

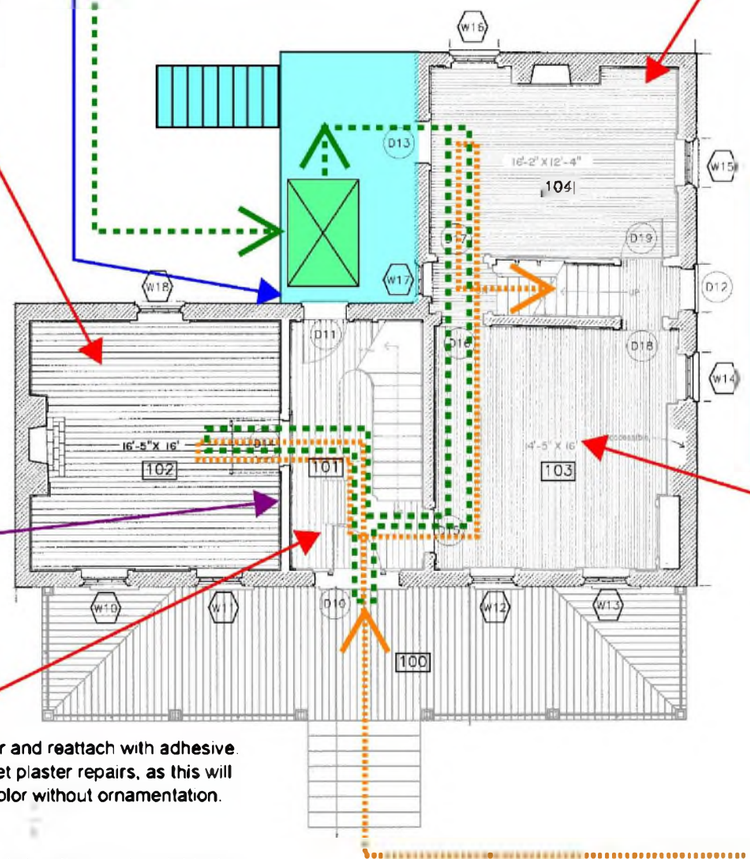
- Document and conserve pencil drawings that date to residency of migrant farm laborers. Provide interpretative sign to contextualize drawings.
- Remove board wall partition at entrance for ease of circulation.

STABILIZATION

- Stabilize plaster ceiling, lath, and keys. Consolidate friable plaster and reattach with adhesive.
- Patch areas of missing plaster with gypsum board. Do not use wet plaster repairs, as this will cause tide lines in decorative paint. Paint areas of infill the field color without ornamentation.
- Clean and consolidate decorative paint.
- Salvage piece of broken painted plaster for testing.
- Document and remove or conceal pencil drawings. Drawings in this location are less intricate than other locations and detract from the elaborate decorative paint in the stair hall.
- Prepare, prime, and repaint wood trim.
- Repair and rebuild wood stair. Clean and wax.
- Clean and wax wood floors.
- Install replicated glazed sashes at all window openings to allow for air-conditioning and mechanical ventilation in all interior spaces.

ACCESSIBILITY | MUSEUM HOUSE

Visitors with limited mobility enter the house through a lift at the west porch, joining the tour group on the east porch. They follow the same tour route, returning to the lift to transition from the first floor to the basement.



MUSEUM HOUSE

Tour begins at east porch and continues on delineated path through the first floor and down the servant stair to the basement.

STABILIZATION

- Perform paint analysis to determine if visible paint layers are original. If visible paint layers on walls and ceiling are original, consolidate existing paint and encapsulate with a matte clear coat. If visible paint layers are not original, prepare walls by removing flaking paint. Encapsulate with matte clear coat and paint color matching original paint layers.
- Stabilize plaster ceiling, lath, and keys. Patch with new plaster on metal lath.
- Replace missing elements of wood trim. Prepare, prime, and repaint.
- Remove linoleum and modern floors. Repair, clean, and wax original floor.
- Clean and wax wood floors.
- Install replicated glazed sashes at all window openings to allow for air-conditioning and mechanical ventilation in all interior spaces.

STABILIZATION: INTERIOR

- Stabilize interior materials by providing HVAC to service the whole interior.
- Maintain a constant relative humidity between 30% - 60%. RH above 70% will promote mold growth. RH below 30% will embrittle materials.
- Prevent rapid swings in RH over 20 percentage points
-Target RH range in winter is between 30%-37%. Target RH range in summer is 53%-60%
- Maintain temperature between 60 and 75 degrees F

STABILIZATION

- Perform paint analysis to determine if visible paint layers are original. If visible paint layers on walls and ceiling are original, consolidate existing paint and encapsulate with a matte clear coat. If visible paint layers are not original, prepare walls by removing flaking paint. Encapsulate with matte clear coat and paint color matching original paint layers.
- Replace bricks that are missing or deteriorated 1/2 of one wythe or more.
- Repoint joints in brick where mortar is missing or failing.
- Stabilize plaster ceiling, lath, and keys. Patch with new plaster on metal lath.
- Replace missing elements of wood trim and casework. Prepare, prime, and repaint.
- Remove warped floorboards. Investigate and repair original floor. Clean and wax wood floors.
- Install replicated glazed sashes at all window openings to allow for air-conditioning and mechanical ventilation in all interior spaces.

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FIRST FLOOR PLAN

Base Design Concept - Architectural

WORTHINGTON HOUSE - FREDERICK, MD

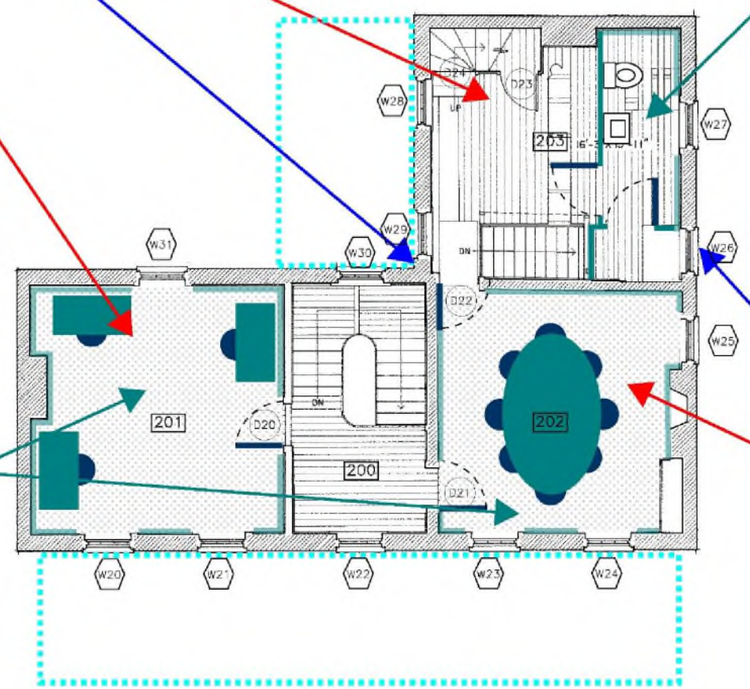
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WATER INFILTRATION
- Replace all gutters with 7" half-round gutters.
- Replace 3" rain leaders with 4" rain leaders.

STABILIZATION
- Perform paint analysis.
- Disassemble floors to access decorative paint plaster ceiling below. Stabilize plaster lath and keys of ceiling below. Provide supplemental 2x wood floor joists between the existing floor joists.
- Stabilize plaster ceiling lath and keys. Patch with new plaster and metal lath at ceiling. Repaint.
- Reinstall wood floors, clean and wax.
- Prepare, prime, and repaint wood trim. Replace missing elements.
- Install replicated glazed sashes at all window openings.
- Clean doors. Stabilize paint and provide protective coating.

REHABILITATION: OFFICE SPACE AND CONFERENCE ROOM
- Fur out walls in future office and conference room to provide cavity for R19 insulation and conduit. Furred to be less than 4" thick.
- Provide R30 insulation in attic space.
- Provide padding and carpet to act as insulation at floor
  - Tack down carpet around the perimeter of the room. Do not adhere carpet to wood floor as is typical in modern construction.
- Remove board wall partition at entrance of office space for ease of circulation.

STABILIZATION
- Disassemble floors to access plaster ceiling below. Stabilize plaster lath and keys of ceiling below. Provide supplemental 2x wood floor joists between the existing floor joists.
- Perform paint analysis.
- Replace bricks that are missing or deteriorated 1/2 of one wythe or more.
- Repoint all joints in brick where mortar is missing or failed.
- Stabilize plaster ceiling lath and keys. Patch with new plaster and metal lath at ceiling. Repaint at toilet room.
- Reattach loose plaster to masonry wall with adhesive and repair in areas that are not furred out.
- Remove flaking paint and encapsulate with clear matte coating except at pencil drawings. At pencil drawings, any protective coating must be reversible.
- Prepare, prime, and repaint painted wood trim.
- Replace missing elements and casework at attic stair. Prepare, prime, and paint.
- Replace missing wood flooring. Clean and wax wood floors.
- Install replicated glazed sashes at all window openings.



REHABILITATION: TOILET ROOM
- Construct partition walls where indicated.
- Locate toilet and sink at partition wall so that plumbing runs through modern wall rather than existing.
- Fur out walls in toilet room to provide cavity for R19 insulation. Furred walls to be less than 4" thick.
- Maintain plaster ceiling in stabilized condition, and provide R30 insulation in attic space above toilet room at ceiling joists only to permit natural air ventilation through attic.
- Provide partition wall to create storage area at east end of toilet room.
- Install new balustrade at service stair. Keep ghosting of new on east wall and protect.
- Restore glazed sash at all window openings.
- Minimize plaster penetrations in ceiling below as much as possible. Expose plumbing in kitchen towards shaft in fireplace.

WATER INFILTRATION
- Replace all gutters with 7" half-round gutters.
- Replace 3" rain leaders with 4" rain leaders.

STABILIZATION
- Perform paint analysis.
- Replace bricks that are missing or deteriorated 1/2 of one wythe or more.
- Repoint all joints in brick where mortar is missing or failed.
- Stabilize plaster ceiling lath and keys. Patch with new plaster and metal lath at ceiling. Repaint.
- Replace missing elements at wood trim. Prepare, prime, and repaint painted wood trim. Clean and wax clear-finished trim and casework.
- Dissassemble floors to access plaster ceiling below for stabilization. Provide supplemental 2x wood floor joists between the existing floor joists.
- Replace missing wood flooring. Clean and wax wood floors.
- Repair and reinstall mantel and window stool that were displaced. Prepare, prime, and repaint.
- Install replicated glazed sashes at all window openings,
- Clean doors. Stabilize paint and provide protective coating.

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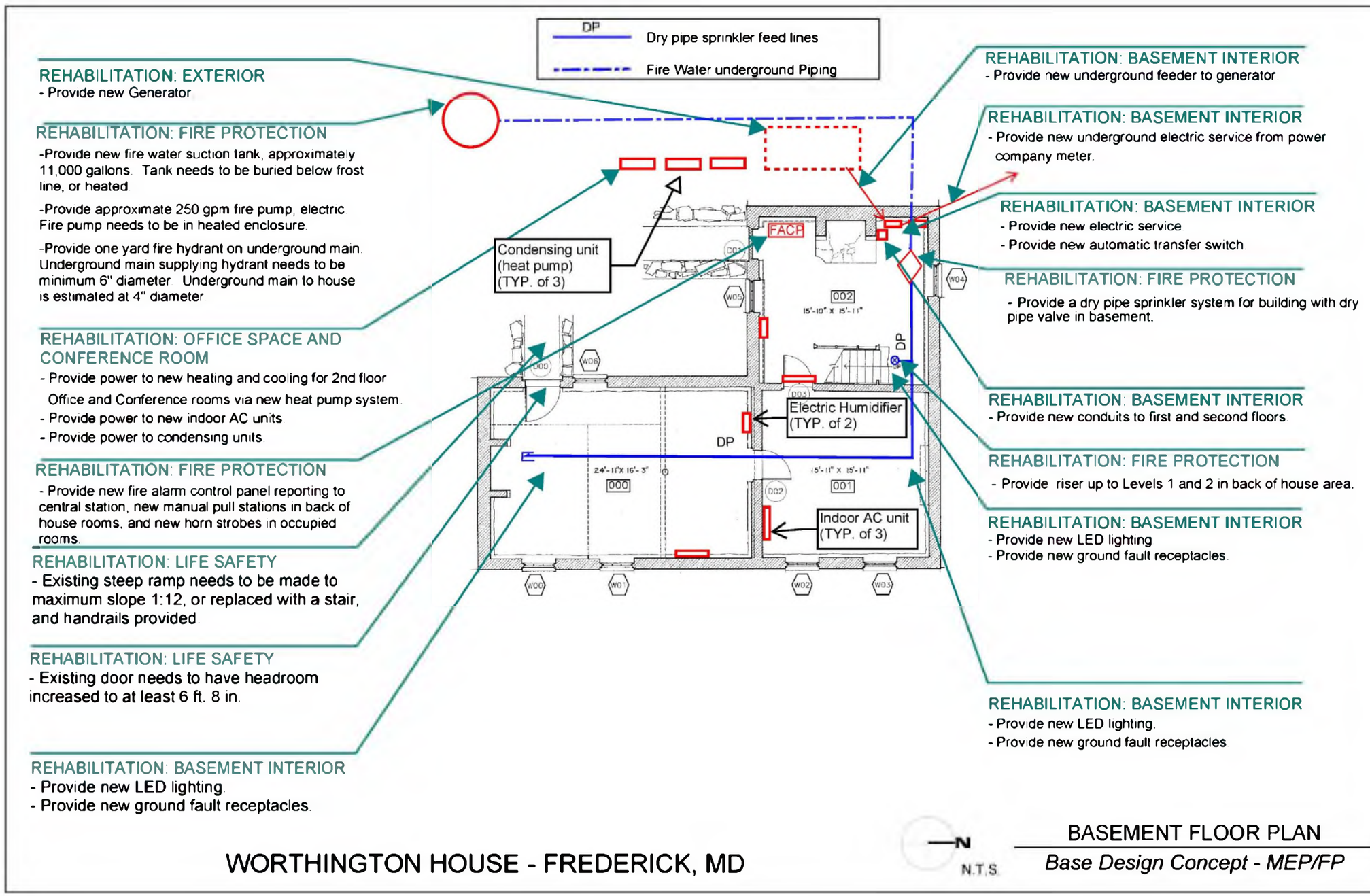
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WORTHINGTON HOUSE - FREDERICK, MD

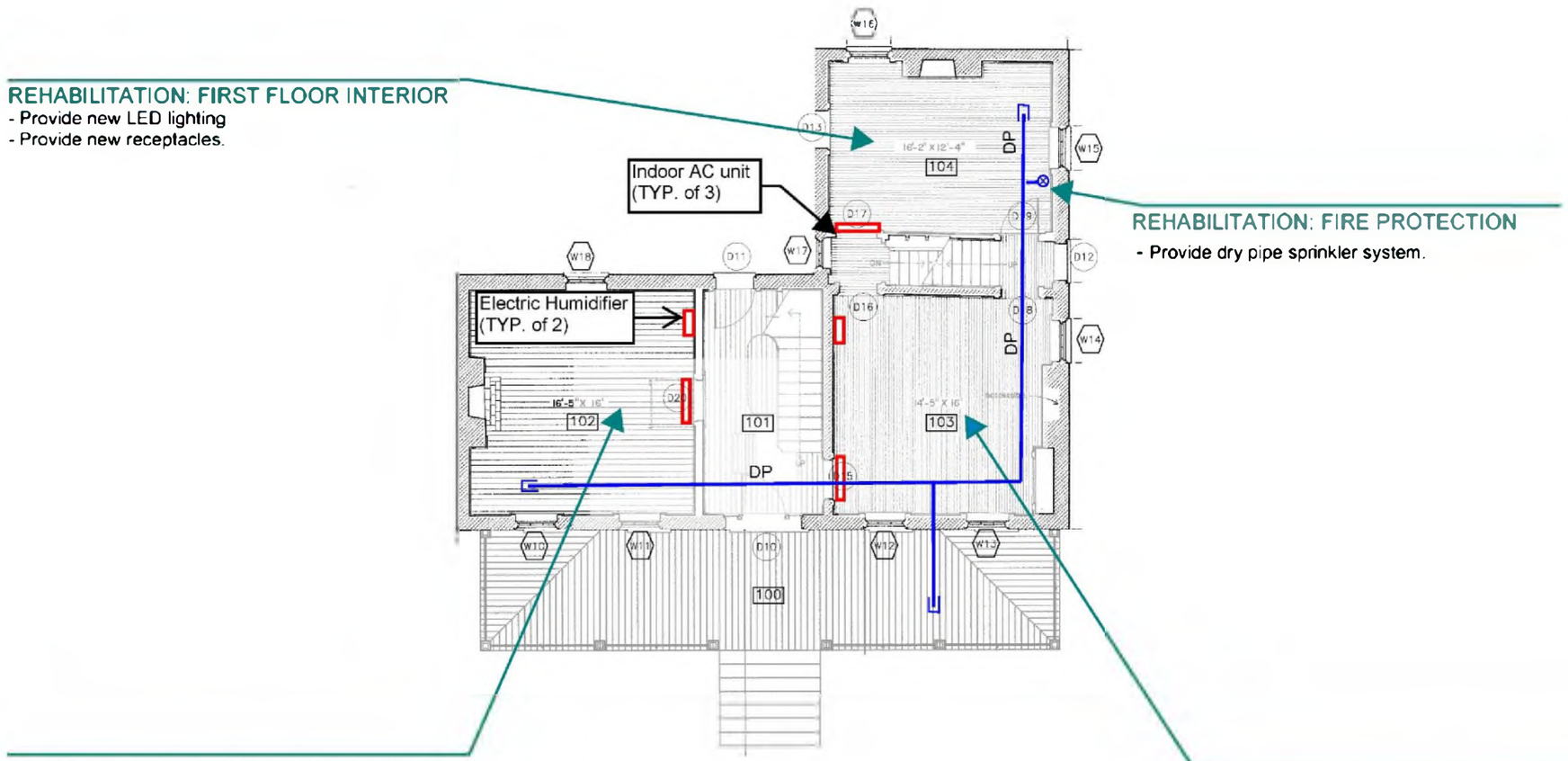
SECOND FLOOR PLAN

Base Design Concept - Architectural

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DP
Dry pipe sprinkler feed lines
Fire Water underground Piping
REHABILITATION: EXTERIOR
- Provide new Generator.
REHABILITATION: FIRE PROTECTION
-Provide new fire water suction tank, approximately 11,000 gallons. Tank needs to be buried below frost line, or heated.
-Provide approximate 250 gpm fire pump, electric. Fire pump needs to be in heated enclosure.
-Provide one yard fire hydrant on underground main. Underground main supplying hydrant needs to be minimum 6" diameter. Underground main to house is estimated at 4" diameter.
REHABILITATION: OFFICE SPACE AND CONFERENCE ROOM
- Provide power to new heating and cooling for 2nd floor Office and Conference rooms via new heat pump system.
- Provide power to new indoor AC units.
- Provide power to condensing units.
REHABILITATION: FIRE PROTECTION
- Provide new fire alarm control panel reporting to central station, new manual pull stations in back of house rooms, and new horn strobes in occupied rooms.
REHABILITATION: LIFE SAFETY
- Existing steep ramp needs to be made to maximum slope 1:12, or replaced with a stair, and handrails provided.
REHABILITATION: LIFE SAFETY
- Existing door needs to have headroom increased to at least 6 ft. 8 in.
REHABILITATION: BASEMENT INTERIOR
- Provide new LED lighting.
- Provide new ground fault receptacles.
Condensing unit (heat pump) (TYP. of 3)
FACP
002
15'-10" X 15'-11"
000
24'-11"X 16'-3"
001
15'-11" X 15'-11"
Electric Humidifier (TYP. of 2)
Indoor AC unit (TYP. of 3)
DP
REHABILITATION: BASEMENT INTERIOR
- Provide new underground feeder to generator.
REHABILITATION: BASEMENT INTERIOR
- Provide new underground electric service from power company meter.
REHABILITATION: BASEMENT INTERIOR
- Provide new electric service.
- Provide new automatic transfer switch.
REHABILITATION: FIRE PROTECTION
- Provide a dry pipe sprinkler system for building with dry pipe valve in basement.
REHABILITATION: BASEMENT INTERIOR
- Provide new conduits to first and second floors.
REHABILITATION: FIRE PROTECTION
- Provide riser up to Levels 1 and 2 in back of house area.
REHABILITATION: BASEMENT INTERIOR
- Provide new LED lighting
- Provide new ground fault receptacles.
REHABILITATION: BASEMENT INTERIOR
- Provide new LED lighting.
- Provide new ground fault receptacles
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N.T.S.
WORTHINGTON HOUSE - FREDERICK, MD
BASEMENT FLOOR PLAN
Base Design Concept - MEP/FP

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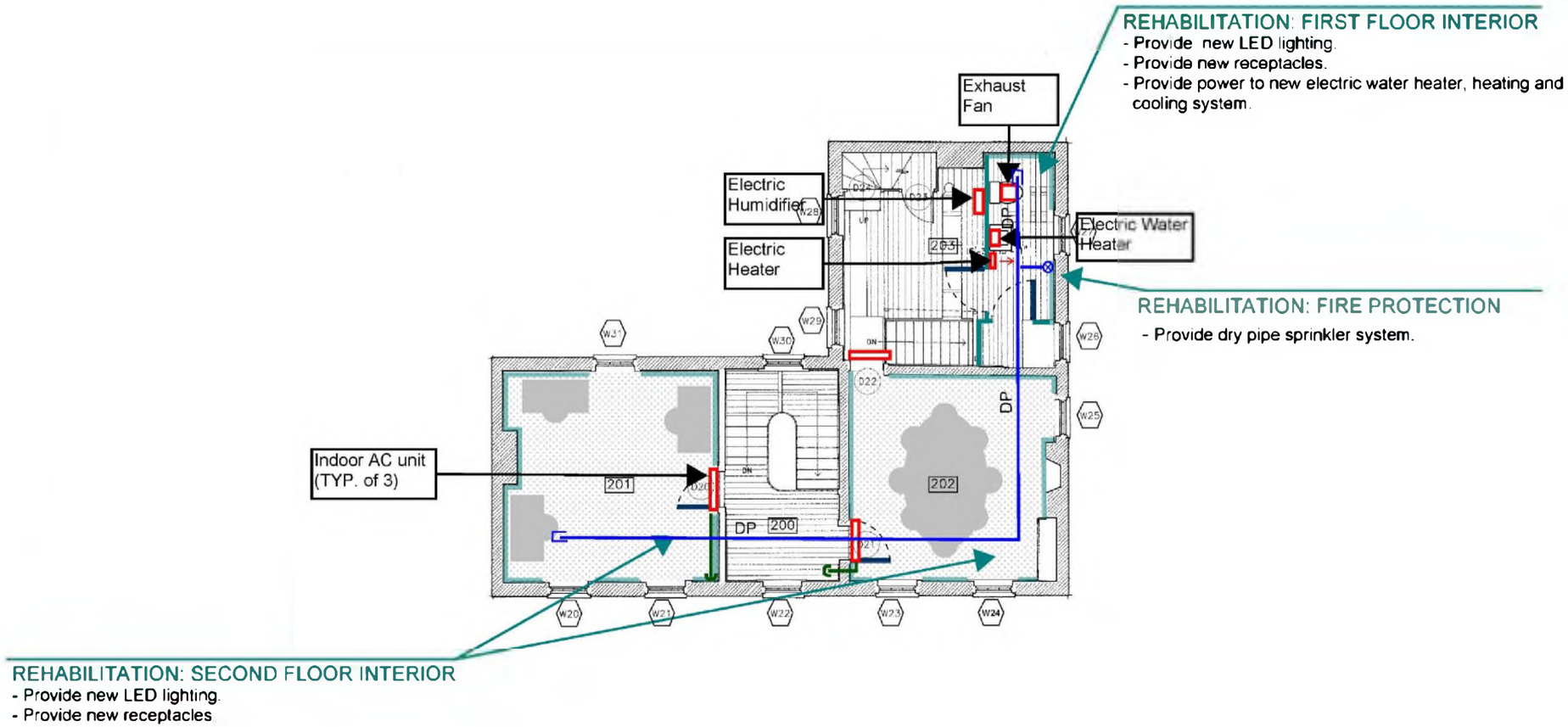


WORTHINGTON HOUSE - FREDERICK, MD

FIRST FLOOR PLAN

Base Design Concept - MEP/FP

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WORTHINGTON HOUSE - FREDERICK, MD

SECOND FLOOR PLAN

Base Design Concept - MEP/FP

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6. OPTIONAL DESIGN TREATMENTS

The NPS and design team considered optional design elements as part of the overall treatment of Worthington House. Refer to the Optional Design Concept drawings on pp. 141-147. These Optional Design drawings explore four different options from the base concept. The first is the rehabilitation of Room 104 to accommodate an ABAAS-accessible toilet room for visitors. The second is the stabilization of the second-floor rooms instead of rehabilitation as offices. The third option is an alternative placement of the two-door wheelchair lift. The fourth option is the construction of a door hood over the north entry. The first two options have been considered as part of the design drivers for the concept. The second two options present alternatives for approaches that received much debate during the design concept process.

The optional design for the first-floor bathroom indicates that the space can accommodate only one toilet while still allowing enough turn radius for the wheelchair. The benefit of this option is adding a second usable restroom to the house that can be available for tourists. The drawback of this option is that it eliminates the kitchen from the interpretive space and greatly diminishes the flow of tours.

The optional design for the stabilization of the second floor focuses on material treatments to bring the historic finishes to an appearance more consistent with design intent. This option eliminates staff amenities, including a restroom, and all insulation. These rooms would not receive enhanced insulation or HVAC treatments.

The placement of the wheelchair lift within the footprint of the reconstructed west porch is desirable to preserve the historic appearance of the west and south elevations. However, this location would require removing a historic retaining wall and excavating to a significant depth at the building foundation. If the lift is moved out to the edge of the porch, a ramp can be installed to the basement door (D01). The lift would only move up to the porch floor with straight-on access to door D13. The retaining wall can then remain in place, and condensing units can be installed under the porch. This option does not allow for egress from Room 104, as there will be no room for a porch stair.

The last option considered for Worthington House is constructing a door hood and stairs at the north entrance to mitigate water infiltration on the north wall. The HABS photos from 1991 show a brick disturbance above the door and to the east where a stair could have been. There are no photographs, drawings, or other definitive evidence that this entrance existed. It is not even known if the door is original. The water infiltration is pervasive at this location directly below the connection of the ell to the main building. Since the evidence of this entrance or porch is in question, it is undesirable to create a false sense of history by reconstructing something that was unknown. Further study is required to confirm its existence, whether through dismantling the existing door frame or research into a vernacular precedent, but a simplified door hood and stair would benefit the building. This option is shown to continue the debate.

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WORTHINGTON HOUSE | OPTIONAL DESIGN CONCEPT

The Optional Design Concept includes provisions for the following additions and/or alterations to the Base Design Concept:

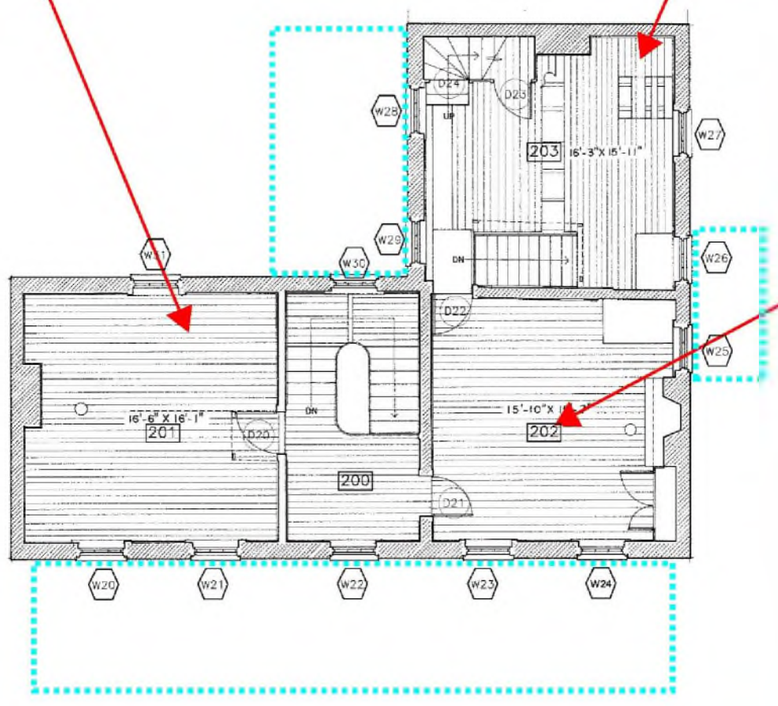
1. Addition of ABBAS-compliant toilet room in Room 104
2. Alternate locations for lift
3. Construction of north porch
4. Alternate for stabilization of second floor instead of rehabilitation as office space. This alternate would remove installation of an all-air HVAC system included as part of rehabilitation in the Base Design Concept. This alternate assumes the use of passive ventilation or conservation ventilation and heating within the house.

DESIGN DRIVERS BY DECREASING PRIORITY
1. WATER INFILTRATION MITIGATION
2. STABILIZATION
3. HOUSE MUSEUM
4. LAYERED HISTORY
5. 20-PERSON OCCUPANCY
6. INTERPRETATION
7. REHABILITATION FOR OFFICE USE

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STABILIZATION

- In lieu of converting upper rooms to offices, stabilize historic finishes.
- Perform paint analysis to determine if visible paint layers are original.
- Stabilize ceiling plaster, lath, and keys. Patch with new plaster on metal lath.
- Reattach loose plaster to masonry wall with adhesive and repair.
- Encapsulate existing paint with a matte clear coat.
- Prepare, prime, and repaint wood trim. Replace missing elements.
- Disassemble floors to access decorative paint plaster ceiling below. Catalog and reinstall.
- Clean and wax wood floors.
- Install replicated sashes at all window openings to allow for air-conditioning and mechanical ventilation in all interior spaces.
- Clean doors. Stabilize paint and provide protective coating.



STABILIZATION

- In lieu of creating staff bathroom, stabilize historic finishes.
- Perform paint analysis to determine if visible paint layers are original.
- Replace bricks that are missing or deteriorated 1/2 of one wythe or more.
- Repoint all joints in brick where mortar is missing or failed.
- Stabilize plaster ceiling, lath, and keys. Patch with new plaster and metal lath at ceiling.
- Reattach loose plaster to masonry wall with adhesive and repair in areas that are not furred out.
- Encapsulate existing paint with a matte clear coat. Any coatings at pencil drawings must be reversible.
- Prepare, prime, and repaint painted wood trim.
- Replace missing elements and casework at attic stair. Prepare, prime, and paint.
- Replace missing wood flooring. Clean and wax wood floors.
- Install replicated glazed sashes at all window openings to allow for air-conditioning and mechanical ventilation in all interior spaces.

STABILIZATION

- In lieu of creating a conference room, stabilize historic finishes.
- Perform paint analysis to determine if visible paint layers are original.
- Replace bricks that are missing or deteriorated 1/2 of one wythe or more.
- Repoint all joints in brick where mortar is missing or failed.
- Stabilize plaster ceiling, lath, and keys. Patch with new plaster and metal lath at ceiling.
- Reattach loose plaster to masonry wall with adhesive and repair.
- Encapsulate existing paint with a matte clear coat.
- Replace missing elements wood trim. Prepare, prime, and repaint painted wood trim. Clean and wax clear-finished trim and casework.
- Replace missing wood flooring. Clean and wax wood floors.
- Repair and reinstall mantel and window stool that were displaced. Prepare, prime, and repaint.
- Install replicated glazed sashes at all window openings to allow for air-conditioning and mechanical ventilation in all interior spaces.
- Clean doors. Stabilize paint and provide protective coating.

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N.T.S.

SECOND FLOOR PLAN

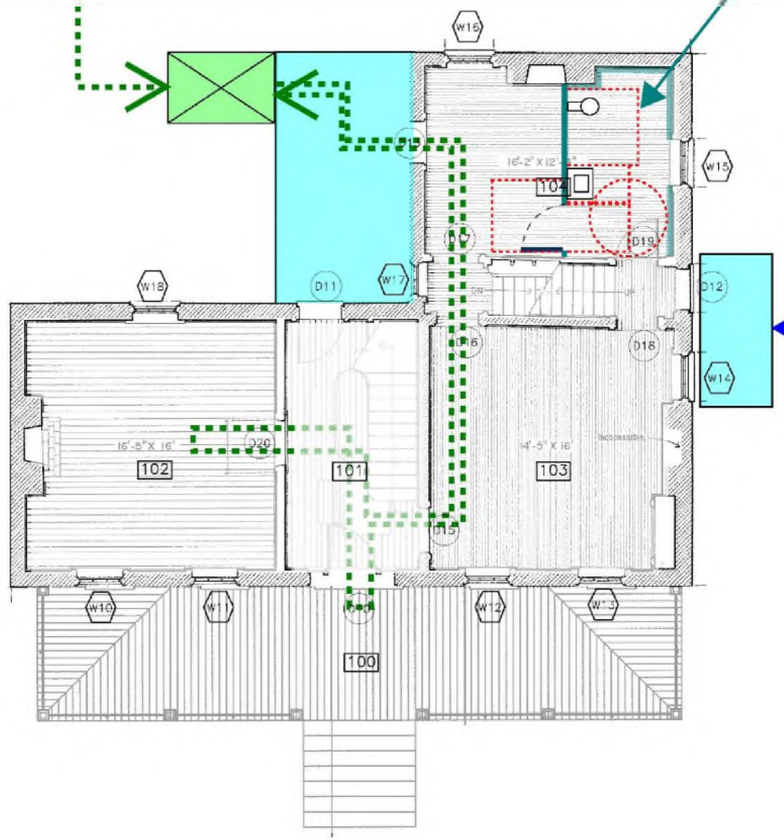
Optional Design Concept - Architecture

WORTHINGTON HOUSE - FREDERICK, MD

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ACCESSIBILITY | MUSEUM HOUSE

Visitors with limited mobility will enter the house through a lift at the west porch, joining the tour group on the east porch. They follow the same tour route, returning to the lift to transition from the first floor to the basement.



REHABILITATION: TOILET ROOM

- Construct partition walls to create ABAAS accessible toilet room in this location.
- Locate toilet and sink at partition wall so that plumbing runs through modern wall rather than existing.
- Fur out walls in toilet room to provide cavity for R19 insulation. Furred walls to be less than 4" thick.
- Maintain plaster ceiling in stabilized condition. Provide R30 insulation in ceiling above toilet room at ceiling joints only

– ····· indicates ABAAS clearance requirements

WATER INFILTRATION | INTERPRETATION

- Investigate architectural history to establish vernacular porch configuration and construction for Worthington era.
- Reconstruct the north porch and roof to divert water runoff that results in water infiltration at the north elevation.

WORTHINGTON HOUSE - FREDERICK, MD

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N.T.S.

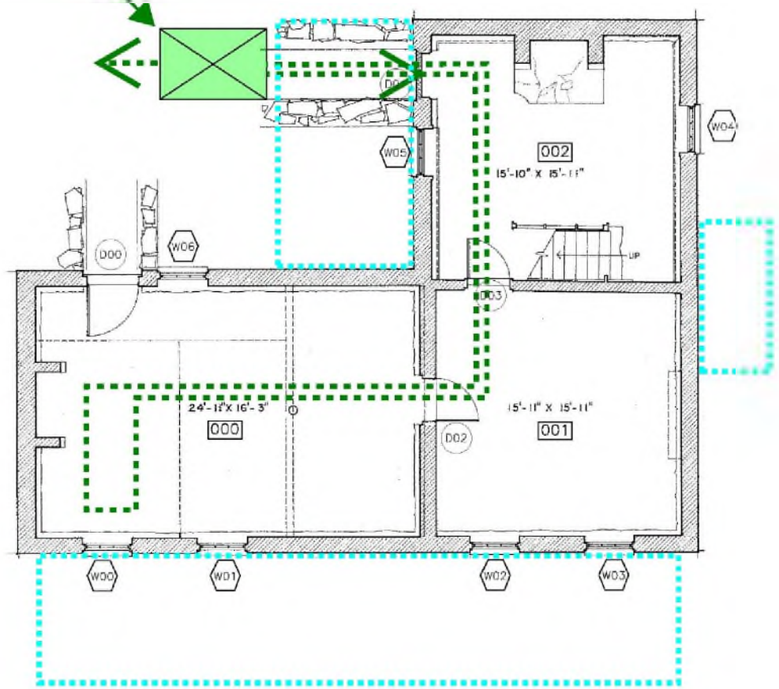
FIRST FLOOR PLAN

Optional Design Concept - Architecture

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ACCESSIBILITY | MUSEUM HOUSE

- Install a two-door wheelchair lift to provide access to the basement level and porch/first floor level.
- Place lift at the location of the existing deck stair. There will be no stair access to the west porch
- This is the best solution to ensure the lift is not visible from the most significant view sheds. This solution is also reversible - the lift may be removed in future to restore the stair if the house transitions to a different use
- This option does not disrupt any historic materials.



WORTHINGTON HOUSE - FREDERICK, MD

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N.T.S.

BASEMENT FLOOR PLAN

Optional Design Concept - Architecture

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B. RECOMMENDATIONS, ALTERNATIVES

1. GENERAL CONDITION STATEMENT

The condition of the historic fabric of Worthington House is unstable. The forces affecting the preservation of the farmhouse are being addressed, particularly on the exterior, but without further intervention, water infiltration, woodwork damage, and plaster deterioration will accelerate on the interior. The interior of the building has a significant amount of loss and a significant amount of historic materials that are at risk of being lost.

Most of the interior building fabric will require extensive rehabilitation to make the house functional for tours or other use. Most importantly, the floors and ceilings must be repaired to return them to solid surfaces. Then, conservation treatments of decorative painted surfaces and stabilization/repair of all plaster surfaces will be required to retain as much original plaster as possible. The woodwork must be repaired or replicated and refinished to complete the interior spaces.

2. BUILDING ELEMENTS – PROBLEMS, ALTERNATIVES AND RECOMMENDATIONS

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3. 2019 CLASS C COST ESTIMATE

Background Supporting Material (Scope of Work)

The scope of work includes renovations to the existing Worthington House in Frederick, Maryland. The 3,345 sf house consists of two stories and a basement. Renovations to the house include wall and floor stabilization, water infiltration remediation, reconstruction of the porches, and window repairs or replacements. The cost estimate has been developed from the 90% design concept submission report dated May 6, 2019, prepared by AECOM. Exclusions include design fees or other consultant fees, impact or other governments costs, costs resulting from owner-requested changes or design changes, utility company charges, contaminated soil excavation, any site improvements/pavements, furniture, security system devices/wiring/equipment, hazmat handling and abatement, and cost premiums due to lead paint removal.

Source of Cost Data

The level of pricing of the cost estimate is representative of current day costs of construction in Frederick, Maryland. It assumes a fair and reasonable rate of return for overhead and profit for the general contractor and subcontractors. This cost estimate was developed for comparative purposes, and measurements are based on quantity surveys that are as detailed as possible given the level of design and available references to similar projects recently estimated by DMS Construction Consulting Services, Inc. The cost estimate is an opinion of probable costs based on fair market value and is not a prediction of anticipated low bid. DMS has no control over the costs of labor, material, the general contractor, or any subcontractor's method of determining price or competitive bidding and market conditions. Historic data, RS Means, local equipment representatives, and contractor input were used to develop costs.

Estimate Assumptions

This estimate is based on third quarter 2019 dollars and represents the construction cost value for the scope of work defined in "90% submission" documents. Subcontractor markups and subcontractor overhead (material storage, handling, and laydown) have been included in this estimate. We included 20% for design contingency. The requirement for insurance comes to approximately 2.75% of the construction costs. We also included escalation at 3% per annum. The effective rate is 3% with an anticipated construction start date of April 2020.

Major Changes from Previous Estimate

None.

Description of Mark-ups and Add-ons

Location Factor	0.00%	This has been included in the unit costs
Remoteness Factor	0.00%	Site is _____ miles from published commercial center. Describe other impacts included.
Wage Rate Factor	0.00%	Explain method and justify value
State & Local Taxes	6.00%	State tax
Design Contingency	20.00%	We use a 20% design contingency for all studies, based on the fact that limited details are available at this design stage.
Standard General Conditions	35.00%	Historic building factors
Government General Conditions	5.00%	
Historic Preservation Factor	12.00%%	Based on recommended percentage per historic preservation architect
Contractor Overhead	10.00%	Going rate in for this type of project
Contractor Profit	10.00%	Going rate in for this type of project
Bonds and Permits	2.75%	Typical requirement
Contracting Method Adjustment	0.00%	Describe anticipated contract method and justify value used.
Annual Inflation Escalation Factor	3.00%	Projected annual inflation rate.
Time Until Project Midpoint (Months)	12	Unknown at this time

Other Comments

Note: The rates used in this estimate are dependent on several variables that are difficult to quantify and may require adjustment. Included in the list of variables are: bidding climate; the ability of the insurance industry to underwrite the liability insurance required; the economic status of the bonding industry; the banking industry requirements with respect to letters of credit; and the ability of subcontractors to obtain liability insurance, bonds, and letters of credit.

MASTER SUMMARY			
DESCRIPTION	Gross Square Feet (GSF)	COST	COST/GSF
ARCHITECTURAL	3,345	$538,409	$160.96
STRUCTURAL	3,345	$87,848	$26.26
FIRE PROTECTION	3,345	$135,512	$40.51
PLUMBING	3,345	$98,840	$29.55
MECHANICAL	3,345	$137,736	$41.18
ELECTRICAL	3,345	$284,757	$85.13
GRAND TOTAL	**3,345**	**$1,283,103**	**$383.59**
GENERAL CONDITIONS/REQUIREMENTS	35.0%	$449,086	$134.26
SUBTOTAL		$1,732,188	
DESIGN CONTINGENCY	20.0%	$346,438	$103.57
SUBTOTAL		$2,078,626	
ESCALATION ALLOWANCE	3.0%	$62,359	$18.64
SUBTOTAL		$2,140,985	
SUBCONTRACTOR BONDS	2.75%	$58,877	$17.60
SUBTOTAL		$2,199,862	
OVERHEAD AND PROFIT	20.0%	$439,972	$131.53
SUBTOTAL		$2,639,834	
GOVERNMENT GENERAL CONDITIONS	5.0%	$131,992	$39.46
SUBTOTAL		$2,771,826	
HISTORIC PRESERVATION FACTOR	12.0%	$332,619	$99.44
SUBTOTAL		$3,104,44	
GRAND TOTAL		**$3,104,445**	**$928.09**
			-$90.66 / GSF
DEDUCT OPTION: 2ND FLOOR NOT CONVERTED TO OFFICES & RESTROOM		-$303,254	**$837.43 / GSF**
TOTAL		**$2,801,191**	

ARCHITECTURAL						
ITEM	QUANTITY	UNIT	RATE	COST	SUBTOTAL	TOTAL
LIFE SAFETY REPAIRS						
Interior						
mark servant stair as "not to be used"	1	ls	$325.00	$325		
label basement doors	1	ls	$390.00	$390		
provide exit signs	4	ea	$195.00	$780		
					$1,495	
Exterior						
provide disabled persons lift	1	ls	$39,000.00	$39,000		
					$39,000	
LIFE SAFETY REPAIRS TOTAL						**$40,495**
INTERIOR REPAIRS						
Partitions						
remove partitions	16	lf	$32.50	$520		
new partitions	21	lf	$104.00	$2,184		
fur out walls	144	lf	$88.92	$12,804		
					$15,508	
Floors						
remove linoleum floor	197	sf	$2.60	$512		
new carpet	252	sf	$6.50	$1,638		
new slab on grade	493	sf	$15.00	$7,395		
level and repair concrete flooring at basement	405	sf	$5.00	$2,025		
remove floorboards, repair, reinstall	1,314	sf	$39.00	$51,246		
clean and wax wood floors	1,806	sf	$1.95	$3,522		
					$66,338	
Ceilings						
add R30 insulation to attic floor	885	sf	$3.45	$3,049		
prep ceilings by removing flaking paint	1,888	sf	$2.00	$3,776		
stabilize, patch, repair plaster ceilings	1,806	sf	$10.00	$18,060		
paint ceilings	1,806	sf	$3.90	$7,043		
					$31,928	
Walls						
replace missing bricks	212	sf	$32.50	$6,890		
repoint all joints in brick and stone	300	sf	$19.50	$5,850		
prep walls by removing flaking paint	1,888	sf	$2.00	$3,776		
infill areas of plaster/patch walls	1,888	sf	$10.00	$18,880		
paint walls	1,000	sf	$3.90	$3,900		

ARCHITECTURAL						
ITEM	QUANTITY	UNIT	RATE	COST	SUBTOTAL	TOTAL
specialized paint consolidation	888	sf	$30.00	$26,640		
repair interior wall trim at windows	27	loc	$450.00	$12,150		
new wood base trim	177	lf	$19.50	$3,452		
prep, repair, paint existing wood base trim	325	lf	$15.60	$5,070		
misc. trim refurbishment	1	ls	$3,900.00	$3,900		
new fireplace mantel	9	lf	$325.00	$2,763		
					$93,270	
Stairs						
replace missing elements and casework at attic stair	1	loc	$3,000.00	$3,000		
repair and rebuild main staircase	1	flt	$26,000.00	$26,000		
new balustrade at service stair	7	lf	$400.00	$2,648		
rebuilt staircase at basement	1	flt	$10,400.00	$10,400		
					$42,048	
Doors						
new door frame, hardware	2	ea	$1,560.00	$3,120		
clean, encapsulate existing interior doors	5	ea	$975.00	$4,875		
					$7,995	
Misc.						
paint analysis for interior rooms	1	ls	$7,150.00	$7,150		
study for paint consolidation	1	ls	$15,600.00	$15,600		
					$22,750	
INTERIOR REPAIRS TOTAL						**$279,838**
EXTERIOR REPAIRS						
Windows						
repair windows with restored sash	302	sf	$234.00	$70,668		
lift/hoist	3.0	mth	$3,900.00	$11,700		
exterior window sealants & caulking	302	sf	$0.85	$255		
remove existing windows	302	sf	$10.40	$3,141		
repair window sills and trim	142	lf	$19.50	$2,769		
haul & dispose debris	1	load	$1,040.00	$1,040		
					$89,573	
Façade						
refurbish louvers	35	sf	$50.00	$1,750		
repoint exterior brick-allow 20%	786	sf	$26.00	$20,436		
paint existing brick	3,930	sf	$2.00	$7,860		
replace gutters	166	lf	$32.50	$5,395		
replace downspouts	160	lf	$32.50	$5,200		

ARCHITECTURAL						
ITEM	**QUANTITY**	**UNIT**	**RATE**	**COST**	**SUBTOTAL**	**TOTAL**
repaint brick piers	104	sf	$6.50	$676		
repair seams at front porch columns	55	lf	$26.00	$1,430		
remove and reconstruct west porch	143	sf	$182.00	$26,026		
lift/hoist	3.0	mth	$3,900.00	$11,700		
exterior sealants & caulking	3,930	sf	$2.60	$10,218		
haul & dispose debris	1	load	$1,040.00	$1,040		
Below-grade waterproofing at south elevation	36	sf	$390.00	$14,040		
deconstruction of east retaining wall at south elevation	10	lf	$1,200.00	$12,000		
revise slope of ramp access to basement	23	sf	$104.00	$2,392		
					$112,063	
Exterior Doors						
increase headroom of basement ext. door	1	ea	$3,900.00	$3,900		
clean, paint existing exterior doors	4	ea	$650.00	$2,600		
repair/paint door trim	118	lf	$15.60	$1,841		
					$8,341	
EXTERIOR REPAIRS TOTAL						**$218,077,**
ARCHITECTURAL GRAND TOTAL						**$538,409**

STRUCTURAL						
ITEM	QUANTITY	UNIT	RATE	COST	SUBTOTAL	TOTAL
1ST FLOOR REINFORCING						
Reinforcing						
reinforce floor	1,112	sf	$20.00	$22,240		
remove/replace ceilings or flooring (assume 0%)	0	sf	$39.00	$0		
					$22,240	
1ST FLOOR REINFORCING TOTAL						**$22,240**
2ND FLOOR REINFORCING						
Reinforcing						
reinforce floor	1,112	sf	$20.00	$22,240		
remove/replace ceilings or flooring (assume 100%)	1,112	sf	$39.00	$43,368		
					$65,608	
2ND FLOOR REINFORCING TOTAL						**$65,608**
STRUCTURAL GRAND TOTAL						**$87,848**

FIRE PROTECTION						
ITEM	QUANTITY	UNIT	RATE	COST	SUBTOTAL	TOTAL
FIRE PROTECTION						
Sprinkler System						
sprinkler system	3,345	sf	$6.50	$21,743		
250 gpm domestic water/fire pump	1	ea	$26,000.00	$26,000		
heated space/hut for fire pump	1	ea	$6,500.00	$6,500		
11,000 gallon water storage tank	1	ea	$28,600.00	$28,600		
excavate/backfill water tank	36	cy	$162.50	$5,778		
fire hydrant	1	ea	$3,250.00	$3,250		
below grade piping	150	lf	$58.50	$8,775		
Archaeological work for the above	1	ls	$25,000.00	$25,000		
					$125,645	
Electronic Fire Alarm						
modify fire alarm system	3,345	sf	$2.60	$8,697		
					$8,697	
Misc.						
fire extinguishers	6	ea	$195.00	$1,170		
					$1,170	
REMOVE EXISTING TEMPORARY SHORING TOTAL						**$110,512**
FIRE PROTECTION GRAND TOTAL						**$135,512**

PLUMBING						
ITEM	QUANTITY	UNIT	RATE	COST	SUBTOTAL	TOTAL
22 PLUMBING						
Plumbing Equipment						
water well system, 300-500 feet	1	ls	$23,400.00	$23,400		
electric pump (see fire protection)	1	ea	$0.00	$0		
750 gallon septic tank	1	ea	$2,145.00	$2,145		
septic system	817	sf	$10.40	$8,497		
excavate/backfill	121	cy	$39.00	$4,720		
point of use electric water heater	1	ea	$780.00	$780		
					$39,542	
Plumbing Fixtures w/ Rough-in						
toilet	1	ea	$1,300.00	$1,300		
sink with vanity	1	lf	$1,040.00	$1,040		
					$2,340	
Domestic Water Piping						
domestic water piping below grade	50	lf	$45.50	$2,275		
trench/backfill	50	lf	$26.00	$1,300		
domestic water piping	125	lf	$40.00	$5,000		
valves & accessories	3,345	sf	$0.20	$652		
					$9,227	
Sanitary & Vent System						
sanitary piping below grade	30	lf	$58.50	$1,755		
trench/backfill	30	lf	$26.00	$780		
sanitary piping	55	lf	$45.50	$2,503		
vent piping	35	sf	$39.00	$1,365		
					$6,403	
Condensate Piping						
condensate piping	40	lf	$20.00	$800		
					$800	
Other Plumbing						
wall penetrations	5	loc	$260.00	$1,300		
floor penetrations	2	loc	$195.00	$390		
firestopping	7	loc	$110.50	$774		
coordination drawings	24	hrs	$130.00	$3,120		
commissioning support	24	hrs	$156.00	$3,744		
mechanical general conditions	3	mths	$10,400.00	$31,200		
					$40,528	
22 PLUMBING TOTAL						**$98,840**
PLUMBING GRAND TOTAL						**$98,840**

MECHANICAL						
ITEM	QUANTITY	UNIT	RATE	COST	SUBTOTAL	TOTAL
23 HVAC						
HVAC Equipment						
wall mounted AC unit	9	ea	$2,080.00	$18,720		
outdoor condenser	5	tons	$4,550.00	$22,750		
electric humidifier	5	ea	$2,340.00	$11,700		
electric unit heater	1	ea	$650.00	$650		
exhaust fan	1	ea	$780.00	$780		
thermostats	9	ea	$650.00	$5,850		
humidistat	5	ea	$650.00	$3,250		
					$63,700	
HVAC Piping						
RL/RS piping	300	lf	$18.20	$5,460		
insulation	300	lf	$7.80	$2,340		
valves & accessories	3,345	sf	$0.65	$2,174		
condensate piping	70	lf	$15.60	$1,092		
					$11,066	
HVAC Air Distribution						
ductwork	50	lbs	$16.90	$845		
ductwork linings/insulation	35	sf	$4.94	$173		
					$1,018	
Other HVAC						
vibration controls	3,345	sf	$0.07	$217		
wall penetrations	13	loc	$260.00	$3,380		
floor penetrations	7	loc	$195.00	$1,365		
firestopping	20	loc	$110.50	$2,210		
coordination drawings	40	hrs	$130.00	$5,200		
testing & balancing	3,345	sf	$0.52	$1,739		
commissioning support	40	hrs	$156.00	$6,240		
mechanical general conditions	4	mths	$10,400.00	$41,600		
					$61,952	
23 HVAC TOTAL						**$137,736**
MECHANICAL GRAND TOTAL						**$137,736**

ELECTRICAL						
ITEM	QUANTITY	UNIT	RATE	COST	SUBTOTAL	TOTAL
26 ELECTRICAL						
Electrical Demolition						
remove underground electrical service	315	lf	$13.00	$4,095		
					$4,095	
Electrical Equipment						
incoming feeders-by others	315	lf	$0.00	$0		
2" PVC conduit	315	lf	$15.60	$4,914		
excavate/backfill	47	cy	$45.50	$2,123		
pull boxes	2	ea	$455.00	$910		
200 amp panel	2	ea	$3,640.00	$7,280		
100 kw exterior generator in enclosure	1	ea	$97,500.00	$97,500		
underground feeders to generator	30	lf	$58.50	$1,755		
					$114,482	
Electrical Power Devices						
power devices (incl. conduit & wire)	3,345	sf	$7.80	$26,091		
equipment connections	3,345	sf	$2.60	$8,697		
					$34,788	
Interior Lighting						
interior light fixtures, LEDs (incl. conduit & wire)	3,345	sf	$11.70	$39,137		
emergency lighting (incl. conduit & wire)	3,345	sf	$1.30	$4,349		
exterior lighting (incl. conduit & wire)	3,345	sf	$0.65	$2,174		
					$45,659	
Other Electrical						
electrical general conditions	4	mths	$10,400.00	$41,600		
fire stopping/penetrations	3,345	sf	$0.65	$2,174		
testing	40	hrs	$110.50	$4,420		
temporary power/lighting	3,345	sf	$0.78	$2,609		
grounding/lighting protection	3,345	sf	$0.33	$1,087		
coordination drawings	40	hrs	$130.00	$5,200		
commissioning support	40	hrs	$156.00	$6,240		
					$63,330	
26 ELECTRICAL TOTAL						**$262,355**

ELECTRICAL						
ITEM	**QUANTITY**	**UNIT**	**RATE**	**COST**	**SUBTOTAL**	**TOTAL**
27 COMMUNICATIONS						
Data / Voice Communications						
2" PVC conduit	315	lf	$13.00	$4,095		
excavate/backfill-cost included in electrical service upgrade	0	cy	$0.00	$0		
run fiber optics/telephone lines	315	lf	$10.40	$3,276		
pull boxes	2	ea	$455.00	$910		
data/voice outlets	3,345	sf	$1.95	$6,523		
IT rack, patch panels, etc.	1	ls	$3,250.00	$3,250		
					$18,054	
27 COMMUNICATIONS TOTAL						**$18,054**
28 ELECTRONIC SAFETY & SECURITY						
Electronic Security						
reconfigure security system	3,345	sf	$1.30	$4,349		
					$4,349	
28 ELECTRONIC SAFETY & SECURITY TOTAL						**$4,349**
ELECTRICAL GRAND TOTAL						**$284,757**

SUMMARY: 2ND FLOOR NOT CONVERTED TO OFFICES & RESTROOM			3,345 GSF
DESCRIPTION	**GSF**	**COST**	**COST/GSF**
PLUMBING	3,345 GSF	$125,339	$37.47 / GSF
GRAND TOTAL	**3,345 GSF**	**$125,339**	**$37.47 / GSF**
GENERAL CONDITIONS/REQUIREMENTS	35.0%	$43,868	$13.11 / GSF
SUBTOTAL		$169,207	
DESIGN CONTINGENCY	20.0%	$33,841	$10.12 / GSF
SUBTOTAL		$203,048	
ESCALATION ALLOWANCE	3.0%	$6,091	$1.82 / GSF
SUBTOTAL		$209,140	
SUBCONTRACTOR BONDS	2.75%	$5,751	$1.72 / GSF
SUBTOTAL		$214,891	
OVERHEAD AND PROFIT	20.0%	$42,978	$12.85 / GSF
SUBTOTAL		$257,869	
GOVERNMENT GENERAL CONDITIONS	5.0%	$12,893	$3.85 / GSF
SUBTOTAL		$270,763	
HISTORIC PRESERVATION FACTOR	12.0%	$32,492	$9.71 / GSF
SUBTOTAL		$303,254	
GRAND TOTAL		**$303,254**	**$90.66 / GSF**

DETAILS: 2ND FLOOR NOT CONVERTED TO OFFICES & RESTROOM						
ITEM	QUANTITY	UNIT	RATE	COST	SUBTOTAL	TOTAL
INTERIOR REPAIRS						
Partitions						
remove partitions	16	lf	$32.50	$520		
new partitions	21	lf	$104.00	$2,184		
fur out walls	144	lf	$88.92	$12,804		
					$15,508	
Floors						
remove linoleum floor	197	sf	$2.60	$512		
new carpet	252	sf	$6.50	$1,638		
					$2,150	
Ceilings						
add R30 insulation to attic floor	885	sf	$3.45	$3,049		
					$3,049	
Walls						
new wood base trim	177	lf	$19.50	$3,452		
					$3,452	
Doors						
new door frame, hardware	2	ea	$1,560.00	$3,120		
					$3,120	
INTERIOR REPAIRS TOTAL						**$27,279**
22 PLUMBING						
Plumbing Equipment						
water well system, 300-500 feet	1	ls	$23,400.00	$23,400		
electric pump (see fire protection)	1	ea	$0.00	$0		
750 gallon septic tank	1	ea	$2,145.00	$2,145		
septic system	817	sf	$10.40	$8,497		
excavate/backfill	121	cy	$39.00	$4,720		
					$38,762	
Plumbing Fixtures w/ Rough-in						
toilet	1	ea	$1,300.00	$1,300		
sink with vanity	1	lf	$1,040.00	$1,040		
					$2,340	

DETAILS: 2ND FLOOR NOT CONVERTED TO OFFICES & RESTROOM						
ITEM	**QUANTITY**	**UNIT**	**RATE**	**COST**	**SUBTOTAL**	**TOTAL**
Domestic Water Piping						
domestic water piping below grade	50	lf	$45.50	$2,275		
trench/backfill	50	lf	$26.00	$1,300		
domestic water piping	125	lf	$40.00	$5,000		
valves & accessories	3,345	sf	$0.20	$652		
					$9,227	
Sanitary & Vent System						
sanitary piping below grade	30	lf	$58.50	$1,755		
trench/backfill	30	lf	$26.00	$780		
sanitary piping	55	lf	$45.50	$2,503		
vent piping	35	sf	$39.00	$1,365		
					$6,403	
Condensate Piping						
condensate piping	40	lf	$20.00	$800		
					$800	
Other Plumbing						
wall penetrations	5	loc	$260.00	$1,300		
floor penetrations	2	loc	$195.00	$390		
firestopping	7	loc	$110.50	$774		
coordination drawings	24	hrs	$130.00	$3,120		
commissioning support	24	hrs	$156.00	$3,744		
mechanical general conditions	3	mths	$10,400.00	$31,200		
					$40,528	
22 PLUMBING TOTAL						**$98,060**
PLUMBING GRAND TOTAL						**$125,339**

C. POSSIBLE AREAS OF FURTHER RESEARCH

1. ARCHITECTURAL INVESTIGATION

2. HISTORICAL INVESTIGATION

3. ARCHEOLOGICAL INVESTIGATION

4. CULTURAL LANDSCAPE STUDY

5. FINISH ANALYSIS

The treatment options for the conservation of the plaster finishes and the woodwork finishes are dependent on a complete finish analysis of the interior spaces. The sample set for paint analysis should include all painted plaster walls in the basement and on the first floor. In the basement, the results of the analysis should determine the composition of the brick coating to see if it is contributing to moisture problems. On the first floor, broken samples of plaster with trompe l'oeil decorative painting should be tested to determine the composition of the binder. This will help to determine if the paint is water-soluble and what kinds of treatments are required for conservation. The sample set should also include representative samples of wood trim in each room in the basement and first floors. These samples should be tested to determine the original paint palette, if possible, or the composition of the clear finish (oil or wax). Finally, the plaster itself (all layers) should be tested with petrographic analysis to determine the composition of the original mix for replication purposes.

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E. 1995 HISTORIC STRUCTURE REPORT

WORTHINGTON HOUSE
HISTORIC STRUCTURES REPORT



OEHRLEIN & ASSOCIATES ARCHITECTS

FINAL SUBMISSION

WORTHINGTON HOUSE HISTORIC STRUCTURE REPORT:

PHYSICAL HISTORY AND CONDITION ASSESSMENT,

MONOCACY NATIONAL BATTLEFIELD

FREDERICK, MARYLAND

Contract No. CX-3000-1-0067
Work Order No. 10

March 27, 1995

Oehrlein & Associates Architects
1702 Connecticut Avenue NW
Washington, DC 20009
(202) 387-8040

TABLE OF CONTENTS

Executive Summary 1

PART 1. DEVELOPMENTAL HISTORY

A. Historical Background and Context 5

1. Historical Significance 5
2. Architectural/Cultural Significance 5
3. Archeological Significance 5

B. Chronology of Development and Use 7

1. Ownership and Development of the Farmstead 7

2. The Farmstead's Original Configuration 8
   - Construction Phases 8
   - Plans as Completed 9
   - Exterior Elevations 9
   - House Construction 10
   - Brick Masonry 10
   - Wood Floor and Wall Framing 11
   - Roof System 11
   - Doors 12
   - Porches 12
   - Wood Stairs 15
   - Interior Finishes 15
   - Mouldings 16
   - Outbuildings and Landscape 17

3. Appearance of Farmstead in 1864 17
   - Interior Finishes 17

4. Appearance of Farmstead in 1982 18
   - Farmhouse 18
   - Outbuildings 19
   - Landscape 20

C. Physical Description - Existing Conditions

1. Farmstead's Existing Appearance and Condition 21
   - Farmhouse 21
   - 1983 Stabilization Project 21
   - Landscape 23
   - Exterior Masonry 23

Windows and Doors 24
Roofing and Flashing 25
Interior Finishes 25

2. Farmhouse, Existing Structural System Evaluation 28
Introduction 28
Description of Structural System 28
Findings 29
Structural Recommendations 32

3. Farmhouse, Existing Electrical, Mechanical & Plumbing Systems 35
Existing Conditions 35
Use of The Worthington House as a Single Family Residence 36
Use of The Worthington House as an Exhibit House 37

4. Farmhouse, Compliance with Building Codes and Regulations 39
Life Safety Code Analysis 39
Energy Conservation 41
Security 42
Handicapped Accessibility 43
Building Code Compliance 44

5. Forces Affecting the Preservation of the Farmhouse and Site 46
Identification 46
Analysis 47
Recommendations and Constraints 47

PART 2. TREATMENT AND USE

A. Justification for Recommendations 49

1. Option I 49
2. Option II 50
3. Option III 50
4. Option IV 51

B. Recommendations, Alternatives and Cost Estimates 53

1. General Condition Statement 53
2. Building Elements - Problems, Alternatives and Recommendations 53
Masonry Structural Deficiencies 53
Wood Carpentry Repairs 55

Interior Finishes 60
Life Safety Deficiencies 61
Energy Conservagtion Deficiencies 63
Security Deficiencies 63
Building Code Compliance 64
Hazardous Materials 65

3. Cost Estimate 67

C. Possible Areas of Further Research 71

1. Architectural Investigation 71
2. Historical Investigation 71
3. Archeological Investigation 71
4. Cultural Landscape Study 72

PHOTOGRAPHS 77

BIBLIOGRAPHY 159

APPENDICES

A. The Battle of Monocacy 163

B. Paint Analysis 165

C. Hardware Analysis 169

D. Inventory of Significant Materials 173

E. HABS Drawings and Site Survey 183

F. Maps and Illustrations 215

G. Structural Calculations 247

H. Structural Drawings 257

I. Thermal Resistance Calculations 273

J. Preservation Tech Notes, "Temporary Window Vents..." 275

EXECUTIVE SUMMARY

The Worthington House is an important contributing element of the historical context of the Monocacy Battlefield. The house is important historically because of its location in the midst of the Battle of Monocacy and as a field hospital after the battle. It is important architecturally as an example of a largely unaltered, although deteriorated, mid-19th century farmhouse. Because of the importance of the house, any treatment must be carried out with sensitivity to the consequences which an action may have on its long-term preservation.

The configuration of the house remains largely as it was when it was built between 1847 and 1852. The house was constructed over a short period of time in at least two stages. The house has two stories, an attic and a basement, with single rooms on both sides of a central stair hall, and an ell one room deep off the back. The exterior walls and interior masonry bearing walls are common bond brick on a rubble stone foundation. Floor and roof framing and one interior bearing wall are framed in wood. A wood porch on the east elevation was removed from the house in 1983 which, although it was probably not the original porch, was an early addition to the house.

On the interior of the house the walls and ceilings were finished in plaster, applied either directly on the brick walls or on wood lath over the wood framing. A grand wood stair was constructed in the center hall with turned balusters, a curved, moulded handrail, and a decorative wave moulding at the side. A utilitarian wood servant stair was constructed in the ell. Wood mouldings were installed at the windows, doors, and bases, and four-panel doors were installed at the doors.

Of particular interest in the house is the decorative painting which is found in the stair hall and parlor. Faux panelling, ceiling rosettes and other ornamentation was painted on the plaster walls and ceiling of these rooms. Wood graining was painted on doors, stairs and mouldings.

The most important moment in the history of the Worthington House was the Battle of Monocacy, which took place on July 9, 1864. During the battle, Confederate troops crossed the Monocacy River to the south of the house, marched across the Worthington Farm past the house, and engaged Federal troops in battle to the north and west of the house. The history of the Battle of Monocacy is recounted in a book written by Glenn Worthington, who witnessed the battle as a child from the basement of the house.

By the time the house was purchased by the NPS in 1982, it had been vacant for almost 30 years. The house had deteriorated as a result of the neglect which it had suffered, however there had been few alterations to the house since it had been completed over a century before. In 1983 a team from the Williamsport Preservation Training Center performed work on the house, with the goal of stabilizing the structure. The now-collapsed porches were removed, masonry was repaired and repointed, a new galvanized roof and gutter system was installed, wood was painted, windows were repaired and sash

were replaced with louvers. Since the NPS purchase of the Worthington House and Farm all of the remaining outbuildings have been demolished, so the house is now the only remaining structure in the area.

The 1983 work was largely successful in stabilizing the condition of the house, but little restoration of damaged elements took place, and some deterioration has continued. The general condition of the house is not good, although it is remarkably intact for having been unoccupied for over forty years. There are also elements which are inconsistent with the historic construction of the house. The porches are missing from all the 1st floor doorways. Masonry is continuing to deteriorate and mismatched mortar stands out from the original mortar joints. None of the original chimney tops remain above the roof. The metal roof is effective in keeping water out from the house, but it does not match the original slate roof which was removed from the house. Exterior doors to the basement and the ell have been replaced with plywood doors or have been blocked up.

On the interior, both the structure and finishes have been damaged by water infiltration. Plaster has fallen from the walls, especially in the stair hall and north walls of the dining room, ell and north bedroom. The decorative paint is flaking from the walls in areas where the plaster is intact. Wood flooring and wood floor joists have rotted to the point of failure in the stair hall, dining room, north bedroom and both floors of the ell. Vandalism and other wear has damaged the main stair, so that there are almost no remnants of the balustrade remaining and much of the trim has been removed. Plaster and decorative paint has been damaged by graffiti and holes punched through the walls. Wood doors, door casings, window casings and fireplace mantels have been damaged by water penetration and vandalism. There is no plumbing or electrical service to the house, and there is not an operable heating system.

An analysis of the current life safety, structural, electrical, mechanical, and plumbing codes shows that there are many areas where the house does not comply with requirements necessary to use the house as a residence or as an exhibit house open to the public. These areas of non-compliance include exit deficiencies, fire safety deficiencies, handicapped accessibility deficiencies, sub-standard lighting, ventilation, electrical, mechanical and plumbing systems, and inadequacies in the structural system.

Recommendations for the house are divided into four options, listed in order of priority. Option I is the minimum work necessary for the preservation of the historic fabric. With this option, only necessary stabilization and maintenance of the house would be done. Option II restores missing or altered historic fabric so the house is accurate to the Civil War era. This work is in addition to the work of Option I, and would include some speculation since the configuration of all the elements of the house at the time of the Civil War is not entirely known. Option III uses the house and site for specialty tours by those people who have a special interest in architectural history, historic construction, history of 19th century farm life, or the history of the Battle of Monocacy. The house would have to be made handicapped accessible if it is used by the public. Option IV uses the house as a single family residence, and would be done in conjunction with Options I, II,

and/or III. Basic amenities would have to be introduced into the house, and this work could damage or cover important historic fabric. The most effective way to rehabilitate the house as a single family residence is to divide the house into zones. The zones recognizes the relative architectural and historic integrity of the different parts of the house, and assigns the necessary amenities, such as a bathroom and kitchen to the less significant parts of the house.

PART 1. DEVELOPMENTAL HISTORY

PART 1. DEVELOPMENTAL HISTORY

A. HISTORICAL BACKGROUND AND CONTEXT

1. HISTORICAL SIGNIFICANCE

The Worthington House contributes significantly to the historical context of the Monocacy Battlefield. On July 9, 1864 Confederate troops under the command of Lieutenant General Jubal Early engaged in battle with Union troops under the command of Major General Lew Wallace.[1] Early prevailed in the battle and continued on his march towards Washington, but the delay caused by the Battle of Monocacy allowed Union forces to prepare for the defense of the capital.

Much of the action of the Battle of Monocacy took place in the vicinity of the Worthington House. According to Glenn Worthington's account of the battle, Fighting for Time, the house also served as a field hospital after the battle.[2] As the only remaining structure in that part of the battlefield, it is an important feature in the interpretation of the historic battle.

2. ARCHITECTURAL/CULTURAL SIGNIFICANCE

The Worthington House is a good example of a relatively unaltered mid-19th century farmhouse. Although it has deteriorated during the forty years since it last had a permanent resident, much of it is still intact. The center hall with an ell plan is representative of a typical house plan of the period. The house preserves examples of high quality design and craftsmanship of the period, including the woodwork of the doors, windows, mantels, cabinets, stairs and mouldings, wood framed floors, roof rafters and interior walls, stone masonry foundations, brick masonry walls, wood graining on the doors, and plaster finishes. Of particular architectural significance is the trompe l'oeil decorative painting on the plaster in the stair hall and the parlor. The farmhouse is the only surviving structure on the farmstead.

3. ARCHEOLOGICAL SIGNIFICANCE

The archeological significance of the farmstead has yet to be established. It is likely that there is evidence on the site which may indicate the locations of buildings, walls, roads and other missing structures and natural features. It is also likely that there are historic artifacts which may have been left at the site from the Battle of Monocacy and the nearby troop encampments. These artifacts may help to define the role that the farm and its occupants played in the confrontation.

ARCHEOLOGICAL SIGNIFICANCE (cont'd)

The area around the Worthington house is also a possible prehistoric archeological site. A 1979 study of the battlefield reported that the Monocacy River Valley in the vicinity of the battlefield is "an area of high archeological potential. Sites with cultural affiliation from the Early Archaic to Late Woodland have been recorded in the first and second river terraces as well as in the higher areas overlooking the river".[3]

B. CHRONOLOGY OF DEVELOPMENT AND USE

1. OWNERSHIP AND DEVELOPMENT OF THE FARMSTEAD

Between 1835 and 1847 a wealthy farmer named Griffin Taylor purchased three farm properties, sold parts of them, and consolidated the remaining parcels into a single farm.[4] The farm, known as Clifton Farm, was 300 acres located within a crook of the Monocacy River (see maps of 1856 plat, Figures 2 and 3). Taylor located a farmstead at the intersection of the three parcels. The house at the Clifton farmstead was later known as the Worthington House.

The Worthington House was built between 1847 and 1852. The earliest the house could have been built was 1847, when Taylor purchased the final parcel of land necessary for the farmstead. By 1852 a county assessment reported two brick dwellings on Taylor's property, one of them being the Worthington House. The second brick dwelling was the late 18th century house at the adjacent farm, Araby, where Taylor lived from 1852 until his death in 1855. Taylor had sold his previous home on the farm north of the Monocacy River in 1851, so it is possible that Taylor lived in the Worthington House in the interim between residences. After Taylor moved to Araby, the Worthington House was probably rented to a tenant farmer.

Following Taylor's death, Clifton Farm and Araby were sold in 1856 to two partners from Georgetown, Turner Alfred Ball and John F. Wheatley. During Ball's and Wheatley's ownership of the properties, Clifton was a subsidiary of the larger and more established Araby Farm. Ball resided at the Worthington House and Wheatley lived at the Araby Farm house. Ball and Wheatley formed a partnership with another neighbor, James Gambrill, in which rye or barley was grown by Ball on Clifton Farm, Gambrill ground the grain into malt at his mill, and Wheatley operated a distillery. In 1860 the distillery enterprise failed and the Araby portion of the farm was sold by Ball and Wheatley to C.K. Thomas.

Two years later, in 1862, Ball and Wheatley sold Clifton Farm to John T. Worthington, and Ball moved from the house. Worthington and his wife, Mary Ruth Delilah Simmons Worthington, were both from prominent Frederick area farming families. Mary and John Worthington lived in the house until their deaths in 1902 and 1905, respectively. The Worthington family was residing at the house at the time of the Battle of Monocacy, and watched the battle from the basement of the house. Glenn Worthington's observations from the basement of the house at age six was the foundation of his account of the Battle of Monocacy, Fighting for Time. According to Glenn Worthington, the farm was known as "Riverside Drive and Farm."[5]

During the 1890's John Worthington stopped farming at Clifton, and the house became a boardinghouse. After John Worthington died in 1905, his sons Glenn and Clarke Worthington became owners of the property, and the farm and house were rented to tenant farmers.

1. OWNERSHIP AND DEVELOPMENT OF THE FARMSTEAD (cont'd)

The farm stayed in the Worthington family until 1953, when it was sold to a corporate farming operation, Jenkins Brothers, Inc. Jenkins Brothers used the house to board migrant farm workers, but otherwise the house has not had a permanent resident since 1953. The National Park Service acquired Clifton Farm and the Worthington House in 1982.

2. THE FARMSTEAD'S ORIGINAL CONFIGURATION

Construction Phases

The Worthington House was built in at least two distinct stages. The evidence for the different phases of construction of the house is found in the existing materials of the house. The materials of some elements, such as the roof framing, the nails, the color and quality of the exterior brick work, and the colors of the paint, are so uniform throughout the house so as to suggest that it was all constructed at one time. Other elements, however, show that the house was built in two or more phases. The different stages of construction are evident in the configuration of the basement walls and in the materials and techniques used for flooring, floor framing, wood mouldings, and plastering. At the north side of the stair hall there is a consistent break in the continuity of these elements. While roof framing, nails, brick work, and paint colors are consistent on both sides of this wall, the differences in these other elements indicate that the house was constructed in more than one stage.[6]

It is probable that the materials which are consistent throughout the house, the nails, paint and brick, were either acquired at the beginning of the project, or they were acquired over time from a single source. The acquisition of the other materials and the completion of the house were probably dependent on the availability of the cash needed to pay for the materials and the labor, and the availability of the craftsmen to do the work.

The south part of the house, including the south room of the basement, the stair hall, the south bedroom, and the south part of the attic, were the first parts to be completed. At that point the house formed a 2/3 plan house, a type which was not unusual in the region (see plans and elevations for restoration of 2/3 plan house in Appendix F).[7] A now-missing shed or separate outbuilding probably served as a kitchen for the 2/3 plan house. After the first section of the house was constructed, it could have been lived in while the remainder of the house was built.

The dining room and the ell on the 1st floor, the 2nd floor north bedroom and ell, and the attic above were then constructed, completing the house. Although the timing of the construction of the north rooms and the ell is not known, they were completed not long after the original 2/3 house was built. At the very latest, the additions on the north were complete before the Battle of Monocacy in July, 1864. In his account of the battle, Glenn Worthington refers to events taking place "in the backyard, in the angle made by the wings of the house," indicating that the ell existed by that time.[8]

Plans as Completed

Because the completion of the house occurred soon after the construction of the south rooms, the following discussion of the original construction of the house will include the north rooms and the ell.

The plan of the Worthington House as completed was a single pile, two story center hall house with an ell, attic and full basement.[9] An open stair in the center hall went from the 1st floor to the 2nd floor. An enclosed service stair on the east wall of the ell went from the basement to the second floor, and an enclosed stair in the southwest corner of the ell went from the second floor to the attic. The porch on the east elevation (removed from the house in 1983) covered almost the entire width of the house, so it could not have been constructed until after the north rooms were completed.

Masonry walls divided the basement into three spaces. There was one large space on the south, below the parlor and the stair hall, and two roughly equal, square spaces on the north, one below the dining room and one below the ell.

The 1st and 2nd floor plans are similar in their general layouts. They both have one room on either side of the main stair hall, and narrow passages through the landing at the servant stair to the ell. At the basement, 1st floor and 2nd floor, fireplaces were built at the north and south walls of the main block. At the basement and the 1st floor, fireplaces were built at the west wall of the ell. At the 2nd floor there is a wood stair to the attic in the southwest corner of the ell.

On all the elevations, the stone foundation was exposed for one or two feet above grade (see Photos 1 through 7 and 13). Red brick walls were laid on the stone foundation in common bond, with bond courses every sixth course. There were brick gables with moulded rake boards at the north and the south of the main block, and at the west end of the ell. On the east and west elevations of the main block and the north and south elevations of the ell the eaves corbeled out to support the gutters (see Photo 11).

Basement windows were typically six light sash, with the sills sitting on the stone foundation. First floor windows were typically tall six-over-six double-hung windows with wood sills and lintels. Second floor windows were similar to the 1st floor windows, but not as tall.

Exterior Elevations

The main entry to the house and the original road approach to the house were on the east elevation (see Photos 1 and 2). The east elevation was divided into five bays. At the 1st floor on the east elevation, the entry door was in the center bay and there were windows in the other four bays. The basement had four windows, with no windows below the entry door, and the 2nd floor had a window in each bay. The entry door had sidelights and a transom window (see Photos 1, 2 and 8 through 10).

2. THE FARMSTEAD'S ORIGINAL CONFIGURATION (cont'd)

On the north elevation there was a door with a transom window and two double-hung windows on the 1st floor, three double-hung windows on the 2nd floor, a small, four-light window to the attic and a single window to the basement (see Photo 3). Stairs and a porch in an unknown configuration led to the door.

On the west elevation of the ell there was a single double-hung window at the 1st floor and a four-light window at the attic of the ell (see Photos 4 and 5). On the west elevation of the main block there was a door and a single window at the basement, a door and a double hung window at the 1st floor, and two windows at the 2nd floor.

On the south elevation of the ell there was a door and a six-light window to the basement, a door with a transom window and a four-over-four window at the 1st floor, and two double-hung windows on the 2nd floor (see Photos 5 and 6). On the south elevation of the main block, there was a single four-light window at the attic (Photo 7).

House Construction

The foundation and basement walls at the perimeter of the house, including the ell, were built of flat rubble stone, approximately 18" wide and exposed for one to two feet above grade. The brick walls of the house were laid directly on top of the stone foundation walls, flush with the face of the stone wall on the exterior. The brick walls were about 4" narrower than the stone foundation walls, so there was a ledge exposed at the top of the stone on the interior (see Photos 33 through 35).

The stone foundation was built in two roughly equal sections. The first section to be built was the south section below the stair hall and the parlor. The four inch ledge on the inside of the foundation wall continued on all four sides, including the wall below the north wall of the stair hall, in the configuration of an exterior wall. The north section of the foundation was built to the south section of the foundation. Between the main block and the ell on the west elevation this can be seen where the masonry for the ell was laid to the masonry of the main block. The two-part foundation configuration is strong evidence that the house was originally built in a 2/3 plan (see drawings of restored 2/3 plan house in Appendix F).

Two entry doors opened directly to the basement, one at the south end of the west wall of the main block, and the other at the west end of the south wall of the ell. Rubble stone retaining walls enclosed the areaways to the basement doors (see Photos 5, 6 and 13).

Brick Masonry

Exterior brick walls were laid on top of the stone foundation walls. It was laid in common bond, with a header course every sixth course. The brick used on the exterior was very consistent in appearance, indicating that it was probably all from the same kiln. The only joint which is visible in the brickwork between the original and the added parts

of the construction is at the inside corner where the west wall of the main block meets the south wall of the ell.

The masonry wall between the main block of the house and the ell was built of brick all the way to the basement floor, with no stone foundation. The walls of the two north basement rooms were limewashed. The brick above the stone foundation in the south room of the basement was plastered and limewashed. Two brick fireplaces were built in the basement, at the south end of the main block and at the west end of the ell (see Photos 33 and 35). Both of these fireplaces used the exterior brick wall as the outside wall of the chimney. At the south end of the main block brick corbels stepped out to support the fireplace above.

On the 1st and 2nd floors the brick masonry walls continued up to the roof in brick. At the gable ends, 6 3/4" rake boards with a beaded edge and splash boards were installed directly on the face of the brick. At the eaves the brick wall corbelled out for four courses to form a cornice. Window and door openings were framed with wood headers, and the interior walls were plastered directly on the brick. All of the exterior brick on the house is similar in appearance, without variation in size or color from one part of the house to another.

On the 1st floor, brick fireplaces were built at the north and south ends of the main block and at the west end of the ell, and on the 2nd floor there were fireplaces in the two bedrooms, on the north and south walls of the house (see Photos 18, 19, 21, 25, and 26). The brick fireplaces were finished with plaster and covered with wood mantels.

Wood Floor and Wall Framing

In addition to the masonry walls, an interior wood frame wall was constructed at the south of the stair hall. The wood frame wall was finished with lath and plaster on both sides. An unmilled wood post in the basement supported the wood framed wall at mid-span (see Photo 34).

The floors of the house were framed in oak (see structural drawings). Floor joists typically spanned the full width of the house, except in the stair hall. At the stair hall a 6" wide by 7 1/2" deep beam ran the width of the house, supported mid-span by a post. The floor joists in the stair hall ran north-south across the width of the hall from the beam to the masonry wall at the north of the stair hall. In other locations on the 1st and 2nd floors, the floor framing ranged from 2 1/4" to 3" wide, from 8 3/4' to 9 1/2" deep, and were spaced from 21" to 24" on center. At the attic, the floor framing was 2 1/2" wide by 6 3/4" deep, 22" to 24" on center.

Roof System

A 1" by 7 1/2" plate was nailed to the top of the attic floor joists, running the length of the building above the masonry walls at the ends of the joists. A pair of rafters was joined to the plates above each floor joist with a bird's mouth joint (see structural detail

D and Photos 37, 39 and 40). One or two metal spikes driven in from above held the rafter, floor joist and plate together. The pairs of rafters were butted at the ridge and nailed together with no ridge boards. Each rafter has a Roman numeral inscribed on its south side near the ridge, but the order in which the rafters are set is not sequential. The numbering system may have been used only to keep rafter pairs together. One inch thick pine sheathing was nailed to the rafters, and a slate shingle roof was nailed to the sheathing.

The rafters over the main block were paired, and were continuous at the intersection with the ell roof. The ell roof rafters were laid on top of the sheathing of the main roof rafters (se Photo 37). The sheathing on the main block rafters was discontinuous in the area between the rafters of the ell, and there are no nail holes on the tops of the main block rafters in this area. This indicates that there was never any roof over these rafters, and that the ell roof always covered the main block roof in this configuration.

Doors

Four doors opened from the 1st floor to the exterior, one at each end of the center hall, one at the north end of the service stair, and one on the south wall of the ell The doorways on the north and south elevations of the ell had transom windows, but the configurations of the doors themselves is not known.

The main entry door on the east elevation had a transom window and sidelights (see Photos 1, 2, 8 and 9). The door, transom and sidelights were ornamented with classical mouldings and scroll brackets with carved acanthus leaves. The west door to the stair hall was squeezed beneath the landing of the stair, so that the head casing of the door is hidden beneath the plaster of the soffit above. Both of the doors to the stair hall were four-panel doors, with raised panels and applied mouldings. Both doors and their casings and trim were grained on the interior to have the appearance of oak (see Photos 15 and 17).

The passage doors on the interior were four-panel doors with applied mouldings. The doors to the closet in the north bedroom were flat panel doors with no mouldings (see Photo 25 and 26). The doors to the ell in the basement and to the closet under the attic stairs were beaded board doors. The types of doors used in other locations is not known. The hinges on the panel doors were primarily cast iron, and the latches were primarily cast iron rim latches. The hinges on the beaded board doors were wrought iron strap hinges (see hardware analysis, Appendix C).

Porches

All four doors to the outside from the 1st floor were about five feet above grade, and opened to porches and stairs leading down to grade. No porches are now intact on the house, so the evidence for the original configuration of the porches is not entirely clear.

The porch from the east elevation and the west elevation were removed in 1983, after they had severely deteriorated. Parts from the east and west porches were stored in the basement of the house.

The configuration of the porch and stair at the north door is not known. There is no documentation of the porch, and there is no discernible outline of a porch visible on the brick. Two small iron loops projecting from brick joints above the adjacent window heads were possibly used as anchors for a porch roof (see Photo 9).

A single porch on the south side of the ell served both the door from the west end of the stair hall and the door from the south side of the ell. This porch had a roof over it when it was removed in 1983, but the original configuration is not known.

The main, public entry was on the east elevation of the house. A porch which ran the full width of the elevation was removed and placed in storage in the basement in 1983. The full-width porch was built with brick piers under each post and brick walls under both ends, a continuous guardrail with 1" by 1 1/4" balusters, columns with decorative mouldings at the bases and capitals, ornate brackets at the tops of the columns, and a metal roof covering the entire porch (see drawings of the reconstructed porch in Appendix E, dismantling drawings in Appendix F, Photo 36, and photographs of the porch in Appendices F and I). There is no evidence for the stairs which led down from the porch, but it is assumed that there was a set of wood steps over the width of the center bay.

Some indications suggest that the full-width porch was a very early, if not original, element of the house. Analysis of the paint on the porch and the paint at the east entry, and comparison of the nails used on the porch and the nails used on the house, indicate many similarities (see hardware and paint analyses, Appendices B and C).

Other elements, however, indicate that the porch was built later than the main part of the house. On the porch the structural members used were narrow and deep circular sawn pine, and main members were made up of paired timbers which were nailed together. In contrast, on the house the floor structure was made up of vertically sawn oak, and main members on the house, such as headers at stairs, were wide individual members, rather than paired. It is not likely that the porch would be built at the same time as the house using such different materials and construction techniques.

The four basement windows on the east elevation were beneath the full-width porch, rendering them almost useless. If the wide porch were part of the original house, the basement windows probably would not have been placed in a location where they were of so little use.

The wide porch also would not have been an original part of the house if the house had been built in more than one phase. If the house had been originally constructed in the form of a 2/3 house, as it appears to have been, an original porch would have covered only the original part of the house.

However, the strongest contrast between the house and the porch is the stylistic dissimilarities between the porch and the house, and in particular between the porch and

the east entry. The classical mouldings and the scroll brackets at the entry are delicately carved and finely executed. The ornamentation at the entry was made up of scrolls with hand carved acanthus leaves, and fine mouldings made by hand planes. These mouldings at the entry are very different from the larger mouldings of the porch, and the scrolls at the entry are in contrast with the ornamental brackets on the porch, which are flat, sawn pieces.

While both the style of the entry and the style of the wide porch could be representative of the 1847-1852 construction period of the house, the construction date is late for the style of the entry, and early for the style of the porch. Stylistically, the doorway could have been built at almost any time during the first half of the 19th century. The panel door with sidelights, transom and scrolls is seen in both Federal and Greek Revival styles from 1800 to 1860.[10] The wide porch is typical of the type popularized in books such as Andrew Jackson Downing's 1850 The Architecture of Country Houses.[11] The wide porch could have been built in this style at any time from 1840 up to the 1890's.

It is possible that the Worthington House originally had a small porch at just the center bay of the east elevation. This type of porch would be consistent with the architectural style of the east elevation, it would be consistent with the apparent chronology of the house, and it would be appropriate for the house both when it was in a 2/3 plan and later, when it was a full center hall plan.

Evidence indicating the location, size or configuration of a single bay porch is not clear, however. There is no evidence on the brick of paint lines, uneven weathering, or modified flashing. The only indications of a previous configuration for the porch are two iron loops in the masonry, similar to the iron loops on both sides of the door on the north elevation (see Photo 15). These may have been used to anchor pilasters or a roof for the original porch, but it is not clear how or in what configuration. The porch may have been a simple platform structure with no covering, or it may have been a more elaborate columned, pedimented structure with classical mouldings.

If the original porch were a single bay porch, it may have been replaced sometime around the Civil War with the wider, more up-to-date porch. In Fighting for Time, Glenn Worthington describes, perhaps enviously, the "wide-roofed porch or piazza in front," of the neighboring Thomas House.[12] The wide porch on the Worthington House may have been part of the renovation which added the north rooms and the ell, or it may have been added some time later. At any rate, the paint analysis indicates that there was probably not a lot of time between the different phases of construction (see Paint Analysis, Appendix B).

The Pry House at Antietam National Battlefield underwent a similar modification to its entry porch after the Civil War (see Figures 6 and 7). In a recent restoration, the wide, Victorian style porch which had been added to the Pry House after the Civil War and which was similar to the wide porch on the Worthington House was replaced. A reproduction of the original porch which was known in photographs to have existed at the time of the battle was built in its place.

Wood Stairs

The open main stair in the center hall was framed and finished in wood (see HABS drawing of stair details, Appendix E, and Photos 14 through 17). The quality of the workmanship in the stair construction was very high. The joinery, the turning of the balusters, the decorative mouldings and the wood grained finish exhibit the work of skilled and experienced craftsmen.

The stair treads and risers were set on four 2 1/2" wide wood carriages, mortised into 2 1/2" wide wood framing at the landings. Three slots were carved in the back of each riser, through which unpointed screws were driven up into the treads, anchoring the front of the tread and the top of the riser together. A cove moulding was dadoed into the bottom of the tread below the nosing, concealing the joint between the top of the riser and the tread. The back of the tread was dadoed into the bottom of the riser. The continuous stringer curved at the landing and was ornamented with a wood wave moulding along the face and a beaded moulding along the bottom. The 8 1/2" high wood base in the stair hall followed the stair along the wall up to the landing at the 2nd floor.

Two turned balusters were attached to each tread with a dovetail joint. The balusters were made of walnut and were turned with crisp classical profiles. The balusters supported a continuous curved handrail. A newel post at the end of the handrail projected through the floor and was anchored to the framing below. A wall of 3 3/4" by 2" studs and lath and plaster ran straight back beneath the stringer of the first run of the stairs to the west wall of the house.

The servant stairs in the ell between the basement and 1st floor and 1st floor and 2nd floor were also built in wood, but they were simple utilitarian stairs (see Photos 20, 28 and 32). At both levels, the east side of these stairs were built against the brick wall between the ell and the main block of the house. On the west side at the first floor the stair was enclosed with a beaded board wall.

In the southwest corner of the 2nd floor of the ell a tight wood stair ran to the attic. This stair was enclosed with a beaded board wall (see Photo 29). Four tight twisting treads turned the direction of the stair from west to north.

Interior Finishes

In the basement the two north rooms were finished only with limewash on the walls (see Photos 32 and 33). The unfinished bottom of the flooring and the floor joists were exposed at the ceilings, and the floors were dirt.

The ceiling of the south room in the basement was finished in wood lath and plaster (see Photos 34 and 35). The lath was nailed directly to the bottom of the floor joists above. The south room was partitioned into three main spaces and a passageway, with vertical 7/8" thick tongue-and-groove boards (indicated by dotted lines on the HABS basement plan). The use of these partitioned spaces is not clear. The masonry walls were plastered and limewashed.

Throughout the 1st and 2nd floors of the house, the masonry walls were finished with plaster applied directly on the face of the brick (see photos of interiors, Photos 14 through 31). The wood frame wall at the south of the stair hall was finished with plaster over wood lath. Two distinct methods of plastering were used in the house, one method at the south section of the house included in the original 2/3 plan, and the second method used in the north rooms and the ell at the north of the (see HABS drawings of window mouldings). In the stair hall and the parlor and south bedroom, the plaster was screeded using the window frame as a ground, and then the mouldings were installed on top of the plaster. In the rooms north of the stair hall, the mouldings were installed first, and the plaster was then applied up to and under the edge of the moulding. The wood floors on the 1st and 2nd floors were 7/8" tongue-and-groove wood floors. The flooring was discontinuous between the stair hall and the dining room and between the stair hall and the north bedroom (see Photo 27). This discontinuity in the floor construction supports the idea that there was more than one phase of construction, with the line between the phases at the north wall of the stair hall.

The entire attic area was covered with a wood floor (see Photos 37 through 40). The flooring in the attic over the stair hall and the south bedroom was 7/8" thick tongue-and-groove boards, and the attic over the area north of the stair hall had flooring of 1" thick butted boards. The north, south, and west ends of the house had brick gable ends, each of which had a single sash six light window. The walls at the attic stair were plastered and painted, but otherwise the brick, wood floors, rafters and sheathing at the attic were unfinished.

Mouldings

The mouldings in the house are in three set, and these three set are in two basic groups (see HABS drawings of window and door mouldings). The two groups are so different that it is unlikely that they were executed at the same time or by the same hand. The first group is the set "A" mouldings, found in the parlor, stair hall and south bedroom, the parts of the house included in the original 2/3 plan. The set "A" mouldings are generally round and curved hand-planed mouldings. These mouldings were applied on top of the finished plaster. Moulding sets "B" and "C", the second group of mouldings, are located in the rooms north of the stair hall, the parts of the house which were added to the original 2/3 plan house. Mouldings in sets "B" and "C" are generally flat and rectangular, with shallow machine-cut dadoes and thin bead mouldings. These mouldings were applied to wood blocking in the masonry, and the plaster was then installed up to and below the edge of the mouldings.

Outbuildings and Landscape

From the beginning, the farmstead surely included the outbuildings necessary to operate a farm, but little is known about the farmstead's original configuration. An advertisement for the sale of Griffin Taylor's estate in the Frederick Examiner lists outbuildings and other features which existed in 1856 on the 300 acre Clifton Farm. "The improvements consist of a new two-story brick house and kitchen, a good frame barn, and a corn crib, sufficiently large to house four hundred barrels of corn; with a large number of fruit trees around the dwelling."[13]

A drawing of the farmstead dating from 1930 shows three outbuildings to the south of the house, one or two outbuildings to the north of the house, and a large barn to the west of the house (see Figure 5).[14] In the drawing there is a barn directly behind the house, and the slave quarter is likely to be the center chimney outbuilding shown to the south of the house. Which of these structures was part of the original layout of the farmstead is not known.

3. APPEARANCE OF FARMSTEAD IN 1864 (BATTLE OF MONOCACY)

Interior Finishes

After the north rooms, ell and the wide porch were constructed, no major additions were subsequently made to the Worthington House. There were, however, changes to the interior finishes which were made soon after the house was completed. Decorative murals and ceiling paintings were added to the plaster in the stair hall and the parlor. The decorative painting consists of faux paneling in the stair hall in gray with dark red borders, and a ceiling border and faux ceiling medallion in the parlor, in similar colors (see Paint Analysis, Appendix B). This painting may have been applied around 1856-58, based on the dates of similar work done in the Frederick County area around the same time. The decorative painting has been attributed to Constantine Brumidi, an Italian painter who executed frescoes at the Vatican, the U.S. Capitol Building and various American residences and churches. Comparing the painting at the Worthington House to other known work by Brumidi, it is doubtful that the work was executed by the same hand.[15]

Although the HABS documentation of the Worthington House says that the wood mouldings in the stair hall and south rooms were replaced at the same time that the decorative painting was done, the physical evidence does not support this idea.[16] The mouldings in these areas appear to be original. There are no extra nail holes, no repaired plaster, and no previous paint lines which would indicate that there was previous wood trim at the doors and windows of the room or that the existing mouldings were replacements. The mouldings in this part of the house were of an older style and were hand-planed, rather than machine-planed, so it is not likely that they were installed after the newer-looking mouldings found in the north part of the house.

4. APPEARANCE OF THE FARMSTEAD IN 1982

Farmhouse

By 1982, when the National Park Service purchased the Worthington House and Clifton Farm, the house, the farmstead and all the buildings on the site had been sitting unused and were in poor condition. The house had been vacant since 1953, except for the temporary housing of migrant farm workers, and although the land was still being farmed, the outbuildings were not being used and had been left to deteriorate. In addition to deterioration, other minor changes had also taken place to the house.

Electricity was brought to the house in 1935.[17] Electrical service powered a pump at the pump house to the south of the house, the electric stove in the first floor ell, and electric lights (see Electrical, Mechanical and Plumbing Systems report).

No central heating system had ever been installed in the Worthington House, although the fireplaces and chimneys had been adapted to be used by woodstoves. Holes were cut in the chimney breasts above the mantels for stovepipe connections, and holes were cut in the floor between the 1st and 2nd floors in all three rooms to run stovepipes between floors (see Photos 18, 21, 25 and 35). It is not known when these modifications to the chimneys took place or what type of woodstoves were used in the house.

The wall at the inside of the stair to the basement was finished with a beaded board siding (see Photo 20). Wire nails were used to attach this beaded board siding, indicating that it was installed sometime after 1880.[18]

Between 1953 and 1982, during the ownership by Jenkins Brothers, Incorporated, the Worthington House was used for boarding migrant farm workers. During this time, the south rooms on the 1st and 2nd floors were both divided into two rooms.[19] Small entry foyers were constructed and board walls were run down the centers of the rooms (see Photo 30). From the entry foyers doors opened to each side of the rooms. The board walls and the doors have been removed, but parts of the foyers remain and marks on the ceilings and plaster walls indicate where the walls had been, and there are boards on the south bedroom fireplace which closed the wall over the fireplace opening (see Photo 25).

By 1982, the house had been long abandoned and the general condition of the house was deteriorated. The 1979 appraisal report said, "All of the windows are broken out or missing, and there is a gaping hole through the brick wall into the cellar on the rear or west wall. The interior is very deteriorated due to exposure to the elements, with plaster falling, pine flooring rotting, and doors missing or barely hanging".[20]

The deterioration of the Worthington House is further described in a 1979 planning document for the proposed park. This report stated that

> Principal problems lie in the roof and drainage systems. Slates are delaminated, cracked, loose and missing. Water has penetrated into the wood sheathing beneath and caused rot development, particularly along the northern exposure of the back wing. Rafters are still sound,

> nonetheless. Flashing between the main section and the back wing has deteriorated, also permitting water penetration. Gutters and downspouts are missing, allowing rainwater to course over the brick walls, washing away mortar and initiating spalling by freeze-thaw action. Damage is particularly evident at the joint between the main house and the wing, where water has soaked into the masonry, causing walls and decorative plasterwork to crumble. All of the above problems have been aggravated by the fact that most sash and door units are missing.[21]

Despite the water penetration problems and the attendant deterioration, the planning report stated that "Worthington House is in remarkably good shape for a building which has been unoccupied for ten years and neglected long before that. Damage to the structural framework and fabric of the building is still relatively minor and can be corrected".[22] The report emphasized that maintenance to correct the water problems had to be undertaken soon to prevent additional serious deterioration.

The condition of the porch in 1982 was poor, as indicated in the 1979 appraisal report. The porch roof was still standing, but the report said that "the front porch is badly deteriorated and is missing the front steps, most of the hand railing, and one of the support columns."[23] The porch roof collapsed sometime soon after (see illustrations from 1979 report, Figure 8).

Some interior finishes had already suffered major damage by the time the Worthington House was purchased by the National Park Service. The handrail and most of the balusters of the main stair had been removed. Only fragments of the stair rail and balusters remained in the house. Much of the decorative plaster had deteriorated or fallen off the wall, especially in the upper stair hall. An electric light fixture had been installed in the center of the parlor. The electrical work opened a hole in the middle of the ceiling rosette, cut a channel through the lath and plaster for laying wiring, and caused cracks to develop in the plaster all around the fixture.

Outbuildings

When the National Park Service acquired the Worthington House, a number of outbuildings still existed on the farmstead. The 1984 revision of the U.S. Geological Survey map of the area shows two outbuildings to the southwest of the house (see USGS map, Figure 1).[24] It is not known what these buildings on the map were or if they were actually there during the 1984 revision of the map, since revisions were not field verified.

The 1979 appraisal report describes four outbuildings existing on the property near the house, all of them in poor condition.[25] Forty-five feet northwest of the house there was a dairy building 26' by 13', with 8' high walls, built of CMU (concrete masonry units). It had a sheet metal roof with gable ends, a concrete floor, and was divided into three spaces. Twenty feet north of the dairy building was a dairy barn, 44' x 34', also with CMU walls. The dairy barn had a metal roof in a gambrel profile and a wood frame loft supported by two rows of steel columns. The interior walls of the CMU were parged and

the floor was concrete. Both of these buildings were probably twentieth century structures, based on the materials with which they were constructed.

Fifty feet west of the dairy barn were a 40' x 28' wood frame wagon shed and a 40' x 20' wood frame barn shed. These two wood frame buildings are described in Urquhart's report as being "pre-Civil War."

All of the buildings are described by Urquhart as being in extremely poor condition. There are almost no traces of these buildings left on the site. It is not known when or why these buildings were demolished.

Landscape

In 1951 the construction of Interstate 270 condemned a two hundred foot wide parcel of land running roughly north-south across Clifton Farm to the east of the Worthington House. The new right-of-way for I-270 crossed the existing access road to the Worthington House, requiring a new access road to be constructed. The original road ran from the Worthington House towards the northeast, and connected to Georgetown Pike (now known as Route 355) just south of where it crossed the Monocacy River. At the time of the Civil War, another road ran southeast from the farmstead, running between Worthington House and the house at Araby, now known as the Thomas House (see maps in Appendix F). The new access road to the Worthington House was built starting at Baker Valley Road, just west of the I-270 overpass. The access road runs north along the west side of the Interstate 270 right-of-way for about 2/3 of a mile to the Clifton Farm, and then curves west towards the Worthington House.

The construction of Interstate 270 and the relocation of the access road to the Worthington House makes comprehension of the Monocacy Battlefield difficult for visitors. I-270 effectively cuts the battlefield in two, and runs across a part of the battlefield where much of the fighting took place. The elevated grade of the highway breaks up any visual continuity between parts of the battlefield.

C. PHYSICAL DESCRIPTION - EXISTING CONDITIONS

1. FARMSTEAD'S EXISTING APPEARANCE AND CONDITION

Farmhouse

There have been no major alterations to the configuration of the Worthington House since the Civil War. Most of the important changes which have taken place are the result of repairs to the building which have taken place since the NPS purchased the building in 1982 and the deterioration of the building fabric since the house was last occupied in 1953.

1983 Stabilization Project

The biggest changes to the house since National Park Service purchased the Worthington House took place during a 1983 stabilization and restoration project conducted by the Williamsport Training Center. The record of this work is recorded in a project notebook for the work, compiled by Project Leader Thomas Vitanza.[26]

During the 1983 project, the porch on the west side of the house against the ell and the replacement porch on the east elevation of the house were removed, and the surviving parts were stored in the basement of the house (see Photo 36). Before being removed, the two porches had deteriorated severely, and they were causing damage to the masonry on the house. The deck of the porch on the ell had entirely collapsed, evidently as a result of deterioration of the brick piers.[27] The roof and the deck of the east porch had also collapsed, pulling bricks out from the wall where the porch rafters and ceiling joists had been pocketed into the masonry. The porch at the door on the north elevation was already missing from the house.

The porch parts for both the east and the west porches are in storage in the south room of the basement. There are enough parts to be able to determine the dimensions and configurations of the pieces and the methods which were used to join the members together. Few of the pieces which are in storage are in good enough condition to be used in reconstructing the porch, however. Some members were damaged while the porch was still standing, some were cut or otherwise damaged in the process of dismantling the porch, and some have deteriorated while in storage in the basement. So little remains that is in good condition that it would not be worthwhile to reuse any of the stored porch parts. They are invaluable, however, as models for reconstructing the porch.

On the east elevation, the empty joist pockets in the brick wall for the porch ceiling joists and rafters were filled with polyurethane expanding foam and with epoxy patch (see Photo 2). The polyurethane is deteriorating, and small holes are developing, apparently where birds have picked out pieces of the foam. The floor joist pockets were filled with mortar.

Extensive work on the doors and windows of the house took place during the 1983 stabilization work. Work to the window frames included replacement of four interior sills,

eleven exterior sills, two interior heads, six exterior lintels and two jambs. Thirty-seven sash were completely replaced and thirteen sash had parts replaced with new components. All existing wood on the windows was treated with linseed oil and turpentine, and all the sash and frames were primed and painted. In addition to this work to restore the windows, wood louvers were built and installed in twenty-two locations, in place of sash (see building elevations, Photos 1 through 7).[28] The sash for the louvered windows were stored in the house.

Repairs to exterior doors during the 1983 work included closing the windows around the entry door with plywood, replacing the interior lintel and sill of the door on the north elevation and closing the opening with plywood, closing the door on the south side of the ell with plywood, replacing the exterior sill of the west door from the stair hall and blocking in the basement door on the north side of the ell. The basement door at the west elevation was replaced with a plywood door and a modern hasp, and the frame was rebuilt. All of the exterior doors and frames were primed and painted.

Extensive masonry repairs took place in 1983. Prior to the masonry repairs, thirteen samples of mortar and ten samples of plaster and parge were analyzed for color, for sand and lime composition, and for presence of shell and hair. Despite the extensive analysis, the areas which were pointed are a much lighter color mortar and are easily distinguishable from the original (new mortar can be clearly seen in Photos 4, 7, 11, and 13). According to the project records, 300 square feet of masonry were pointed, and 275 square feet of brick were replaced in the walls. One hundred square feet of the new brick was replacing bricks which had been dislodged from the wall by rafters and joists when the porch collapsed.

By 1983 all three chimneys were severely deteriorated where they projected above the roof. Rather than repairing them, they were completely dismantled down to the roof level. The only known documentation of the form of the chimney caps is photocopies of photographs of the entire building in the 1983 project notebook, which were taken before the work began. The project file for the work indicates that photographs and measurements were taken of the chimney caps before they were dismantled, but this information was not included in the project file and its location is unknown.[29]

The 1983 work on the Worthington House also replaced the entire roof and gutter system. The existing slate was removed and stored in the basement. Rafters were repaired, the deteriorating sheathing was replaced, a new 29 gauge galvanized sheet metal roof was installed, and new 28 gauge galvanized gutters and downspouts were installed. The downspouts were installed with extensions which went from eight to eleven feet out from the house, so that the draining water is ejected away from the foundation walls. The existing rake boards, which had a bead moulding on the bottom edge and splash boards at their ends, were removed and replaced with new flat boards.

All of the exterior wood on the house was primed and painted in 1983. Extensive paint analysis took place before the paint color was selected. Thirty-four different paint

samples were analyzed. Based on this analysis, Munsell color notation 2.5 YR: 8.5/2 was selected for the exterior paint color. The paint used for the work was Masury Supreme alkyd oil base exterior non-chalking house paint, white base with C36, L36 color mix.[30]

Miscellaneous exterior hardware was removed from the building and stored in boxes in the basement. The stored hardware included snow board brackets, insulator hooks, hinge sets, cut nails, window gratings, gutter hangers, and metal plates. An inventory and photographs of the hardware are included in the project notebook.

Site work done during the 1983 stabilization included removal of an elm tree from the south elevation and a catalpa tree from the west elevation of the house. These trees were growing too close to the house and were threatening to cause damage. The tree stump at the southwest corner of the house, presumably one of the trees cut down as part of the 1983 work on the house, is still living and has large branches growing from it. By 1994, these branches had reached almost to the level of the eaves of the house.

As part of the 1983 work, the road to the house was graded and gravel was spread to make it more accessible. Chain link fencing was installed around the house to protect it from vandalism.

While the 1983 work helped to stabilize the Worthington House and prevent further deterioration, much of the original fabric had already been damaged or removed, and deterioration of the house is continuing.

Landscape

The tree at the southwest corner of the house had regrown from the stump which was left from the 1983 work, so that it was above the height of the house cornice by 1994. By March of 1995, however, the tree, including the stump, was completely removed. At the same time, there were small trees an brush which had grown up in the area outside the chain link fence. The trees and brush obscured the house from view, especially on the east and south sides of the house. Over the winter of 1994-1995, the trees and brush were removed, particularly to the east of the house. It is now completely open to the fields in front of the house, and the area immediately to the south of the house is more open, as well.

Exterior Masonry

The worst problems with the masonry on the exterior of the house were repaired in 1983. Other problems remain, however (see Photos 1 through 7). It is clear that large areas of the foundation stone have been pointed recently, but other areas of the foundation have washed-out joints. Deterioration of the mortar in the foundation is particularly bad on the south elevation, where there is also a hole all the way though the wall between stones, apparently where an animal such as a groundhog has dug through the mortar. There is a vertical crack in the brick foundation wall at the south of the ell (see Structural Report).

The basement door at the south elevation of the ell was closed-in with CMU blocks, and the area around it is badly deteriorated (see Photo 13). The retaining walls on both sides of the areaway have loose and shifted stones on both sides. There are large openings on the west side of the door opening, and the remaining bricks at the foundation are hanging from the side of the CMU, adhered with mortar. The brick in the walls on both sides of the door has joints which have been washed out to a depth of two to four inches, and the mortar which does remain is mostly loose sand. The wood lintel over the door is rotting and bug infested, and it is beginning to fail, causing a crack to form in the brick above the lintel.

The stone retaining walls which form the areaway leading to the basement door on the south side of the ell are deteriorated. There is very little mortar between any of the stones, and the top of the wall has loose and falling stones. The masonry at the areaway to the basement door on the west of the house is in better condition. There are plants growing through the joints between the stones in some areas, but the masonry is essentially sound.

Other deterioration of the masonry includes washed out mortar from the brick joints on the west elevation north of the basement window. In various areas, and especially on the south elevation, individual bricks have spalled at their faces. A long diagonal crack has formed from the top of the window on the west elevation of the ell. A smaller diagonal crack runs from the top of the lintel above the south door to the ell, and the mortar below the sill of the window above the door is completely washed out.

Windows and Doors

Many window and door sills and lintels were replaced in the 1983 work, but there are others which are now rotting. On the east elevation the sill of the basement window to the north of the entry and the lintel of the north basement window are badly rotted.

The windows on the house are otherwise in good condition. The louvers which were installed in 1983 are effective in sealing the windows from rain, insects and vermin while allowing ventilation through the house. After more than ten years in place, however, the screens are damaged in places, and the louvers are harbors for wasps and other insects (see Photos 23 and 24). The window sash which were replaced by the louvers and are stored in the first floor ell have been chewed and soiled by animals, probably groundhogs.

Original exterior doors remain at the first floor doorways on the east and west elevations (see Photos 8 through 10). All of the latch hardware is missing from these doors. The transom window and sidelights at the east door have been covered over with plywood panels. Doors and the transom windows on the north and south elevations of the ell have been removed and replaced with plywood (see Photos 3 and 6).

The only usable entry to the house is through the basement door on the west elevation of the house. The door is a sheet of plywood braced with 2 x 4s attached to the back. The door jambs and head were rebuilt in 1983. The frame was set into the wall with mortar and the head and the jambs were also joined with mortar.

The basement floor is damp in the south room of the basement. Dark, moist areas of the floor can be seen from two to four feet in from the perimeter of the exterior walls. Moisture is also causing erosion of the plaster on the basement walls. It is not clear if the moisture is moving through the walls from the exterior, or if it is the result of warm, moist air condensing on the cool masonry walls.

Roofing and Flashing

The galvanized roof, gutter and downspout system are in good condition. All of the components are in working order. There is no evidence of recent roof leaks or overflow of the gutters. Some of the downspout extensions have come loose and no longer carry the water away from the house foundation (see Photo 7). A large number of slate shingles from the original roof are stored in the basement.

On both the east elevation and the south elevation of the ell, sheet metal flashing which was between the brick walls and the now-missing porch roofs is still attached to the walls. In the areas under both porches limewash or paint can still be seen on the brick (see Photos 1, 4 and 5, and Paint Analysis, Appendix B).

Interior Finishes

The ceiling of the south room of the basement was finished with lath and plaster (see Photos 34 and 35). About 40% of the plaster has fallen from the lath. In the area under the stair hall the ceiling has been covered with gypsum drywall. About 30% of the drywall in this area has fallen from the ceiling.

The newel post from the stair above on the 1st floor penetrated through the floor and was anchored to a notched floor joist. The newel post is now gone and the joist to which the newel was attached is broken. The beaded board walls which once separated the south basement into four smaller spaces have been cut off just below the ceiling.

The chimney breast in the basement at the south wall of the house has collapsed (see Photo 35). The remaining brick and plaster on the chimney has deteriorated. The north wall of the south basement room was plastered, the south and east walls were plastered and limewashed, and the west wall was plastered on the brick masonry and limewashed on the stone masonry. The limewash and the plaster has deteriorated as a result of the moisture in the basement.

The wood stair from the basement ell to the 1st floor ell is deteriorated (see Photo 32). The stringer against the masonry wall has come loose, so that the entire stair is shaky and dangerous. The main stair is structurally sound, although as described below, all of the

balustrade and much of the ornamental woodwork has been removed. The stair to the attic from the ell is missing a tread, and the door to the stairs is missing (see Photo 29).

Much of the woodwork in the house is missing or damaged, and finishes on the existing woodwork is generally very deteriorated. Casings are missing from many windows and doors, even in areas where there is no damage from water infiltration or other problems. In the south bedroom, for example, only one of the three windows has a complete casing, and in the stair hall casings are missing from all but the west exterior door (see Photos 15 and 30). The mantels have been removed from most of the fireplaces, so that the only existing mantel in the house is in the north bedroom of the 2nd floor. The existing mantel has a vertical board nailed to its face, installed as part of the divider which separated the bedroom into two spaces (see Photo 25). Outlines of the original wood mantels can be seen on the plaster around the fireplaces. In general, painted finishes in the house are either badly peeling or completely missing.

Some of the original doors of the house have survived, but a number of them are either missing or damaged. Original doors which still have the original wood graining visible are at the east entry, at the west entry, at both doors to the north room on the 2nd floor, and at the door to the south room on the 2nd floor.

Almost all of the handrails and balusters for the main stair have been removed. All that remains of the balustrade are broken-off stubs of four balusters still attached to the stairs, and a box of broken balusters and small lengths of handrail. Many pieces of the wave moulding on the stringer of the stair have also broken off.

Throughout the house the plaster on the walls and ceilings has deteriorated. In many areas the plaster deterioration was a result of water which infiltrated the house. Most of the water infiltration problems were fixed during the 1983 stabilization and repair project, but the damage to the plaster was extensive by that time.

The main stair hall, which had the most elaborate decorative paint, has the most extensive damage to the plaster. At the west wall above the stair landing the plaster has almost all fallen from the walls, leaving exposed bare brick. The wall below the stair has several large holes in them, some of which have been patched with a hard mortar-like plaster. Light fixtures have been installed in the ceiling just inside the east door and under the landing just inside the west door. Both of these fixtures were installed by cutting holes through the painted ceiling rosettes, and have damaged the painting and the plaster.

In the parlor the ceiling plaster and the painted rosette have been damaged by the installation of an electric light and the wiring to reach it (see Photo 18). A hole in the ceiling near the fireplace penetrated through the ceiling and floor above to run a stovepipe to the 2nd floor room. The walls in the south room have patches of missing plaster, exposing brick on the south and west walls.

The walls and ceilings in the northwest corner of the north rooms on both the 1st and 2nd floors have extensive water damage, causing much of the plaster to have fallen from the walls and ceilings. A stovepipe hole between the two rooms runs through the plaster, lath and wood floor.

The ell on both floors has extensive damage to the plaster, especially on the ceilings (see Photos 21 and 28). On the 1st floor, the west wall has large areas of missing plaster, exposing bare brick. The masonry in this area was largely rebuilt in 1983, so much of the exposed brick is new. At the 2nd floor ell there is extensive water damage not only to the plaster ceiling, but also to the walls in the northwest corner.

The water infiltration problem has also caused extensive damage to the wood floors, floor joists and rafters. The northwest corner of the north bedroom and the northeast corner of the ell are the areas with the greatest damage. The damage to the rafters, floors and floor framing runs all the way down from the attic to the 1st floor. The 2nd floor joists and floor boards are rotted through so that even though plywood has been laid on the floor, it is unsafe to stand on.

2. FARMHOUSE, EXISTING STRUCTURAL SYSTEM EVALUATION

Introduction

The Worthington House is a two-story structure with an attic level and a basement, constructed with brick load-bearing walls and wood-framed floors and roof systems. The house is located on the Monocacy Battlefield south of Frederick, Maryland.

Visual non-destructive observations and structural survey of the house was conducted on March 11, 1994 and July 21, 1994 by David Linton of McMullan & Associates, Inc., Consulting Engineers. An evaluation of the structural integrity and stability of the house was made, and brief recommendations were made for the repair of structurally inadequate areas. Approximately one-half to one-third of the floor members and the undersides of all of the roof rafters were visible. Sketches, framing plans and calculations were developed based on the visible areas of the masonry and framing.

Since this study is based on visual observations made at isolated existing openings in floor and ceiling finishes, there may be existing structural conditions which were not visible. All dimensions, member sizes and spacings are approximate, and were based on structural elements judged to represent typical conditions. Assumptions have been made regarding the concealed structure which may affect the final analysis.

Description of Structural System

The existing farmhouse is an "L"-shaped building, with the main block of the building running roughly north to south and an ell running west from the north end of the main block. The house has two habitable stories, a basement, and an attic (see HABS drawings in Appendix E, and framing plans and details in Appendix H. See photos of the exterior elevations and interiors for pictures of the masonry walls, especially Photos 1 through 7, 11, 12, 13, 32 and 33. See interior photos for pictures of wood framing, especially Photos 33, 34, 39 and 40).

The existing house has a full basement level, with the floor approximately four feet below the exterior grade. The basement walls are 18" thick rubble stone masonry up to a level one to two feet above the existing grade. Above the rubble stone masonry, the wall construction is 14" thick brick masonry. There are two interior masonry bearing walls, one at the north wall of the stair hall which has a stone masonry foundation, and one between the ell and the main block which is brick all the way to the basement floor. In the south section of the basement the floor is a concrete slab on grade, and in the other sections of the basement there is a dirt floor.

The first floor in the south section of the house consists of 2 1/2" by 9 3/4" joists at 21" on center, spanning east to west and bearing on the outside walls (see 1st floor framing plan). Beneath the south wall of the stair hall there is a 5 3/4" by 7 1/2" hand hewn wood beam, spanning east to west and supported at mid-span by a 6 1/2" diameter tree trunk post which still has its original bark. Wood joists 2 1/2" by 6 3/4" at 22" to 25" on center span north to south between the wood beam and the masonry bearing wall at

the north of the stair hall. The joint between the joists and the beam is shown in Structural Detail A.

At the dining room floor, the joists are 2 1/2" by 9 1/2", spaced at 24" on center, spanning east to west. At the 1st floor of the ell, the floor joists are 2 1/2" by 9 1/2", spaced 22" on center and spanning north to south. The ceiling is 1" plaster over wood lath. Wood floor decking is 7/8" to 1" thick tongue and groove, spanning perpendicular to the joists.

At the 2nd floor bedroom, the joists are 2 1/2" by 8 3/4", at 27" on center, spanning east to west. The framing in the stair hall was not visible, but it is assumed to span north to south, since the decking runs east to west. These joists are supported by a wood stud wall, which rests on the wood beam at the first floor below. The framing of the 2nd floor landing at the top of the stairs is assumed to be cantilevered from the wood wall.

The floor joists in the north bedroom are 3" by 9", at 24" on center, spanning east to west between the east wall and the interior brick wall between the main block and the ell. At the 2nd floor ell, the joists are 3" by 9", at 20" to 27" on center, spanning north to south. Three 1 1/2" by 11" stringers support the stair.

In the attic, the floor joists are 2 1/2" by 6 3/4", spaced at 23" to 25" on center, spanning east to west at the main block and spanning north to south at the ell.

All the roof rafters are roughly the same size and at the same spacing, with a width of 2 3/4" to 3", and with a depth tapering from 5 1/2" at the bottom of the rafters to 3 1/2" at the top. The spacing between rafters varies from 20" on center at the north to as much as 24" on center at the south. The pairs of rafters are above each floor joist, and are anchored to a 1" by 8" sill plate with a bird's mouth joint and a pair of nails (see Structural Details B and D). The roof framing of the ell is overbuilt on the roof framing for the main block of the house as shown on the Roof Framing Plan. Wood lath, 7/8" thick by 2 1/2" wide and spaced at 5" on center, spans between the rafters. In some areas, the lath has been replaced with plywood sheathing. The existing roofing is corrugated galvanized metal over the wood lath.

Findings

Masonry Deterioration

The overall physical condition of the house is fair to poor. Prior to the 1983 repairs there were portions of the house which were exposed to the weather, causing severe deterioration. The damage is generally more severe at the 2nd floor, indicating that the water penetration came from a leaking roof.

One of the most alarming physical defects observed in the house is the deterioration of the existing brick walls. There are several areas where the inside surface of the brick has spalled, reducing the effective thickness and water-tightness of the wall. The worst area is at the north wall at the 2nd floor level, near the interior brick wall between the main

2. FARMHOUSE, EXISTING STRUCTURAL SYSTEM EVALUATION (cont'd)

block and the ell. There is severe deterioration of the masonry walls in this area, and vegetation has grown through the holes in the wall.

Other areas of the house where brick and stone masonry has deteriorated include:

- At the north end of the brick bearing wall between the main block and the ell there are cracks through the entire thickness of the wall at the basement level.
- At three locations at the basement there is spalling on the interior face of the brick.
- At the basement there are two locations where bricks are missing from the interior walls.
- There is a 6" by 8" spalled area of brick on the south elevation of the main block.
- There is widespread deterioration of the brick on the west and north walls of the stair hall. Much of the plaster is missing on the west walls and the adjacent areas of the north wall, brick have spalled and mortar has washed out.
- At the 2nd floor there are three locations in addition to the northwest corner of the main block where there are spalled and deteriorated brick.
- At the west elevation at the 1st floor there is a stepped crack running vertically up the face of the brick from the bearing end of the window.
- The two fireplaces at the basement level have deteriorated, with missing and damaged brick above the fireplace openings and on the insides of the chimneys.
- At the entry to the basement ell, the brick surrounding the CMU infill has deteriorated, leaving a 3" to 6" gap.
- At the basement level there are loose stones in the foundation wall at the interior surface of the north wall.

Wood Framing Deterioration

The wood floor joists and flooring have also deteriorated as a result of the water infiltration. The worst area is adjacent to the severe brick deterioration at the northwest

corner of the 2nd floor. In this area the flooring and joists are severely deteriorated and have failed. A sheet of plywood covers the hole in the floor and wood shoring has propped the ends of the joists.

Other deterioration of the wood floor and roof framing includes:

- At the 1st floor stair hall there is one floor joist which has fractured and one which is rotted. These floor joists support the stair stringers from the main stair.
- There are three areas at the 1st floor where joists and sheathing have deteriorated as a result of water infiltration.
- There are five areas at the 2nd floor where joists and sheathing have deteriorated as a result of water infiltration.
- There are five areas in the attic where joists and sheathing have deteriorated as a result of water infiltration. The deterioration is severe east of the wall between the main block and the ell.
- The roof sheathing at the ridge near the center of the main block is water-stained and shows early signs of decay.
- There is insect damage at several locations in the dining room floor framing. The stored wood framing from the porches has evidence of active powder post beetles.

Code Capacity Defects

The house was analyzed for structural code compliance using the 1993 BOCA code, the current governing code for Frederick County, Maryland. For the purpose of analysis and calculations, reasonable allowable member stresses were assumed. This assumption was based on a visual wood species assessment made by the architect, a lumber grade conservatively assumed by the structural engineer, and by past experience on similar projects. Allowable stresses were taken from design tables of the 1991 National Forest Products Association (see summary of values on calculation sheet 1).

The live load capacity required for the floor of a single family residence is 40 psf (pounds per square foot), except in sleeping rooms where the requirement is 30 psf, and in attics where the requirement is 20 psf (BOCA Section 1606). The roof system complies with the required capacities.

The following structural elements of the floor system do not comply with the code requirements:

- At the 1st floor, the live load capacity of the 2 1/2" by 9 1/2" joists is 27 psf.

2. FARMHOUSE, EXISTING STRUCTURAL SYSTEM EVALUATION (cont'd)

- The live load capacity of the beam below the south wall of the stair hall is zero. The 2 1/2" by 9 1/2" joists which are supported by the beam have a capacity of 53 psf, although the mortise and tenon joint connection limits the joist capacity to 23 psf.

- At the second floor, the live load capacities for the three different joist spans were calculated at 13 psf (south bedroom), 29 psf (north bedroom), and 21 psf (ell). None of these capacities meet the current code minimum for usable space, although the deficiency is negligible at the north bedroom.

- The 2 1/2" by 6 3/4" attic floor joists have an allowable live load capacity of only 6 psf.

- Calculations for the load capacity of the porch floor and roof framing were based on drawings by the architect of the reconstructed porch, and measurements taken of the porch parts stored in the basement of the house. The size of the porch roof hip beam is not known, so no calculations were made for that one structural element. The roof framing of the porch was found to be adequate. The live load capacity of the porch floor was found to be 19 psf, which is below the code requirement of 60 psf (BOCA 1607.2). The limiting elements on the porch floor are the diagonal beams at the corners. The other elements in the porch floor system meet code requirements.

Structural Recommendations

The structural defects and code compliance deficiencies described in this report require repair before the house is put into any kind of public or private use. Before repairs to the wood framing take place, material testing, lumber grading and structural testing should be performed to further define the allowable load capacities of the floors and roof.

If the house is intended to be used as an exhibit-type space, greater strengthening will be needed in order to meet the required live load capacity of 100 psf for public spaces. As an alternative, it may be more feasible to restrict the number of occupants in the house so that an allowable live load capacity of 40 psf is not exceeded. Based on the smallest room size of 12'-4" by 16'-2", an average weight of 200 pounds and a factor of safety equal to 2, the maximum number of people in one room at the same time should be limited to 20. This assumes that all the required repairs to the deteriorated structure has taken place, and that the live load capacity in all the rooms of the house is 40 psf.

Most of the deterioration of the masonry and the wood framing in the house is the result of water infiltration. The leaks which caused the deterioration appear to have been stopped when the new roof was put on in 1983. The maintenance of the roof, gutter system, windows, doors, walls and other elements which prevent water infiltration is critical to the structural integrity of the house.

Masonry Deterioration Recommendations

Structural repairs of the deteriorated brick needs to be evaluated on a case-by-case basis. Where the depth of the deteriorated brick is less than one half of one wythe, there is no need for structural repair. The walls have an adequate thickness in these areas to remain serviceable.

In locations where the brick has deteriorated so that more than one half of one wythe is missing, and in locations where bricks are missing, the brick needs to be replaced. In general, the areas where replacement is required are the north wall at the 2nd floor, the interior wall between the main block and the ell at the basement, and the west wall at the stair hall.

At the west elevation of the ell, where there is a crack in the masonry running from the lintel over the window, brace the masonry and replace the lintel to eliminate the cause of deterioration. Replace broken bricks, relay shifted bricks and point joints.

The deteriorated basement fireplaces appear to be stable. Masonry repairs were done to the wall behind the ell fireplace in 1983. No structural repairs are required at this time.

At the door to the ell which has been filled in with CMU, repair the opening by infilling the gap with brick and pointing the existing brick.

At the basement level where there are loose stones at the foundation, point the deteriorated areas.

Wood Framing Deterioration Recommendations

The worst deterioration of the wood framing is from rotted joists. In the areas where the joists are rotted, remove the rotted sections and replace them with new wood joists. Either completely replace the rotted members, or remove the rotted parts and attach new extensions to the joists which provide adequate bearing on the masonry. These repairs need to take place at all the places where there is deterioration of the framing and the flooring.

The insect damage at the dining room floor needs to be stopped before it spreads throughout the house. Treat all the stored wood with an insecticide formulated for this use, such as Bora-Care. The insect infestation does not appear to have caused structural damage to the house, but it will if it is allowed to continue.

2. FARMHOUSE, EXISTING STRUCTURAL SYSTEM EVALUATION (cont'd)

Code Deficiencies Recommendations

Most of the code capacity deficiencies at the 1st and 2nd floors are not great enough to warrant invasive repairs. In areas where deteriorated framing requires replacement, it may be worthwhile to install joists which will provide a higher load capacity than the existing size of members provide. Before any strengthening is done to the floor framing, however, it is recommended that the wood species and grade be certified by a professional timber grader to ensure that the proper allowable design stresses are used. Higher properties for the wood may increase the calculated capacity for the joists and bring it to an acceptable range.

The wood beam under the south wall of the stair hall is severely deficient. Additional posts under the beam to reduce the span of the beam, or a steel beam running beneath the wood beam would bring the beam up to the required capacity. The mortise and tenon joints connecting the floor joists to the beam are also a weak point in the system, but the deficiency is marginal. Additional study may indicate that the joints need to be reinforced.

The attic floor joists fall short of having the 20 psf live load capacity required for an attic space. The attic should be considered to be unoccupiable space and should not be used.

If the porch is reconstructed, the diagonal beams at the corners need to be strengthened in order to meet the code-required live load capacity. This could be accomplished either by adding intermediate supports under the beam to reduce the length of the span or by tripling the beam. The other elements of the porch are adequate as originally constructed and can be restored as originally built.

3. FARMHOUSE, EXISTING ELECTRICAL, MECHANICAL AND PLUMBING SYSTEMS

Existing Conditions

Electrical

No electrical system exists at the house or on the farmstead. At one time there was a minimal system, but it has been disconnected at least since 1953. The electrical system at the house powered light fixtures and an electric pump at the well. All that remains of the system is some wiring, conduit, outlet boxes and light fixtures, all in very poor condition. There is no panelboard in the house.

There is no existing electrical service to the house. The nearest electrical line is to an adjacent farmhouse on Baker Valley Road, about 1.5 miles from the Worthington House. The nearest telephone service is at the same location.

Mechanical

The house was originally heated by the six fireplaces in the house. At an unknown time, freestanding wood or coal stoves were used and connections to the original chimneys were made with thimbles and holes to the chimneys. The stoves no longer are in the house, and there is no evidence indicating what type they were. A range in the kitchen was gas-operated, indicating that there was once a source for gas in the house. The range was probably fueled by a removable, refillable tank.

There is now no operable heating system in the house. The chimneys have had their tops removed and there are numerous additional code violations at the fireplaces, so they are not usable (see Life Safety Code Analysis).

Plumbing

There are no plumbing fixtures in the house, although there is a pipe stubbed up in the northwest corner of the 1st floor ell, indicating that there was probably once a kitchen sink. In the west yard of the house there is a concrete well and to the south of the house there is a small pump house with an electric pump. The pump is not operable, and would have to be entirely replaced to be usable. If the well is to be used as a source of drinking water it would have to be tested for purity, and a constant flow would have to be verified. It is unlikely that the well would provide an adequate flow for fire suppression purposes.

3. FARMHOUSE, EXISTING ELECTRICAL, MECHANICAL AND PLUMBING SYSTEMS (cont'd)

Use of The Worthington House as a Single Family Residence

If the Worthington House is used as a single family house, electrical, mechanical and plumbing service must be provided to the house. The required modifications must be carried out with great sensitivity. The recommended approach to making the house usable as a single family house is described in Option IV of the Recommendations section. Following are the specific electrical, mechanical and plumbing modifications which would be required.

Electrical Requirements

A complete, new electrical system would have to be installed in the house if it is to be used as a single family residence. The new electrical service would be installed with 200 ampere single phase three-wire electrical service, sized to accommodate the loads of the house and the farmstead. The new service would originate at the nearest line on Baker Valley Road, about 1.5 miles away.

To provide a residential electrical system:

- Install new branch circuit wiring system throughout the house in accordance with Article 210 of the National Electrical Code. Install ground fault interruptable receptacles in the bathrooms, kitchen and the exterior of the main entrance. Control one receptacle in each bedroom and the living room by a switch.

- Install new light fixtures in the kitchen, stair hall, dining room, bathroom, basement and outside of each exterior door. Provide a switch for each light. Provide three-way switching at the stair hall, with a light at each landing.

- Install appliance circuits in the kitchen in accordance with Article 210-52 of the National Electrical Code. Provide connections for new kitchen appliances.

- Install smoke detectors in the stair hall at each level, connected together to sound simultaneously upon activation of any single detector.

- Install a four pair telephone cable, prewired with branch circuit wiring in bedrooms and the living room. New telephone service would originate at the existing line at the adjacent farmstead on Baker Valley Road, approximately 1.5 miles away.

Mechanical Requirements

To use the house as a residence, at a minimum the house would require a heating system. Because a ducted system would require major alterations to the structure to provide distribution, it is not recommended. If air conditioning is desired, it could be accomplished with window units in strategic locations.

A heating system using electrical resistance baseboard heaters would require the fewest alterations to the building to install, but it would be the most expensive system to operate. A piped hot water system would require more penetrations through the floors to install, but it could have a central boiler in the basement which would be less expensive to operate. Any heating system would be more effective if insulation were added at the attic floor and at the basement ceiling.

Plumbing Requirements

Because there is no existing plumbing system at the Worthington House, a complete new system must be provided if the house is to be used as a residence. This system would include a well, a sewage disposal system, and distribution to a complete bath and kitchen.

The existing well appears to be hand-dug. This existing well may not be deep enough to provide an adequate flow of water. It is also possible that the configuration of the well does not comply with code requirements or provide sanitary water. If this is the case, a new well needs to be drilled. The new well must be 100' from a septic system. There should not be difficulty finding water in this area.

A septic system is the best system for a sewage disposal system. A perk point would have to be located, but this does not appear to be a problem in this location.

In the house, a complete bathroom including a toilet, a sink and a shower or a bath would be required. A kitchen sink with connections for clothes washing would also be required.

Use of the Worthington House as an Exhibit House

The electrical, mechanical, and plumbing needs for the house would not be as extensive as would be required for a single family residence. Certain minimal requirements would remain, however, especially if the house contained valuable artifacts which would be damaged by exposure to extreme conditions or by vandalism.

Electrical Requirements

A new electrical system would have to be installed in the house if it is to be used as an exhibit house. The new electrical service would be installed with 200 ampere single phase three-wire electrical service, sized to accommodate the planned loads of the house and with adequate panels. The new service would originate at the nearest line on Baker

3. FARMHOUSE, EXISTING ELECTRICAL, MECHANICAL AND PLUMBING SYSTEMS (cont'd)

Valley Road, about 1.5 miles away. Install all wiring in concealed locations, under floors or, if necessary, chased in plaster.

To provide an electrical system for an exhibit house:

- Install one new receptacle in each room. Mount receptacles in inconspicuous locations.
- Install emergency battery-powered light packs in the stair hall at each level. Connect to a constant power source.
- Install a central security system with motion detectors and smoke detectors at each room. Connect to a central station monitor using telephone lines.
- Install circuits, lighting and photo cells for exterior lighting around the exterior of the building.

Mechanical Requirements

As with a residential use for the house, an exhibit house would require a heating system. Because a ducted system would require major alterations to the structure to provide distribution, it is not recommended. If air conditioning is desired, it could be accomplished with window units in strategic locations.

A heating system using electrical resistance baseboard heaters would require the fewest alterations to the structure to install, but it would be the most expensive system to operate. A piped hot water system would require more penetrations through the floors to install, but it could have a central boiler in the basement which would be less expensive to operate. Any heating system would be more effective if insulation were added at the attic floor and at the basement ceiling.

4. FARMHOUSE, COMPLIANCE WITH BUILDING CODES AND REGULATIONS

In this chapter the building is evaluated to determine where it meets or fails to meet minimum standards of local codes and regulations. Issues of life safety, energy conservation, security, and handicapped accessibility will be addressed. See the Structural Analysis and the Electrical, Mechanical and Plumbing Evaluation sections for code compliance in these areas. The locations of potentially hazardous materials in and around the building are also identified. The building code used by the local building department and in this analysis is the 1992 CABO One and Two Family Dwelling Code.[31] This evaluation assumes that the Worthington House will be used as a single family dwelling.

Life Safety Code Analysis

The life safety analysis evaluates the construction of the existing building, installation and condition of the existing systems relative to fire safety, alarm and detection equipment, fire suppression and water supply, emergency lighting, and means of egress.

Construction

The Worthington House is a brick building with two stories and an attic set on a stone foundation enclosing a basement. The building is set near the top of a small hill on a gently sloping site. Interior walls, floors and roof rafters are framed with oak joists and beams, and the roof is covered with wood sheathing and sheet metal roofing.

The six fireplaces and an undetermined number of woodstoves in the house were served by three chimneys. All of the chimney tops have been removed to below the roof level. None of the chimneys are lined, and the masonry in all the flues is deteriorated. All of the thimbles for attaching wood stoves to the chimneys are thin and loose. There are no dampers in the chimneys.

The two basement fireplaces have deteriorated brick, deteriorated plaster in the firebox, and collapsed chimney breasts. The 1st floor ell fireplace has exposed brick in the firebox and no hearth. The 1st floor south fireplace has deteriorated plaster in the firebox, is 1'-2" deep and has a 1'-2" deep hearth which extends 9" beyond the sides of the firebox. The 1st floor north fireplace has been filled in with C.M.U. The fireplace in the 2nd floor north bedroom has a wood mantel which has a vertical wood divider in the center of the fireplace opening.

All of the fireplaces and chimneys in the house would require major modifications in order to meet building code standards. The code requires linings in the chimneys, separation of flues, minimum height of chimneys above the roof, minimum dimensions for fireboxes and hearths, and numerous structural requirements for fireplaces and chimneys (CABO, Chapter 9). Installation of woodstoves would require modifications at the connections to the chimneys, installation of an approved hearth extension, and approved structural support for the stove (CABO R-905).

4. FARMHOUSE, COMPLIANCE WITH BUILDING CODES AND REGULATIONS (cont'd)

It is not recommended that any effort be made to bring the fireplaces or chimneys up to code. The fireplaces and chimneys are significant historic material, and the extensive effort required to make them safe and usable would damage historic fabric. It is recommended that the fireplaces not be used.

Emergency Lighting, Fire Alarm and Detection

There is no emergency lighting system in the house, and none is required for the use being evaluated.

There are no fire alarm or detection systems within the house. The building code requires a smoke detector on each floor and outside each group of sleeping areas (CABO R-215).

Fire Suppression and Water Supply

Although local building and fire codes do not require a fire suppression system in the house, it is required by National Park Service Guidelines, NPS-76. There is no existing fire suppression system in the house.

There is no available on-site water to supply a fire suppression system. The well directly to the west of the house and the well southwest of the house probably would not provide adequate quantities of water for a fire suppression system.

Means of Egress

The code requires one exit which fully conforms to the standards for each dwelling. The main entry of the house and the paths leading to the main entry comply with the standards for width and height of the door, width of the hallways and stairway along the exit path, and the size of the landing at the exit door. As it is now, however, the main entry door is nailed closed, and the porch and the stairs down from the porch are missing.

The main stair leading down from the 2nd floor complies with code requirements for width, maximum riser height and minimum tread depth. The handrail for the stair and the guardrail for the landing are missing. The height of the rail where it is connected to the wall at the landing was 32 1/4". A guardrail at this location is required to be 36" high. At the open sides of stairs, handrails are required to be 34" above the nosing and to be continuous. It is not known how high the original handrail was or what its configuration was, but a small curved section of handrail indicates that it was curved, so it was probably continuous. If restored, the handrail could be made to comply with the code requirements. The balusters, if restored, would meet the requirement which does not allow passage of a 4" diameter sphere.

The east porch which is stored in the basement of the house has a handrail which is 33 3/4" above the floor. This is 2 1/4" below the required height of 36". There are no known existing parts of the east porch steps, so this component of the house could be restored to meet all code requirements.

The servant stair at the ell does not meet the requirements for an exit. The stair from the 2nd floor to the 1st floor is itself wide enough to meet the minimum requirements, but the door at the bottom of the stair and the landing at the bottom of the stair do not meet the minimum dimensional standards (CABO R-212). The existing handrail at the ell stair does not meet the requirements for width and clearance from the wall. The depth of the average tread averages around 8", and the height of the average riser averages around 8 3/4", making it much too steep to meet the code standards (CABO R-213). The porch and stair outside the door is missing. The stair from the basement is loose, narrow and also lacks minimum dimensions. Both the treads and the risers on this section of the stair average around 8". Because the ell stair is deficient in so many areas, it should not be considered to be an exit stair. Exit access from the ell can be through the northeast room, so it is not required to meet the standards as long as the main stair is available as an exit.

The stair leading down from the attic does not meet the standards for width, clear headroom, handrails, configuration of winders, or tread and riser dimensions. Because the attic is not an occupiable space, this stair would not be required to meet the standards for an egress.

The windows on the 2nd floor do not meet the minimum dimensions required for emergency egress. Openings in windows for emergency egress from a sleeping area are required to be a minimum of 5.7 square feet of area, with a minimum width of 20" and a minimum height of 24" and with a maximum sill height of 44" above the floor. The 2nd floor windows meet the requirements for maximum sill height and minimum width, but the area of the openings is only 5 square feet, and the height of the opening is barely 24".

Energy Conservation

The energy conservation analysis evaluates the environment around the house, the thermal characteristics of the house's construction, and the energy efficiency of the existing systems in the house.

The Worthington House is built at the top of a gently sloping hill, with a large open field to the north and west of the house. This exposure to the north and west allows cold winter winds to blow unhindered from the direction of the river and the mountains beyond. The house has few south facing windows, so the heat gain from the winter sun would be minimal, especially since the trees to the south of the house would block the winter sun. The circa 1930 sketch of the farmstead by Helen Smith shows a few large trees east and southeast of the house, but otherwise the hilltop was not sheltered from the sun and the wind.[32] It is not known what configuration of trees existed on the hilltop prior to 1930.

4. FARMHOUSE, COMPLIANCE WITH BUILDING CODES AND REGULATIONS (cont'd)

The house has no insulation of any kind. The leaks which caused water damage before the 1983 repairs have been largely repaired so there is no major water infiltration in the house. However, the existing windows and doors are loose and do not provide a seal against wind and weather, and many of the windows have been replaced with louvers which are intended to provide outside air circulation through the house. There are no storm sash or doors on the house, and there are no dampers in the chimneys. As it exists, the house is, by design, very drafty. The windows, doors, chimneys and walls would have to be made weathertight to provide minimum energy efficiency for the house.

The masonry walls of the house are uninsulated, and in spite of their thickness, they result in a low thermal resistance for the walls. The total thermal resistance for the brick walls is R 3.65 (see Thermal Resistance Calculations, Appendix I). The total R value for the walls is even lower if the thermal resistance of the doors and windows is considered. The R value for single pane glass is only .10, which would detract considerably from the already low thermal resistance of the walls.

The total R value of the roof is also low, at R 1.78. This value is assuming continuous sheathing, although the sheathing actually has large gaps in it. If the entire attic including the air space and the attic floor is included, the additional R value is only 2.25, for a total thermal resistance above the 2nd floor of 4.03.

The thermal characteristics of the construction of the house are below the standards recommended by the FHA Minimum Property Standards for thermal resistance.[33] Based on an estimated 5000 degree-days of heating per year for the Frederick area, the FHA recommends ceilings to have an R value of 30, walls to have an R value of 12, and floors to have an R value of 11. All of the components of the house are areas of substantial heat loss and do not meet these standards.

Security

There is no electrical security system in the structure. The existing security for the house consists of a locked gate at the end of the entry road, a tall chain link fence enclosing the yard around the house, with a locked gate and barbed wire top, and secured doors and windows. The gate at the road often is left open by the farmer who leases the farm around the house, and there are openings in the gate and fence around the house which would easily allow access to the yard. The only door which can be opened from the outside is the basement door on the west side. It is secured with a padlock and a hasp. The doors to the ell have been closed off with sheets of plywood nailed to the door frames. The entry door is barred with a 2 x 4 on the interior. Windows are either covered with plywood, secured closed with nailed blocks, or the sash have been replaced with louvers which are tacked into place and can be removed only from the inside. Park rangers do check on the house, but patrolling is by necessity infrequent. Park security officers claim to check on the house daily during the summer season, but during the

winter the road often is not passable and the house is not checked for days or weeks at a time.

The existing security of the house is not good. The main deterrents to break-ins are the isolation and obscurity of the house, the locked gate at the road, and the chain link fence with barbed wire around the house. Because of its isolation, however, anyone trying to break into the house would have time to find and penetrate a weakness in the fence, and then would be able to break or remove a door or window to get into the house. Because patrolling the house is by necessity limited, an electronic alarm system would be the only alternative for detecting a break-in at the house.

Handicapped Accessibility

The Uniform Federal Accessibility Standards (UFAS), which set the minimum facility accessibility by physically handicapped persons at Federal facilities, does not require that the farmhouse be accessible if it is maintained as a single family residence. Should it become desirable or necessary to make the farmhouse accessible to handicapped persons, then several alterations will be necessary.

The house as it exists is not handicapped accessible. The only entry is by the basement door on the west side of the house. Access to the upper floors of the house requires winding through the basement and climbing the loose steps to the 1st floor by the ell. This path does not meet UFAS requirements for handicapped accessibility, and probably could not be easily modified to meet accessibility standards.

Assuming that the porch and entry of the house are restored, it would still not be handicapped accessible. The entry porch would be several feet above grade and there would be an additional step at the threshold. A lift or a ramp would have to be built for accessibility to the porch, and an additional ramp would have to be installed up to the threshold. This would be very difficult to do without diminishing the historic appearance of the east elevation.

An alternative solution to achieve accessibility to the house would be to provide a lift to the door on the west side of the house, and enter the house by way of the door at the west end of the entry hall. This solution would require that handicapped accessibility be through a door other than the main entrance, but it would not have such a strong impact on the historic appearance of the house.

Even if the 1st floor of the house were handicapped accessible, the 2nd floor and the basement would still not be accessible from the 1st floor. To achieve handicapped accessibility to the 2nd floor and the basement, a lift could be installed in the location occupied by the ell stair. To accomplish this would require removal of some historic fabric.

As a single family house other modifications would have to be made to make the house handicapped accessible. The minimum construction would involve a lift to the 2nd floor,

an accessible bathroom, an accessible kitchen, and modifications to doorways to meet the requirements for minimum width of doorways and maximum height of thresholds.

Building Code Compliance

Review of the CABO One and Two Family Dwelling Code revealed the following items that do not conform to the code and are not addressed in the life safety, structural, mechanical or electrical evaluations.

Light, Ventilation and Heating

The windows of the 1st and 2nd floors provide sufficient light and ventilation to satisfy the required levels. In the attic and the basement the existing windows provide less than the required glazed area of 8% of the floor area (CABO R-203). These spaces are not considered to be habitable areas by the code, however, and are not required to meet the minimum glazing area standards.

Hazardous Materials

The following is an overview of the possible locations of hazardous materials that may be found in the house or on the site.

Asbestos

Asbestos is a mineral product that because of its noncombustible characteristics was used in a wide variety of building products manufactured after World War II. Typical materials in which asbestos was used were acoustical insulation, pipe insulation, duct and boiler insulation, plaster and taping compounds, and roof and flooring materials. Since the 1970s, airborne asbestos fibers have been linked with diseases such as asbestosis, mesothelioma, lung and other cancers and as a result, the use of asbestos in building materials has stopped.

Federal and state governments have or are in the process of enacting legislation on the handling of asbestos-containing materials. While this legislation varies between jurisdictions, all entities regard the buildings owner as responsible for asbestos in their buildings.

Possible Asbestos-Containing Material (ACM) locations include:

- Sheet linoleum in the kitchen may contain asbestos.
- Insulation on the old electrical wiring in the house may contain asbestos.

Lead

Lead and lead compounds are toxic if ingested, and lead poisoning is considered a major health concern in young and unborn children. Lead and lead compounds were typically used as the pigment in paint in general use before 1978. The state of Maryland does have requirements defining the allowable limits of lead contamination in residences. The paint finishes were not tested to determine the components or lead content of the paint. Considering the age of the residence and the age and types of the paint coatings found on the exterior and interior of the building, it is highly probable that most of the paint coatings contain lead.

Radon

Radon is a colorless, radioactive, inert gaseous element that is produced in nature by the disintegration of uranium and radium in rock and soil. Uranium is abundant in the earth's crust, however, its concentrations vary within the same type of rock and within the same rock formations. Radon is a major source of the ionizing radiation that is a health hazard. Radon typically enters a building by leaching up through the ground under the building or through well water. Because of its gaseous state, radon concentrations increase as buildings are made more energy efficient with less ventilation.[34] The Environmental Protection Agency has determined that 4 pico curies per liter is the maximum allowable limit for radon.

Possible sources of radon:

- The ground under the house is not covered or sealed and may allow radon gas to enter the house. Because of the air infiltration at the windows, louvers and doors of the house, it is not likely that there are high concentrations of radon gas building up in the house at this time.

Petroleum Products

Storage of petroleum products is a potential source of contamination for surface and ground water. Leaks from tanks used to store fuel oil and gasoline have resulted in the regulation of underground storage tanks under the Hazardous and Solid Waste Amendments of 1984 (Resource Conservation and Recovery Act).[35] There are no petroleum product storage tanks known to be on the site, although it is possible that petroleum storage tanks were buried on the farm and still exist somewhere near the house.

5. FORCES AFFECTING THE PRESERVATION OF THE FARMHOUSE AND SITE

Identification

Natural and manmade forces combine to cause deterioration of the Worthington House. Neglecting the problems caused by the natural and manmade forces which are acting on the building can jeopardize the future of the house.

Natural Forces

- Rain, snow, ice and moisture deteriorate the painted wood, plaster, wood framing and masonry. If allowed to infiltrate into the building it deteriorates interior finishes and materials.

- High humidity in the basement from the earth provides favorable conditions for the growth of wood-decaying fungi in the structural wood framing and the wood floors.

- High humidity in the basement and other areas of the house causes corrosion of door hardware, fasteners and other metal objects.

- Sunlight shining on the finishes, especially the finishes of the grained doors, the wood windows, and the painted plaster causes deterioration of the wood, plaster and finishes.

- Electrical storms can start fires which could destroy the house.

- Insects, birds, rodents, bats and other wildlife burrow, bore, nest, chew, defecate and decompose in and around the house, damaging all types of materials. Currently, birds are nesting in the chimneys and other places, snakes are nesting under the attic stairs, wasps are nesting in various locations, especially in the wood louvers outside the screens, large rodents, probably woodchucks, are burrowing around the foundations of the house, and powder post beetles are boring into the wood of the stored porch in the basement.

- Plants growing around and in the house damage masonry and wood with penetrating roots. The tree near the southwest corner of the house which was cut down in 1983 has large shoots growing from the stump. Vines, poison ivy and other plants are growing around the house and may cause damage to the house if not managed.

Manmade Forces

- Vandalism and theft.
- Well-intentioned maintenance work which obscures, damages or removes historic fabric.
- Fire from arson or accidents.
- Wear and tear from normal use of the building, such as abrasion on the wood floors, tracking of moisture and dirt, wear and handprints on doors and hardware, and over-cleaning of historic materials.

Analysis

The farmhouse and farmstead are currently in stable condition and if maintained will be protected from the adverse effects of the forces acting on it. Regular and conscientious maintenance can prevent deterioration of the house from natural or man-made causes.

Recommendations and Constraints

Rain, snow and ice are controlled by the roof, gutters and sealant systems. These elements must be maintained and monitored on a regular basis to ensure that they not allow water infiltration into the house.

The humidity in the house can be mitigated by ensuring that there is adequate ventilation in these spaces. The louvers in the windows appear to be providing sufficient ventilation to prevent problems from humidity. Growth of fungi causing decay of the wood can be prevented by the use of a penetrating fungicide on the wood, such as pentachlorephene. Corrosion of metals can be reduced by cleaning, oiling or refinishing of metal hardware, where appropriate.

The damage caused by sunlight on the wood and finishes cannot be avoided in some places, such as the wood windows. In other locations, however, simply protecting the material from exposure to the sun would prevent deterioration.

Damage caused by fires from electrical storms could be minimized by a fire suppression system. Damage from a lightning fire could still be substantial, however. A lightning rod system could be installed on the house which does not detract from the historic appearance of the house, but which would provide protection from this hazard.

The threat of man-made fires at the Worthington House must be minimized by controlling who has access to the house and by strictly forbidding smoking and other sources of fire in and around the house. A fire detection and alarm system would alert the local fire department of a fire, although the remoteness of the house would still make it difficult for an effective response by a fire department. A fire suppression system would stop a fire

5. FORCES AFFECTING THE PRESERVATION OF THE FARMHOUSE AND SITE (cont'd)

even in the absence of emergency response from a fire department. Nevertheless, the logistics, expense, and damage to historic fabric precludes the installation of a fire suppression system.

Insects, birds, snakes, rodents and other animals must be constantly monitored and removed from the house when they get in. Animals must be removed as soon as they get in, and their access to the house must be screened or otherwise eliminated to prevent future infestation.

The plants growing around the house must be kept trimmed back so that the roots cannot penetrate the masonry or the windows. This must be monitored and controlled on a regular basis.

Vandalism and theft at the Worthington House can be prevented by a security system in the house and by monitoring the house. Vandalism and theft have not been reported as problems in the past at the Worthington House, but once they become problems it is already too late.

Damage to historic fabric caused by ill-advised maintenance may be prevented by a review process for all procedures which take place at the house. The reviewers must be knowledgeable about the effect of the work done on the house, and must be sensitive to the historic value of the house and its components. There must be a long-range plan for the house which includes a clearly stated purpose for the house and the means to realize the purpose.

Wear and tear on the house from the comings and goings of people is inevitable to a certain degree, but there are many steps which can be taken to minimize it. Restrict the number of people who are in the house. Ensure that everyone who does use the house is knowledgeable about the historic and fragile nature of the materials in the house and understands what needs to be done to minimize the impact of using the house. Clean the dirt and fallen plaster from the floors so that walking in the house is not so abrasive.

PART 2. TREATMENT AND USE

PART 2. TREATMENT AND USE

A. JUSTIFICATION FOR RECOMMENDATIONS

The specific recommendations and alternatives for the Worthington House are described in the following section under "Recommendations, Alternatives and Cost Estimates." Below is a general discussion of optional approaches which could be followed in considering the treatment and use of the Worthington House and Farm. These four options are in preferred order. Option I is necessary for the preservation of the historic fabric; Option II restores missing or altered historic fabric; Option III is a proposed use for the house as a site for special tours; and Option IV explores the proposed use of the house as a single family residence.

OPTION I: Stabilize and maintain the existing fabric of the Worthington House.

Stabilizing and maintaining the existing fabric of the farmhouse would be the least intrusive action possible for the Worthington House. This is the minimum action which must take place to maintain the house in its existing condition. With this option, only necessary stabilization and maintenance of the house would be done. Previous work on the house which was historically inaccurate would remain in place. The stabilization and maintenance which would be done for this option is the necessary minimum work which needs to take place, and is the basis for all the other options.

The work of this option includes:

- Exterminate insects, birds and other wildlife which are in the house. Close openings in windows and doorways and install new and maintain existing screens or other materials to prevent reinfestation. Exterminate the insects which are boring in the stored wood in the basement.

- Repair hazardous conditions in the house, such as the loose stair to the basement and holes in the floors so that the house is not dangerous for personnel doing maintenance and documentation work.

- Perform cyclical maintenance, such as roof repairs, repair of deteriorated masonry, cleaning and maintenance of gutters and downspouts and painting of exterior wood.

- Document and stabilize the decorative paint in the stair hall and the south parlor.

OPTION II: Restore the interior and exterior of the house and the landscape to be accurate to the Civil War era. This work is in addition to the work of Option I.

This option takes a more activist approach to the house. The goal is to create the appearance at the Worthington House so that it appears the way it was at the time of the Battle of Monocacy. Since the configuration of some elements of the house at the time of the Battle of Monocacy is not sure, this option runs the risk of removing existing historic fabric and replacing it with non-historic materials in an historically inaccurate configuration. The restoration of the elements of the house which are not known, such as the porches, the tops of the chimneys, the fireplace mantels, the outbuildings and the landscape, will require some speculation. The design of these elements must be based on careful research of the architecture of the region and the period.

The work of this option includes:

- Restore porches on the east, west and north of the house.
- Restore the slate roof to the house.
- Restore the chimney tops to the house.
- Restore the interior woodwork, including the missing door and window trim, missing and damaged doors, the handrail, trim and balusters of the main stair, the ell stairs, and the missing fireplace mantels.
- Repair and restore damaged floors.
- Repair and restore damaged and missing plaster.
- Restore the decorative painting.
- Restore the landscape around the house, including the historic plantings, fencing, and outbuildings.

OPTION III: Use the house and site for specialty tours (in conjunction with Options I and/or II).

Using the house and site for specialty tours would allow the house to be seen and known by those people who have a special interest in architectural history, historic construction, history of 19th century farm life, or the history of the Battle of Monocacy. Of particular interest to people visiting the house would be the decorative painting which is found in the entry hall and the parlor.

The only additional work which would have to be done on the house other than the work described in Option I and/or Option II would be to make the house handicapped accessible, as required by the Uniform Federal Accessibility Standards.

OPTION IV: Rehabilitate house for use as a single family residence (in conjunction with Options I, II and/or III).

Rehabilitation of the Worthington House as a single family residence would require extensive modifications. Basic amenities required to comply with building code requirements would have to be introduced into the house, and this work could damage or cover important historic fabric. Any work done to rehabilitate the house to the standards required for a single family house requires a high degree of sensitivity by everyone involved in the project.

The most effective way to rehabilitate the house as a single family residence is to divide the house into three zones:

- Zone 1 is made up of the areas of the house which have a high level of architectural and historic integrity. Accurately restore this zone to its appearance at the time of the Battle of Monocacy. The primary historic interpretation of the house would take place in the zone 1 areas. The areas included in zone 1 are the exterior of the house including the porches, the stair hall, the parlor, and the south bedroom. These areas are not to be used as living spaces by the residents of the house, but are to be used only as exhibit areas.

- Zone 2 is made up of the areas of the house which are historically significant and have some amount of significant historic fabric. Zone 2 is to be restored with historic accuracy, but would be available for use by the residents of the house. The areas included in zone 2 are the dining room and the north bedroom.

- Zone 3 is made up of the areas of the house which are not historically significant. Zone 3 areas have been altered or have deteriorated to the point that there is little significant existing historic material. These areas can be used to provide the modern amenities needed for a residence, such as a kitchen and bathroom. Zone 3 includes the ell on both the 1st and 2nd floors, the basement and attic.

The most important advantage of using the Worthington House as a single family residence would be to provide the house with greater security and monitoring. An occupied house would be less inviting to vandals, arsons and thieves, and residents of the house would be more aware of problems with the house as they developed. A resident would be on hand immediately in case of fire to either sound an alarm to the fire department or to fight a small fire. A resident in the house would be more aware of maintenance or security issues than security personnel who visit the house infrequently, and would have a personal interest in maintenance work being performed on the house.

The disadvantages of having a resident in the house is the potential for wear and damage to the house. A resident who is not sensitive to the historic importance of the house potentially could cause damage to the house. The damage could range from simply

causing wear and tear on the house to causing severe damage from a fire or other problem.

To make the house habitable according to today's codes, this option would require the following (see Electrical, Mechanical and Plumbing Evaluation for complete descriptions of the requirements in these areas):

- Install a complete bathroom, including a water closet, lavatory and bath or shower.
- Install a kitchen with a sink.
- Install a complete updated electrical system.
- Install an effective heating system.
- Perform general repair of the interior, such as repair and replacement of damaged and missing floor joists and flooring, plaster repair and replacement, painting, and replacement of locks and other hardware.
- Modify the windows to allow their use as emergency exits from sleeping spaces.

B. RECOMMENDATIONS, ALTERNATIVES & COST ESTIMATES

1. GENERAL CONDITION STATEMENT

The Worthington House is in stable condition, but it has suffered from many years of neglect. Many materials and the general configuration of the house dating from the time of the Battle of Monocacy still exist, but there has been deterioration to the interior and exterior during the forty years that it has been unoccupied. No major structures other than the house exist on the site from the period of the Civil War.

Although the Worthington House is in stable condition, an active restoration of the building must take place if it is to be a viable contributor to the historic scene of the Battle of Monocacy. The most effective approach to this restoration is to complete Options I through IV. The following discussion of alternative treatments and the cost estimate for the Worthington House assumes that a complete restoration will take place, completing all the work described in Options I through IV.

2. BUILDING ELEMENTS - PROBLEMS, ALTERNATIVES AND RECOMMENDATIONS

Masonry Structural Deficiencies

Both basement fireplaces have deteriorated and the chimney breasts have fallen.

Recommended Action:

♦No action. The fireplaces appear to be stable, although in poor condition. Some repairs to the masonry have already taken place to stabilize the fireplaces. Monitor the fireplaces and chimneys for water infiltration and further deterioration.

Alternative Actions:

♦Restore fireplaces. The original configuration of the fireplaces is not known. Inaccurate restoration of the fireplaces misleads future historians as to the original configuration of the fireplaces.

Chimneys have been removed above the roof line.

Recommended Action:

♦Restore the chimneys to their original appearance, based on photographs, drawings and other documentation performed before the chimneys were removed, if possible. Provide concealed chimney caps to prevent water infiltration and bird and rodent entry. The chimney can be used to vent a new heating system, if it is properly lined in a way which does not damage the historic fabric of the

house. Use existing salvaged brick which is stored in the basement, and cull bricks for the chimney tops which are the best match with the existing masonry.

Alternative Action:
♦No action. The house continues to have no chimneys visible on the exterior.

Brick, stone, and CMU is deteriorated at and around the basement door at the south of the ell.

Recommended Action:
♦Remove CMU, restore doorway and beaded board door to stabilize masonry and to seal entry.

Alternative Actions:
♦No action. Masonry continues to deteriorate, and openings in the masonry continue to allow animal and insect entry into the house.

♦Repair masonry to stabilize and seal the doorway. This solution solves the immediate deterioration problem, but it does not address the historic appearance of the doorway.

There is deterioration of window lintels at the 1st floor on the west elevation of the ell, of lintels and sills at the basement on the east elevation, and at the basement door lintel on the south elevation of the ell. Some damage to masonry above the lintels has occurred as a result of the deteriorating lintels.

Recommended Action:
♦Replace lintels with new wood lintels to match the original, and repair cracks in the masonry.

Alternative Action:
♦No action. Lintels will continue to deteriorate and the masonry above the lintels will continue to deteriorate.

There are cracks in the basement wall between the ell and the north room below the dining room.

Recommended Action:
♦Replace broken bricks and point open joints in the wall to stabilize the masonry (see structural evaluation).

Alternative Action:
♦No action.

♦Monitor cracks over time to determine if they are continuing to grow. If they are found to be growing, then repair and stabilize them.

Mortar in the joints of brick and stone masonry is deteriorating.

Recommended Action:
♦Point joints with new mortar to match existing.

Alternative Action:
♦No action. Mortar will continue to deteriorate and will lead to failure of masonry.

Mortar from 1983 pointing does not match the original mortar.

Recommended Action:
♦Repoint mismatched mortar.

Alternative Action:
♦No action. The mismatched mortar continues to stand out as a bad match.

Retaining walls at areaways to basement entries are deteriorating.

Recommended Action:
♦Rebuild walls where stones are loose and falling. Remove vegetation which is causing damage to walls.

Alternative Action:
♦No action. The walls continue to deteriorate.

Wood/Carpentry Repairs

The sidelights and transom window at the main entry are missing and replaced with plywood. Doors and transom windows at the north and south sides of the ell are missing and covered with plywood.

Recommended Action:
♦Restore windows and trim to original configuration. The details of the original windows and trim would be relatively easy to develop.

Alternative Action:
♦No action. There would be no cost for this alternative, however the appearance of the house in these locations would continue to be unsightly.

The basement door at the west elevation of the main block is a non-historic plywood door with a new wood frame.

Recommended Action:
♦Replace plywood door and wood frame with a new beaded board door and frame to match the existing beaded board doors in the basement.

Alternative Action:
♦No action. The existing plywood door is utilitarian, but it is historically inaccurate and unsightly.

Rake boards at the gable ends are flat, historically inaccurate boards.

Recommended Action:
♦Replace rake boards with new wood boards which have a moulding on the drip edge and a splash board at the end, as found on the original rake boards.

Alternative Action:
♦No action. The existing rake boards are utilitarian, although historically inaccurate.

Water infiltration into the building has damaged floor joists and flooring at the north end of the house.

Recommended Action:
♦Repair or replace joists where necessary and replace flooring with new flooring to match existing.

Alternative Action:
♦No action. The floor in the deteriorated areas remains unusable.

Deterioration of floor at bottom of main stair is patched with plywood.

Recommended Action:
♦Repair or replace joists where necessary and replace flooring with new flooring to match existing.

Alternative Action:

♦No action. The plywood on the floor in the deteriorated areas remains in place.

Deterioration of the floor in the 2nd floor ell: missing boards, plywood patches, rotted floor boards.

Recommended Action:

♦Repair or replace joists where necessary and replace flooring with new flooring to match existing.

Alternative Action:

♦No action. The floor in the deteriorated areas remains unusable.

Main stair is missing balustrade and wood trim is missing and damaged.

Recommended Action:

♦Restore the balustrade and missing and damaged wood trim.

Alternative Action:

♦No action. Stair remains in deteriorated state.

Stair between the basement and 1st floor is loose and unsafe.

Recommended Action:

♦Repair the stair so that it is secure. Replace wood stringers which are rotting with new wood to match existing.

Alternative Action:

♦No action. The stair will continue to deteriorate to the point that it is unusable.

♦Replace stair with new. This secures the stair, but it unnecessarily removes historic fabric.

Powder post beetle infestation of stored wood porch parts in basement.

Recommended Action:

♦Treat all wood in the storage area and other areas which show evidence of infestation with an insecticide formulated for use in exterminating these beetles, such as Bora-Care. Include loose, non-structural wood.

Alternative Actions:

♦No action. The infestation of insects will continue and will spread, causing irreversible damage to the wood of the porch and to the structural wood of the house.

♦Spot treat with an insecticide only the wood members which show indications of damage. This is a less expensive treatment, but the presence of beetle larvae is not always visible. Untreated insects will spread and reinfect the wood in the house.

Original interior and exterior doors are missing or damaged. Original wood grained finishes are deteriorated or painted over. Original door hardware is missing or damaged.

Recommended Action:

♦Replace missing doors with new doors to match existing. Repair damaged doors. Refinish doors with wood grain finish to match existing door finishes. Clean and restore existing wood grain finish. Replace missing hardware with reproduction hardware. Repair damaged hardware or replace with reproduction hardware.

Alternative Action:

♦No action. Missing and damaged doors remain missing or damaged.

♦Replace missing or damaged doors with new modern doors. This alternative is less expensive and clearly identifies modern interventions. Historic fabric is lost and the architectural integrity of the house is compromised.

Door and window casings are missing or damaged.

Recommended Action:

♦Replace missing and damaged door and window casings with casings to match original.

Alternative Action:

♦No action. Missing and damaged door and window casings remain missing or damaged.

Fireplace mantels are missing from the fireplaces, and the dining room fireplace is blocked up.

Recommended Action:

♦Restore the missing mantels and blocked up fireplace. Because the configuration of the missing mantels is not known, there must be some speculation as to the mantels' configurations. Careful study must be made of the

existing paint shadows and nail patterns at the missing mantels, and of the typical fireplace mantels of the region and the period.

Altemative Action:

♦Do not restore the missing mantels or blocked up fireplace. There would be no danger of installing an historically inaccurate mantel, and the evidence of the original mantels could be restored.

Porches on the east, west and north sides are missing from the house.

Recommended Action:

♦Restore missing porches to the house. Restore east and west porches based on dismantling drawings and existing parts stored in the basement. The porches stored in the basement are the only porches which are known in any detail. They may be the porches which were on the house at the time of the Battle of Monocacy. Restore the north porch as a simple, utilitarian porch and stairs, since nothing is known about the configuration of the original stair.

Altemative Action:

♦No action. The four exterior doors to the house remain unusable, and the house is missing these visual and functional elements.

♦Construct simple utilitarian porches at all four doors. These porches make no pretext of historic accuracy, but provide access to the house.

♦Restore the east porch as a single bay porch, based on historic models. A single bay porch may have been the original configuration of the porch, but the details of the design are entirely conjectural.

♦Restore the north porch based on historic models. The configuration is entirely conjectural.

The original slate roof has been replaced with a modern metal roof.

Recommended Action:

♦Replace the metal roof with a slate roof to match the original. Use the original slate shingles which are stored in the house as far as possible, and match the original slate with new slate for the rest of the roof.

Altemative Action:

♦No action, do not replace the metal roof. The house will remain waterproof, but will not have a historically accurate appearance.

2. BUILDING ELEMENTS - PROBLEMS, ALTERNATIVES AND RECOMMENDATIONS (cont'd)

Interior Finishes

Decorative paint in stair hall and parlor is deteriorating. Paint is peeling and holes in plaster are causing paint loss (see Paint Analysis in Appendix 2).

Recommended Action:

♦Perform a complete survey of the decorative paint. Document with photographs, drawings and Munsell color system notations. Determine paint composition, and methodology for stabilization of paint. Stabilize samples of each pattern and color of paint, or if possible, all existing decorative paint. Restore missing and damaged plaster and paint.

Alternative Action:

♦No action. Decorative paint continues to deteriorate.

♦Stabilize existing paint, do not restore missing paint. The restored plaster has large unpainted voids. This prevents having areas of conjecture, but the appearance is incomplete.

Sections of plaster are missing and loose from walls and ceilings. Ceiling light fixtures penetrate through original lath and plaster.

Recommended Action:

♦Restore missing plaster to match existing plaster. Restore missing lath where necessary. Remove light fixtures and repair holes in lath and plaster.

Alternative Action:

♦No action. Missing and loose plaster remains missing and loose.

Stovepipe holes are cut in ceilings, floors and chimney breasts.

Recommended Action:

♦Repair holes in plaster ceilings, wood floors and in plaster and brick at chimney breasts.

Alternative Actions:

♦No action. Stovepipe holes will remain. Holes in the floor create a hazard. Holes in ceiling and chimney breasts are unsightly and are not historically significant.

Life Safety Deficiencies

Chimneys and fireplaces do not comply with code requirements for chimney height, fireplace opening size, hearth size, flue lining, and distance to combustible materials.

Recommended Action:

♦No action, do not use fireplaces. Fireplaces and chimneys are significant historic material and the action required to remedy these code deficiencies are very damaging to them. Do not use the fireplaces, both for safety reasons and for the preservation of the fireplaces.

Alternative Action:

♦No action, build fires in the fireplaces. Using the fireplaces is very hazardous, is damaging to the fireplaces, and can potentially cause a fire in the house.

♦Make modifications necessary to the fireplaces to bring them up to code and make them usable. The fireplaces could be used to provide auxiliary heat. Fireplaces and chimneys are significant historic material and to remedy these code deficiencies is very damaging to them.

There is no fire alarm or detection system in the house.

Recommended Action:

♦No action. This alternative has no cost, and requires no alteration to the historic fabric of the house. Because of the remote location of the house, a fire probably would not be reported quickly and the house would be severely damaged.

Alternative Actions:

♦Install smoke or heat detectors as part of an integrated fire protection system. An integrated system in the house signals the presence of a fire either with the local fire department or at a NPS security station, as well as starting evacuation alarms and triggering the suppression system. Signalling a remote location where there is 24 hour staffing ensures that response to a fire is quick.

There is no fire suppression system in the house.

Recommended Action:

♦Install fire extinguishers in strategic locations throughout the house. Fire extinguishers do not have such a detrimental impact on the historic fabric of the house. Fire extinguishers are not effective if the house is unoccupied and there is no one in the house to use them.

Alternative Actions:

♦Install a halon fire suppression system as part of an integrated fire protection system. A halon fire suppression system does not cause water damage to historic

fabric, as a water system does. A halon fire suppression system requires installation of detectors, discharge valves and canisters. The system uses individual canisters of halon, does not require running a water line to the house or require a supplementary pump systems. Halon causes damage to the ozone layer and requires maintenance by qualified personnel. As a result of the environmental dangers of halon and the subsequent increase in the cost of the materials, this type of system is being installed for only the most specialized applications.

♦ Install a wet sprinkler system as part of an integrated fire protection system. This is the simplest and least expensive of the fire suppression systems. A supply of water with adequate pressure is required (see plumbing analysis). A wet sprinkler system requires freeze protection for the pipes. Piping and sprinkler heads are visible in every room of the house. When activated, the water from the sprinklers damages wood, plaster and hardware in the house.

♦ Install a dry sprinkler system as part of an integrated fire protection system. A dry system is more expensive than a wet system, but it does not require freeze protection for the pipes. A supply of water with adequate pressure is required (see plumbing analysis) and additional equipment is required for a dry system. Piping and sprinkler heads are visible in every room of the house. When activated, the water from the sprinklers damages wood, plaster and hardware in the house.

♦ No action. No alteration to the historic fabric of the house is required. In case of a fire, there is no suppression of the conflagration until the fire department arrives with their equipment. The closest source for water is the river, which is over 1000 feet away, and 80 feet lower in elevation, so the department would have to use a tank truck.

The egress path from the house does not comply with the code for handrail size, size of egress door from the basement, egress door availability, egress path continuity where porches and stairs are missing, and size of emergency egress through bedroom windows.

Recommended Action:

♦ If the house is to be occupied, restore the handrail at the main stair, restore the porch and steps, repair the door hardware so that the door is operable from the interior, and make the window hardware in the 2nd floor bedroom operative. Do not change size of openings at 2nd floor windows, size of egress doors from the basement, and handrail heights. These are relatively minor infractions which do not greatly diminish the ability to egress the building, and to modify these elements to meet code requirements would cause damage to historic material.

Alternative Actions:

♦No action. The blocked doors, missing porches and steps, and missing handrail create a hazardous situation. The other violations are relatively minor and do not prevent a reasonably safe egress.

♦Make all the changes required so that the house complies with the code for means of egress, including enlarging window openings at 2nd floor bedrooms, enlarging basement doors, and changing handrail heights. This alternative is expensive and damages a great deal of historic fabric. It does not gain a lot of additional fire security as a result.

Energy Conservation Deficiencies

Insulation value of the building is very low.

Recommended Action:

♦Add insulation to the 2nd floor ceiling (attic floor) to raise the thermal resistance of the ceiling. Four inches of rigid polyurethane provides additional thermal resistance of R-25, bringing the total thermal resistance of the ceiling to around R-30. Do not provide additional thermal insulation in the walls or the floor.

Alternative Action:

♦No action. The thermal insulation value of the house remains low.

♦Install insulation in the basement ceiling, as well as the attic ceiling. Insulating the ceiling of the basement assumes that the basement will not be heated or used as part of the residential space.

♦Fur out the walls and add insulation on the interior of the masonry walls. The energy efficiency of the house is greatly improved. Furring the walls damages or covers historic plaster, bases, window sills, and window and door casings, and is detrimental to the historic character of the house. If not done properly, the furred walls can create a situation where moisture from the house condenses on the historic plaster and the decorative painting. If done properly, a furred wall can provide protection to the historic finishes of the house.

Security Deficiencies

There is no security system in the house to alert the Park of intruders in the house.

Recommended Action:

♦No action. Rely on existing patrols for surveillance and the existing gates, fences, and locks on doors and windows to provide security at the house. Vandalism or a break in can remain undetected for days, and historic fabric can be damaged or removed.

Alternative Action:

♦Install a motion detector system as part of a Park security system which alerts a central security office of break ins at the house. With this type of system NPS security officers could be at the house soon after a break in, preventing theft or vandalism to the house.

Building Code Compliance

The house is not handicapped accessible. An unassisted wheelchair is unable to enter the house at any of the doors, as required by the Uniform Federal Accessibility Standards.

Recommended Action:

♦Install a path to the west side of the house south of the ell. When restoring the porch, install a ramp to accommodate wheelchair access. This provides entry to the house, but through a secondary entry. An entry on the west side of the house does not disturb the historic appearance of the main elevation of the house.

Alternative Actions:

♦No action. Unassisted handicapped accessibility to the house is not possible.

♦Install a ramp to the east porch. A ramp to the east porch provides handicapped accessibility to the same entry which is used by non-handicapped visitors to the house, but is detrimental to the historic appearance of the front elevation of the house.

♦Install a wheelchair lift to the east entry of the house. The machinery for a lift to the door is detrimental to the historic appearance of the house and requires maintenance.

The interior stairs of the house do not allow wheelchair accessibility to other levels of the house.

Recommended Action:

♦No action. Installation of the equipment needed to transport a wheelchair to other levels of the house damages the historic fabric of the house. A public tour of the house restricted to the 1st floor shows most of the features of the house.

Alternative Action:

♦Install a lift which provides access to the basement and 2nd floor of the house from the 1st floor. The best location is at the south wall of the ell, where it is isolated from the most important historic fabric. Installation of a lift in the

house requires damaging historic fabric, and detracts from the historic character of the house.

Masonry foundations are required by code to be dampproofed with a 3/8" portland cement parging.

Recommended Action:

♦No action. Water seepage through the foundation walls is not a major problem, so this action is not necessary. The excavation required to expose the walls for parging causes damage. Parging is expensive to install and covers historic fabric.

Alternative Action:

♦Excavate along the perimeter of the foundation and apply parging to the foundation wall. The excavation required to expose the walls for parging causes damage. Parging is expensive to install and covers historic fabric.

Hazardous Materials

Paint layers on the house are likely to be lead-based.

Recommended Action:

♦Survey the house for lead-based paint. Follow proper abatement procedures when scraping, sanding, or removing lead-based paint or the materials which are painted with them. Perform annual survey for peeling lead-based paint, and properly abate where it is warranted. Because the house is not occupied, the exposure to any individual will be minimal. Surveying, monitoring and abating when warranted is the most cost-effective approach to the problem.

Alternative Action:

♦No action. Potential lead-based paint hazards will remain unknown, and the risk of exposure is increased.

♦Survey the house for lead-based paint. Follow proper procedures for abatement of all the paint which tests positive for lead. This will completely eliminate the hazard of lead-based paint from the house. Complete abatement is very expensive and is not necessary for an unoccupied building. Abatement may damage historic fabric and requires removal of historic paint finishes.

House may contain asbestos in kitchen linoleum and in wire insulation.

Recommended Action:

♦Survey the house for asbestos. Follow proper procedures for abatement of asbestos-containing material. None of the potential asbestos-containing material is historic fabric.

2. BUILDING ELEMENTS - PROBLEMS, ALTERNATIVES AND RECOMMENDATIONS (cont'd)

Alternative Action:

♦No action. The asbestos hazard remains unknown, and the risk of exposure, especially for workers removing the basement floor, continues.

♦Survey the house for asbestos. Encapsulate asbestos-containing material where necessary. Follow proper abatement procedures for abatement of asbestos-containing material at the time that the material is to be disturbed for construction or repairs. This alternative is less expensive over the short run.

The basement may contain radon.

Recommended Action:

♦Monitor the basement and sub-basement for radon. Provide ventilation to reduce the radon level if it is found to be high. Ventilation in the basement and sub-basement are necessary for reducing humidity, and will help in clearing radon problems, as well.

Alternative Action:

♦No action. Any potential radon problem will remain. Because the building is unoccupied, exposure for any individual will not be high.

♦Monitor the basement and sub-basement for radon. Provide vapor barriers and radon control system for containing and evacuating radon if high levels are found. This is a more expensive approach, but may be necessary if high levels of radon are found. Even with high levels in the house, it is unoccupied and exposure to any individual will not be high.

3. COST ESTIMATE

• Rebuild 3 chimney tops.	$2858.
• Replace 3 deteriorated window lintels.	$590.
• Replace broken bricks and point open joints to stabilize wall at the basement between ell and main block.	$531.
• Point deteriorated and mismatching masonry joints with new mortar to match existing.	$2625.
• Rebuild deteriorated stone masonry walls at areaways.	$1062.
• Restore windows and trim at exterior doors to original configuration.	$2750.
• Replace plywood door and wood frame at basement entry with a new beaded board door.	$933.
• Restore doorway and beaded board door at basement door to ell.	$933.
• Replace existing rake boards with new wood boards which have a moulding on the drip edge and a splash board at the end, as found on the original rake boards.	$1206.
• Replace deteriorated floor joists.	$4687.
• Replace deteriorated flooring.	$7387.
• Restore the balustrade and missing and damaged wood trim at the main stair.	$10283.
• Repair the servant stair so that it is secure. Replace wood stringers which are rotting with new wood to match existing.	$1316.
• Treat all the wood stored in the south room of the basement and the basement ceiling with an insecticide formulated for use in exterminating these beetles, such as Bora-Care. Include loose, non-structural wood.	$1880.
• Replace five missing interior doors with new doors to match existing.	$3293.
• Repair three damaged doors.	$880.

3. COST ESTIMATE (cont'd)

• Refinish doors with wood grain finish to match existing door finishes. Clean and restore existing wood grain finish.	$2500.
• Replace missing hardware with reproduction hardware. Repair damaged hardware or replace with reproduction hardware.	$1800.
• Replace missing and damaged door and window casings with casings to match original.	$2197.
• Replace four missing mantels and open blocked up fireplace.	$8197.
• Restore missing porches to the house. Restore east and west porches based on dismantling drawings and existing parts stored in the basement. Restore the north porch as a simple, utilitarian porch and stairs, since nothing is known about the configuration of the original stair.	$49410.
• Replace the metal roof with a slate roof to match the original.	$9105.
• Perform a complete survey of the decorative paint. Document with photographs, drawings and Munsell color system notations. Determine paint composition, and methodology for stabilization of paint.	$5950.
• Restore missing and damaged plaster and paint. No estimate made; this cost is dependent on the recommendations of the paint study.	
• Restore missing plaster to match existing plaster. Restore missing lath where necessary. Repair holes in lath and plaster from light fixtures, stovepipe openings, and access holes. Patch cracks in plaster.	$10272.
• Install fire extinguishers in strategic locations throughout the house.	$426.
• Make the window hardware in the 2nd floor bedroom operable so that the house complies with egress code requirements.	$293.

•	Add insulation to the 2nd floor ceiling (attic floor) to raise the thermal resistance of the ceiling. Four inches of rigid polyurethane provides additional thermal resistance of R-25, bringing the total thermal resistance of the ceiling to around R-30.	$2121.
•	To provide handicapped accessibility, install a path to the west side of the house south of the ell. The cost of a ramp to the porch has been included in the cost of constructing a new porch.	$2205.
•	Survey the house for lead-based paint.	$125.
•	Survey the house for asbestos.	$150.
•	Monitor the basement and sub-basement for radon.	$150.
•	Install new kitchen with range, sink and cabinets.	$8625.
•	Install new bathroom, with toilet, tub, sink, cabinets and finishes.	$3446.
•	Install new electrical system, with new panel, circuit breakers, wiring, outlets, light fixtures, switches, etc.	$18560.
•	Install new heating system with hot water distribution and baseboard radiators.	$14662.
•	Install new water supply; drill well, install pumps, etc.	$1010.
•	Install new septic system.	$3640.
Total:		**$188,058**

C. POSSIBLE AREAS OF FURTHER RESEARCH

1. ARCHITECTURAL INVESTIGATION

- Survey of similar buildings constructed during the same era or in the same region.

  Knowledge of the architectural traditions of the region and era would help in understanding the historical context of the Sherrick House. This type of study could be as focused as a study of 1850's houses on the Monocacy Battlefield, or as broad as a study of mid-19th century American architecture.

- Reconstruction of the farmstead.

  At the time of the Battle of Monocacy, the Worthington House was surrounded by a barn, slave quarters and other outbuildings which no longer exist. Reconstruction of the missing buildings would provide a more complete historic context for the Battle of Monocacy and for the configuration of a 19th century farmstead.

2. HISTORICAL INVESTIGATION

- Historic questions which would be worthwhile to pursue regarding the Worthington House include:

  Who were the Worthingtons? Where did they come from, what did they do at the farm?

  What did the Worthingtons do during and after the battle?

  What took place at and around the farm during the battle?

  How were the house and barn used as a hospital after the battle?

  Who lived in the house between 1862 and 1953? How did they live?

3. ARCHEOLOGICAL INVESTIGATION

- Locate and determine the size and use of Civil War era barns and outbuildings. This could be accomplished by studying early surveys, maps and aerial photographs of the area, as well as by archeological study.

3. ARCHEOLOGICAL INVESTIGATION (cont'd)

- Locate Civil War Era site features such as orchards, gardens and fences.

- Did Clifton Farm have other buildings on the site which predate the Worthington House? Was there a previous house on the site of the existing house?

CULTURAL LANDSCAPE STUDY

- Documentation of historical landscape and description of existing conditions.

- Recommendations for possible alternatives for treatment of the site, including incorporating the house and farm into the regular tours of the battlefield, using the house and farm for special interest tours, or using the house as a focal point for a historical wayside for southbound traffic on I-270. A historical wayside which overlooks the battlefield currently exists for northbound traffic on I-270.

1. An account of the Battle of Monocacy and the activities surrounding the Worthington House is given in Appendix A. The only book-length account of the battle is found in Glenn H. Worthington, Fighting for Time, The Battle of Monocacy (1932; rpt. Shippensburg, PA: White Mane Press, 1994).

2. Glenn H. Worthington, Fighting for Time, p. 138.

3. Miller, Wihry & Lee, Inc., Assessment of the Alternatives - General Management Plan for Monocacy National Battlefield, Frederick County, Maryland, prepared for the National Park Service, Denver Service Center, National Capital Team (May, 1979), p. 10.

4. The chronology of the Clifton Farm is outlined in the HABS history report prepared by Philip Edmund Pendleton, et. al, "Clifton Farm (Worthington Farm, Riverside Farm), HABS No. MD-1052," (Washington, DC: Historic American Buildings Survey, 1991). The dates used in this section of the report are taken primarily from the HABS account.

5. Glenn Worthington, Fighting for Time, p. 104.

6. Philip Edmund Pendleton, et al., in "Clifton Farm (Worthington Farm, Riverside Farm) HABS No. MD-1052," assumes that the entire house was constructed at one time, and that the only alterations were to the interior finishes and other minor, non-structural changes. Pendleton did not observe the important differences in materials and techniques which exist between the two parts of the house.

7. Some typical examples of the 2/3 house are shown in Henry Glassie, Pattern in the Material Folk Culture of the Eastern United States, (Philadelphia: University of Pennsylvania Press, 1968), pp. 56 and 68. This building type is found throughout the mid-Atlantic region.

8. Glenn Worthington, Fighting for Time, p. 161.

9. For plans, elevations and sections, see the drawings of the Worthington House, prepared by the Historic American Buildings Survey in 1991, Appendix E.

10. Examples of Federal and Greek Revival houses with this configuration of doorway, sidelights, transom and porch are numerous. Two examples, dating from 1805 and 1850, can be seen in Leland M. Roth, A Concise History of American Architecture (New York: Harper & Row, Publishers, 1979), p. 59 and 99.

11. A.J. Downing, The Architecture of Country Houses, 1850; rpt. New York: Dover Publications, Inc., 1969. Porches similar to the Worthington House porch can be found throughout the book. See figures 41, 42, 43, etc.

12. Glenn Worthington, Fighting for Time, p. 168.

13. Pendleton, "Clifton Farm, HABS No. MD-1052," p. 8.

14. Published in Glenn Worthington, Fighting for Time, p. 120.

15. The 1856-58 date for the decorative painting and the attribution to Brumidi are from an anonymous, undated report for Frederick County Landmarks Commission, cited in Philip Edmund Pendleton, et al. "Clifton Farm (Worthington Farm, Riverside Farm) HABS No. MD-1052," Historic American Buildings Survey, Washington, DC, 1991, p. 9.

16. Pendleton, "Clifton Farm, HABS No. MD-1052", p. 9.

17. Pendleton, "Clifton Farm, HABS No. MD-1052," p. 35.

18. Peter Priess, "Wire Nails in North America," Bulletin of the Association of Preservation Technology, vol. V, no. 4 (1973), p. 90.

19. Pendleton, "Clifton Farm, HABS No. MD-1052," p. 11.

20. Donald V. Urquhart, "Appraisal," n.d., p. 11 (in Thomas A. Vitanza, "Project File, Exterior Preservation of the Worthington House").

21. Miller, Wihry & Lee, Assessment of the Alternatives, p. 21.

22. Miller, Wihry & Lee, Assessment of the Alternatives, p. 21.

23. Urquhart, "Appraisal," p. 11.

24. United States Geological Survey, "Buckeystown Quadrangle," 1952, revised 1984. The Worthington House is on the map about 1500 feet southwest of where Interstate 270 crosses the Monocacy River.

25. Donald V. Urquhart, "Appraisal," n.d., n.p. 11-12.

26. Thomas A. Vitanza, Project Leader, "Project File, Exterior Preservation of the Worthington House," provided by National Park Service, National Capital Region.

27. See illustration in Appendix J., Charles Fisher and Thomas A. Vitanza, "Temporary Window Vents in Unoccupied Historic Buildings", Preservation Tech Notes, Number 10, (Washington, DC: National Park Service, US Department of the Interior August, 1985), p. 1.

28. See description of the louver design and installation in Appendix J, Charles Fisher and Thomas A. Vitanza, "Temporary Window Vents in Unoccupied Historic Buildings."

29. The chimney documentation is described in the project notebook, Thomas A. Vitanza, "Project File, Exterior Preservation of the Worthington House," weekly field report for week ending 1/28/83.

30. Thomas A. Vitanza, "Project File, Exterior Preservation of the Worthington House."

31. CABO One and Two Family Dwelling Code, (Falls Church, Virginia: The Council of American Building Officials, 1992).

32. Drawing published in Glenn Worthington, Fighting for Time, opposite p. 120.

33. "How to Meet the New HUD/FHA Minimum Property Standards Thermal Requirements" (Toledo, Ohio: Owens-Corning Fiberglass Corporation, 1979), p. 3.

34. Lester B. Lave and Arthur C. Upton, Toxic Chemicals, Health and the Environment (Baltimore: Johns Hopkins University Press, 1987), p. 9.

35. Lave and Upton, p. 12.

PHOTOGRAPHS

EXISTING CONDITIONS PHOTOGRAPHS

Each of the following existing conditions photographs of the Worthington House has a key on the facing page which indicates the locations of the important features which are shown. Refer to the text for complete descriptions of the building's features.



Photo 1
Worthington House, east elevation.

A) Chain link fence around house.
B) East entry door.
C) Porch floor joist pockets, filled with urethane foam.
D) Porch flashing and rafter pockets. Pockets filled with mortar or urethane foam.
E) Corrugated metal roof, gutters and downspouts.
F) Louvers in place of window sash, typical of 8 louvers on east elevation.



Photo 1
Worthington House, east elevation.
Photographed by David Amundson
May, 1994

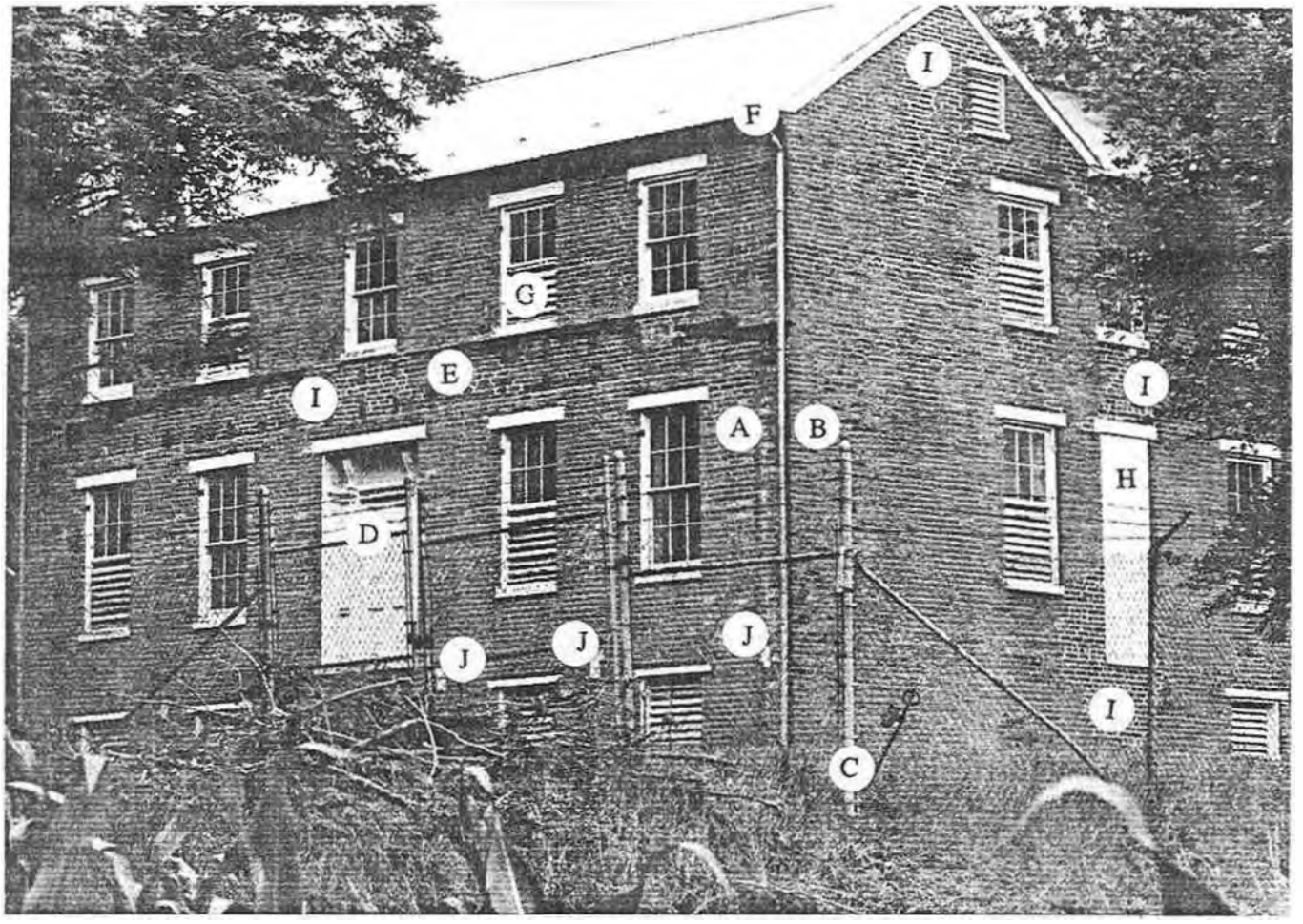


Photo 2
Worthington House, exterior view from the northeast.

A) East elevation.
B) North elevation.
C) Chain link fence around house.
D) East entry door.
E) Porch flashing and rafter pockets. Pockets filled with mortar or urethane foam.
F) Corrugated metal roof, gutters and downspouts.
G) Louvers in place of window sash, typical of 8 louvers on east elevation and 6 on the north elevation.
H) Plywood over north door opening.
I) Brick masonry rebuilt 1983 (areas with light colored mortar).
J) Porch floor joist pockets.



Photo 2
Worthington House, exterior view from the northeast.
Photographed by David Amundson
March, 1995

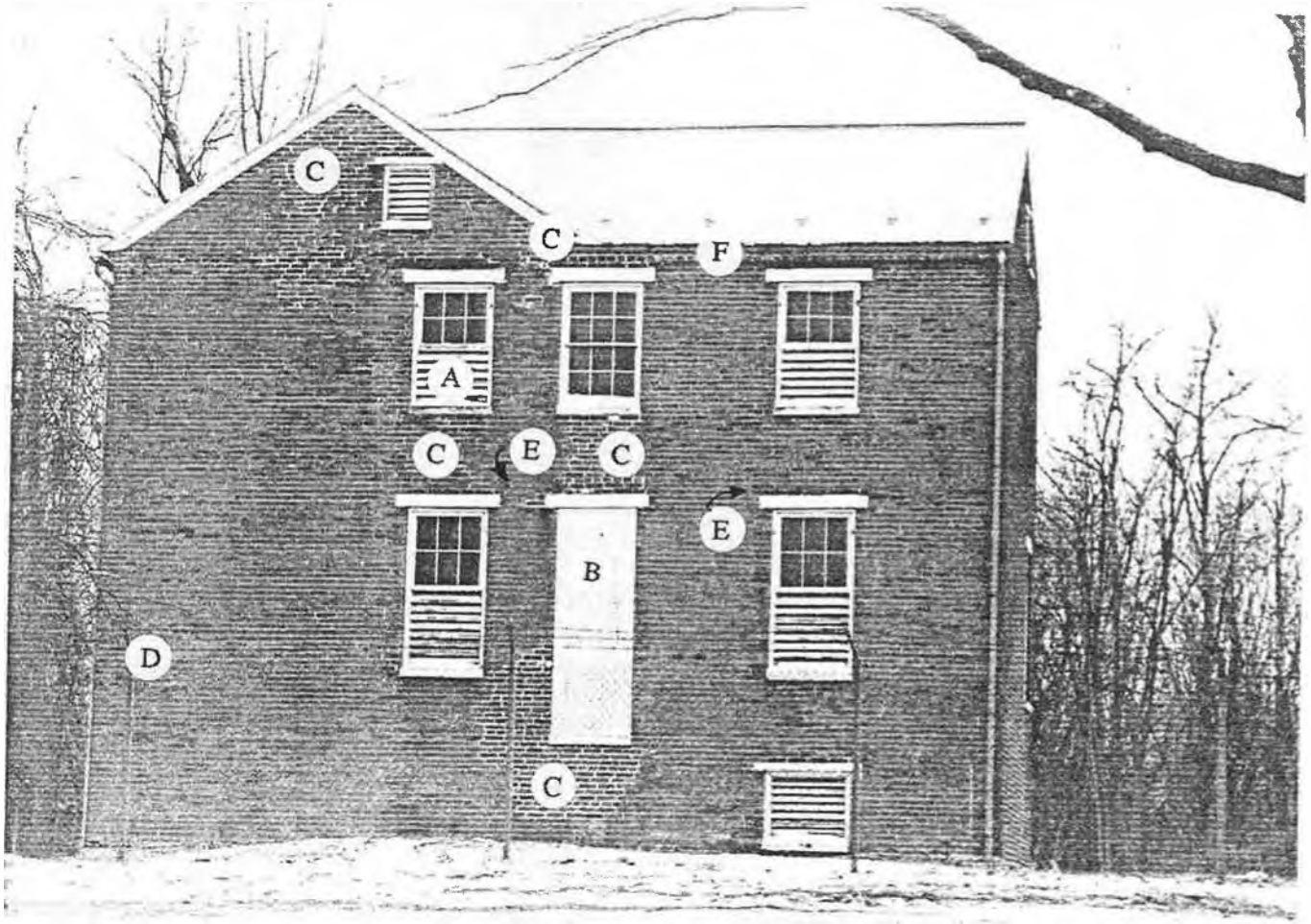


Photo 3
Worthington House, north elevation.

A) Louvers in place of window sash, typical of 6 louvers on the north elevation.
B) Plywood over north door opening.
C) Brick masonry rebuilt 1983 (areas with light colored mortar).
D) Chain link fence around house.
E) Iron loops at sides of doorway.
F) Corbelled brick cornice.



Photo 3
Worthington House, north elevation.
Photographed by David Amundson
March, 1995

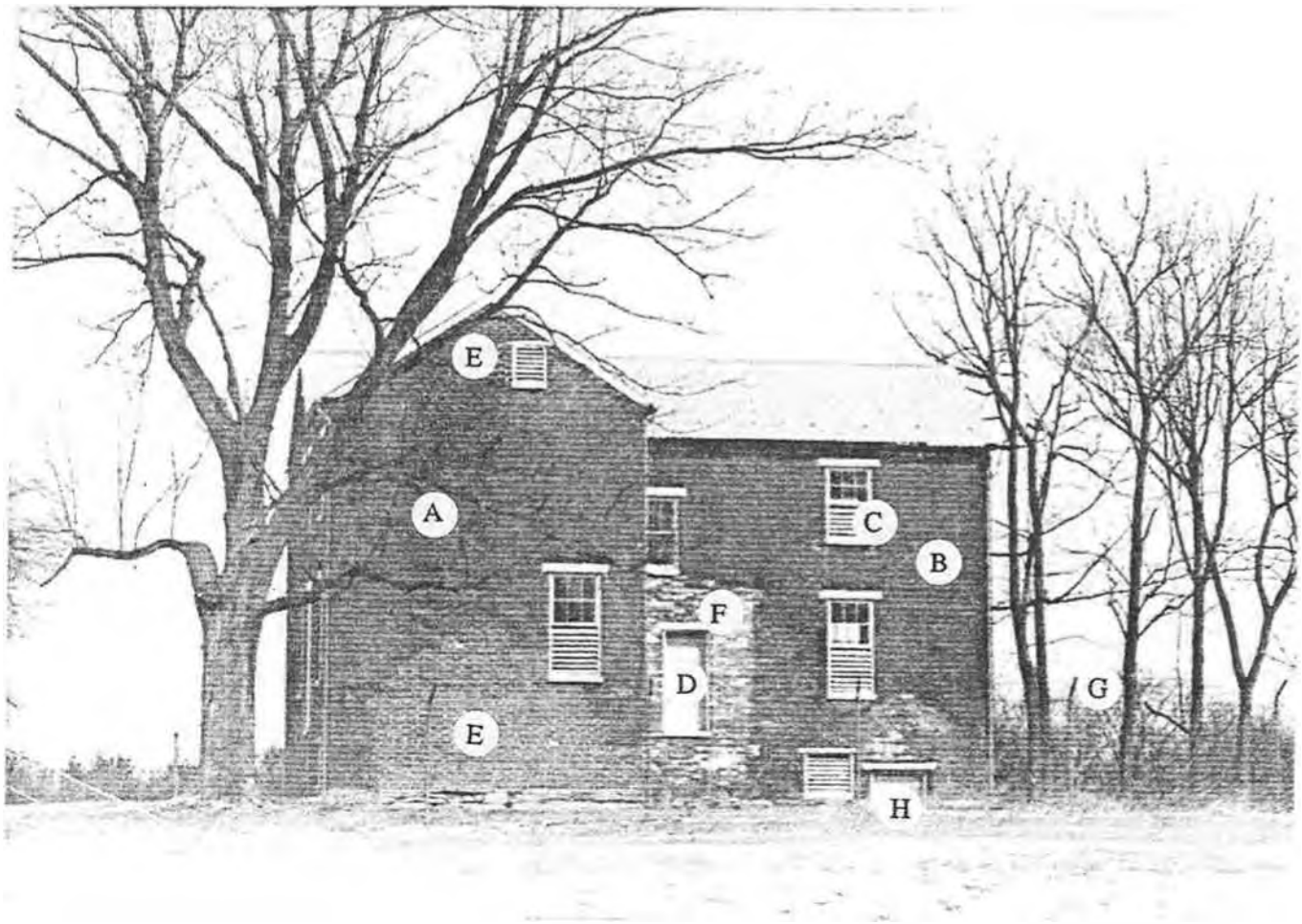


Photo 4
Worthington House, west elevation.

A) West elevation of ell.
B) West elevation of main block.
C) Louvers in place of window sash, typical of 2 louvers on the west elevation of the ell and 3 louvers on the west elevation of the main block.
D) West entry door.
E) Brick masonry rebuilt 1983 (areas with light colored mortar).
F) Painted masonry protected by covered porch.
G) Chain link fence around house.
H) Plywood door to basement.



Photo 4
Worthington House, west elevation.
Photographed by David Amundson
March, 1995

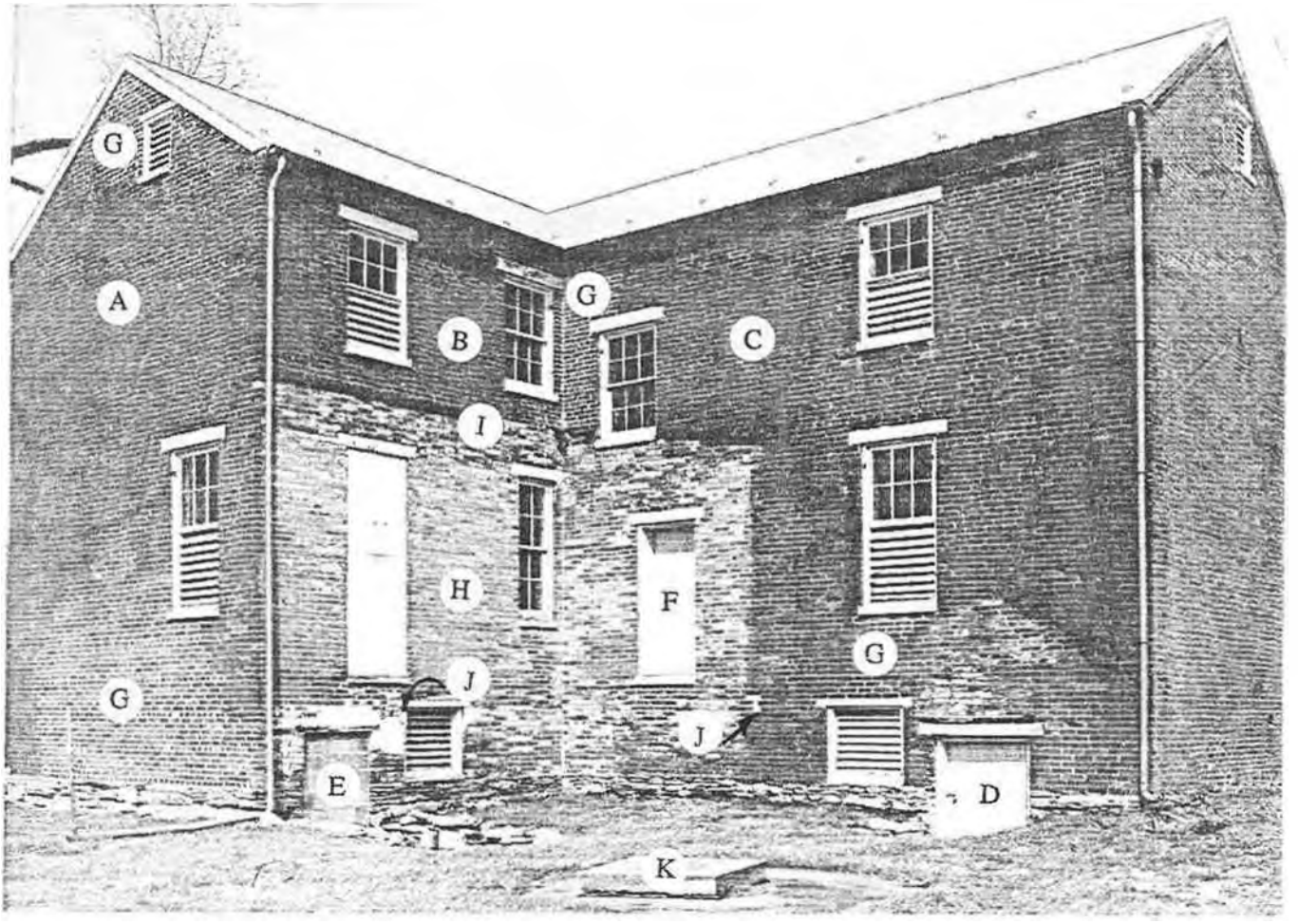


Photo 5
Worthington House, exterior view from the southwest.

A) West elevation of ell.
B) South elevation of ell.
C) West elevation of main block.
D) Plywood entry door to basement and stone masonry areaway.
E) Blocked in doorway to basement ell, and stone masonry areaway.
F) West entry door.
G) Brick masonry rebuilt 1983 (areas with light colored mortar).
H) Painted masonry protected by covered porch.
I) Porch flashing and rafter pockets. Pockets filled with mortar or urethane foam.
J) Porch floor joist pockets, filled with urethane foam.
K) Concrete cover over well.

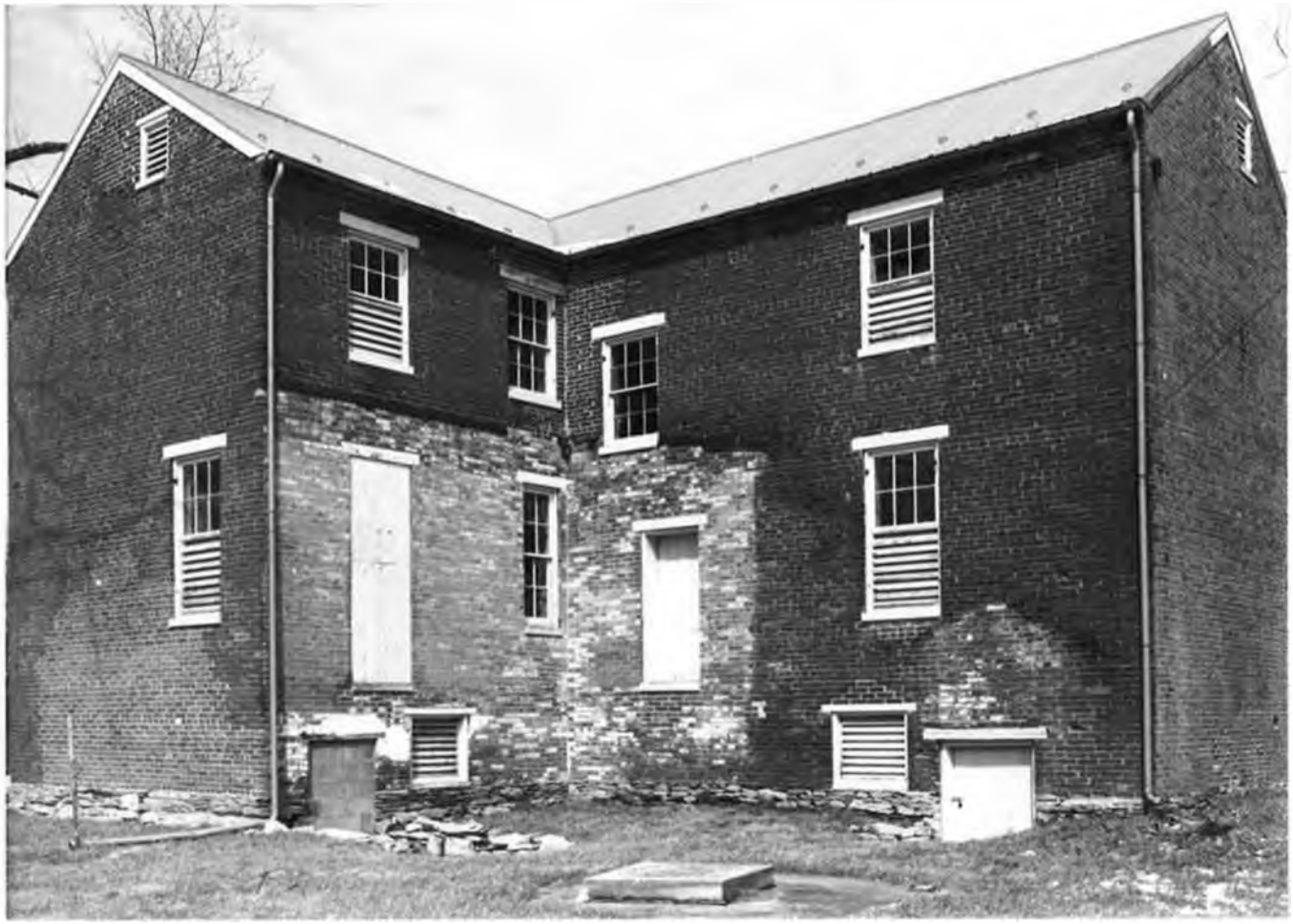


Photo 5
Worthington House, exterior view from the southwest.
Photographed by David Amundson
March, 1995

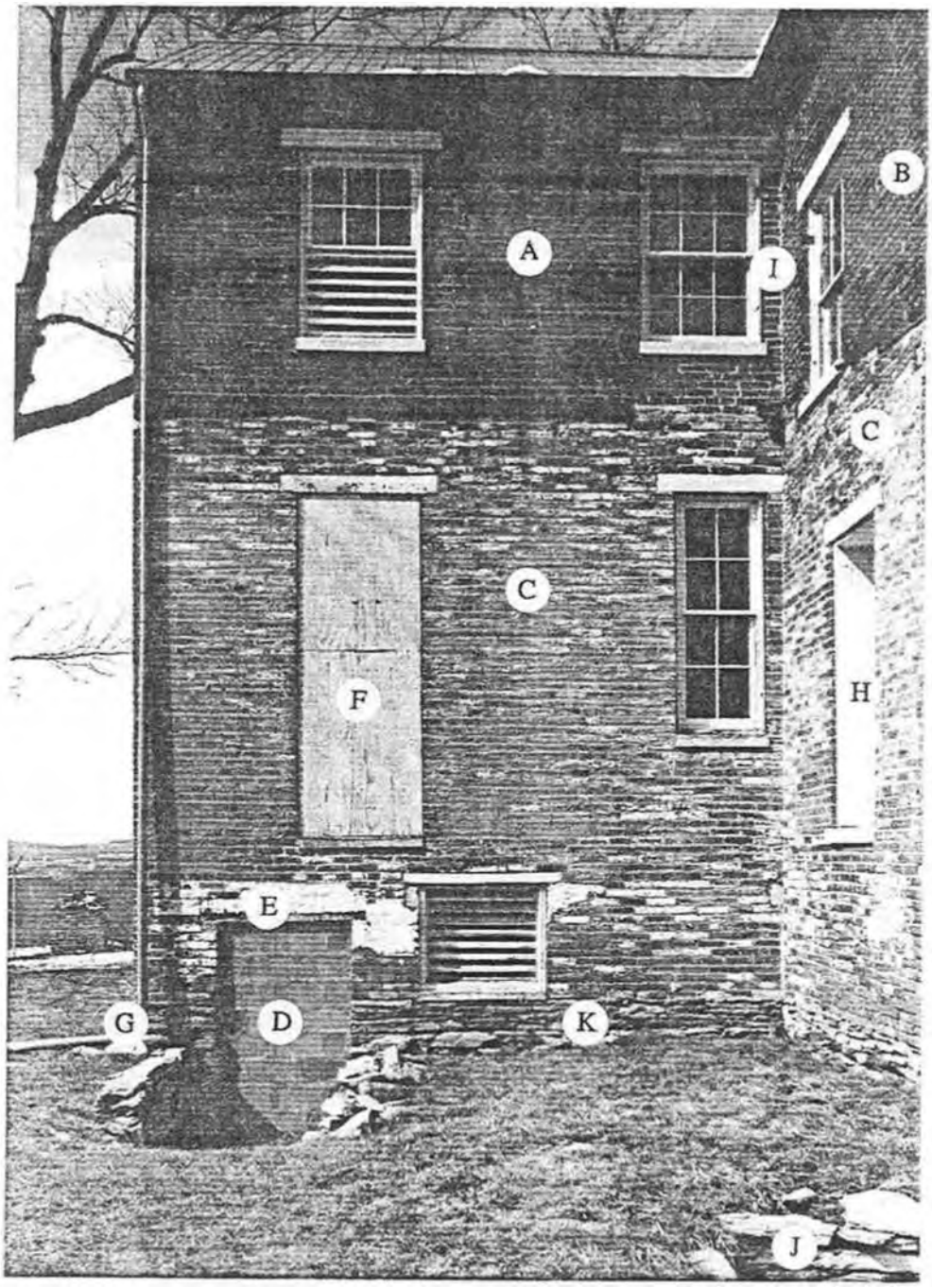


Photo 6
Worthington House, south elevation of ell.

A) South elevation of ell.
B) West elevation of main block.
C) Painted masonry protected by covered porch.
D) Blocked in doorway to basement ell, and stone masonry areaway.
E) Deteriorated wood lintel over basement doorway.
F) Plywood cover over door to ell.
G) Galvanized downspout and downspout extension.
H) West entry door.
I) Brick masonry rebuilt 1983 (areas with light colored mortar).
J) Stone masonry areaway to west basement door.
K) Rubble stone masonry foundation.



Photo 6
Worthington House, south elevation of ell.
Photographed by David Amundson
March, 1995

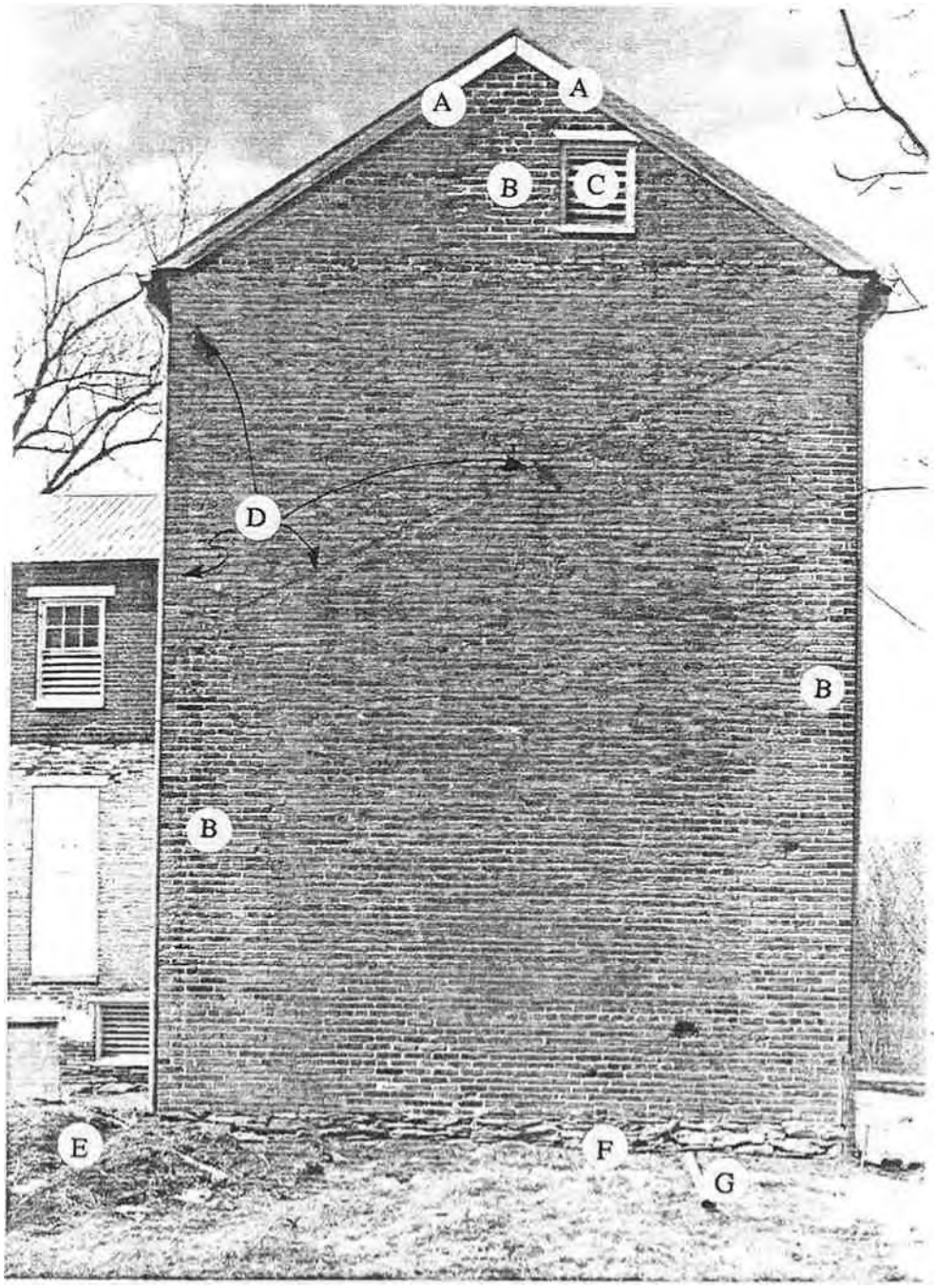


Photo 7
Worthington House, south elevation of main block.

A) New flat wood rake boards.
B) Brick masonry rebuilt 1983 (areas with light colored mortar).
C) Wood louver in attic window.
D) Paint shadows and brackets from removed downspouts.
E) Tree stump removed, winter 1994-95.
F) Rubble stone masonry foundation.
G) Downspout extension removed from downspout.

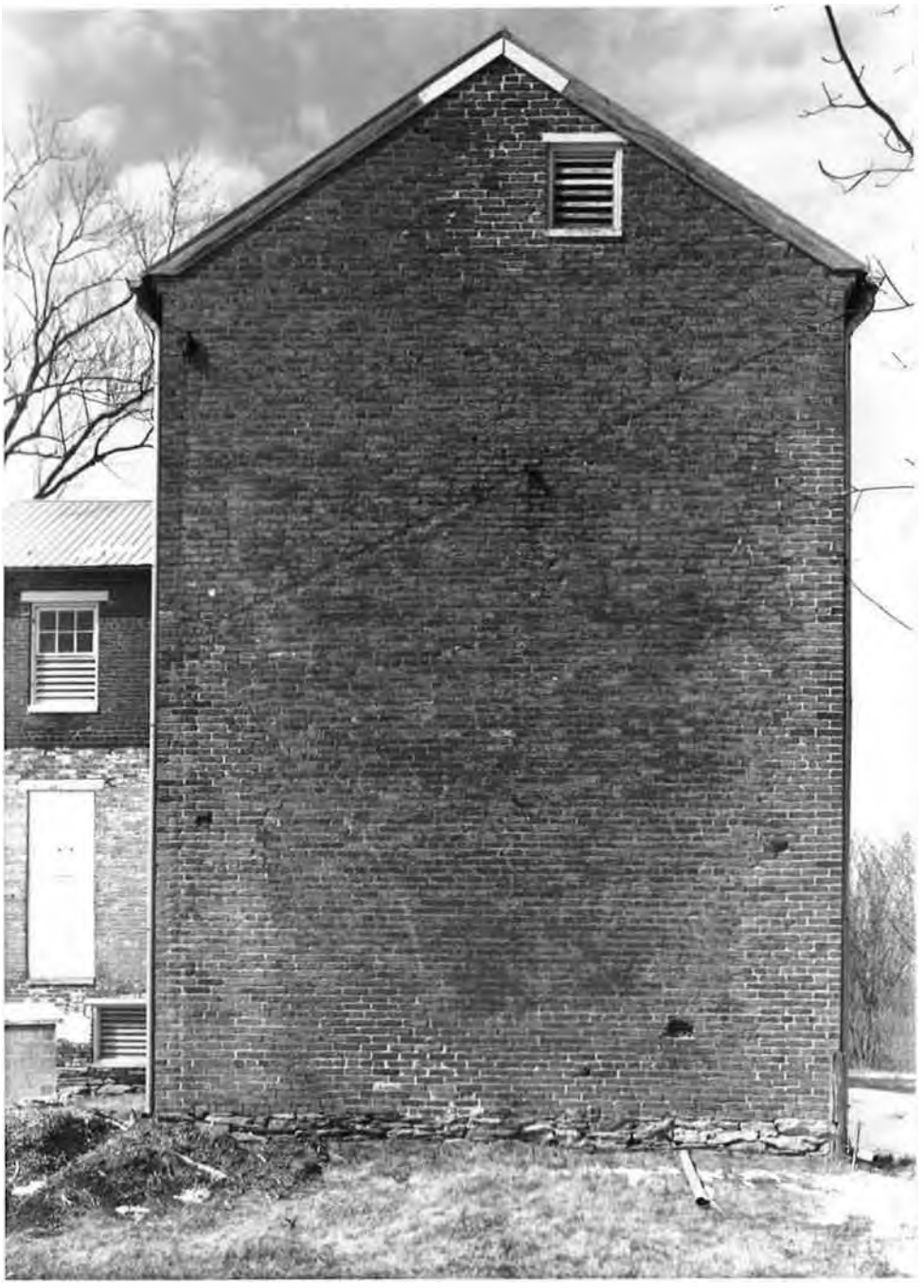


Photo 7
Worthington House, south elevation of main block.
Photographed by David Amundson
March, 1995

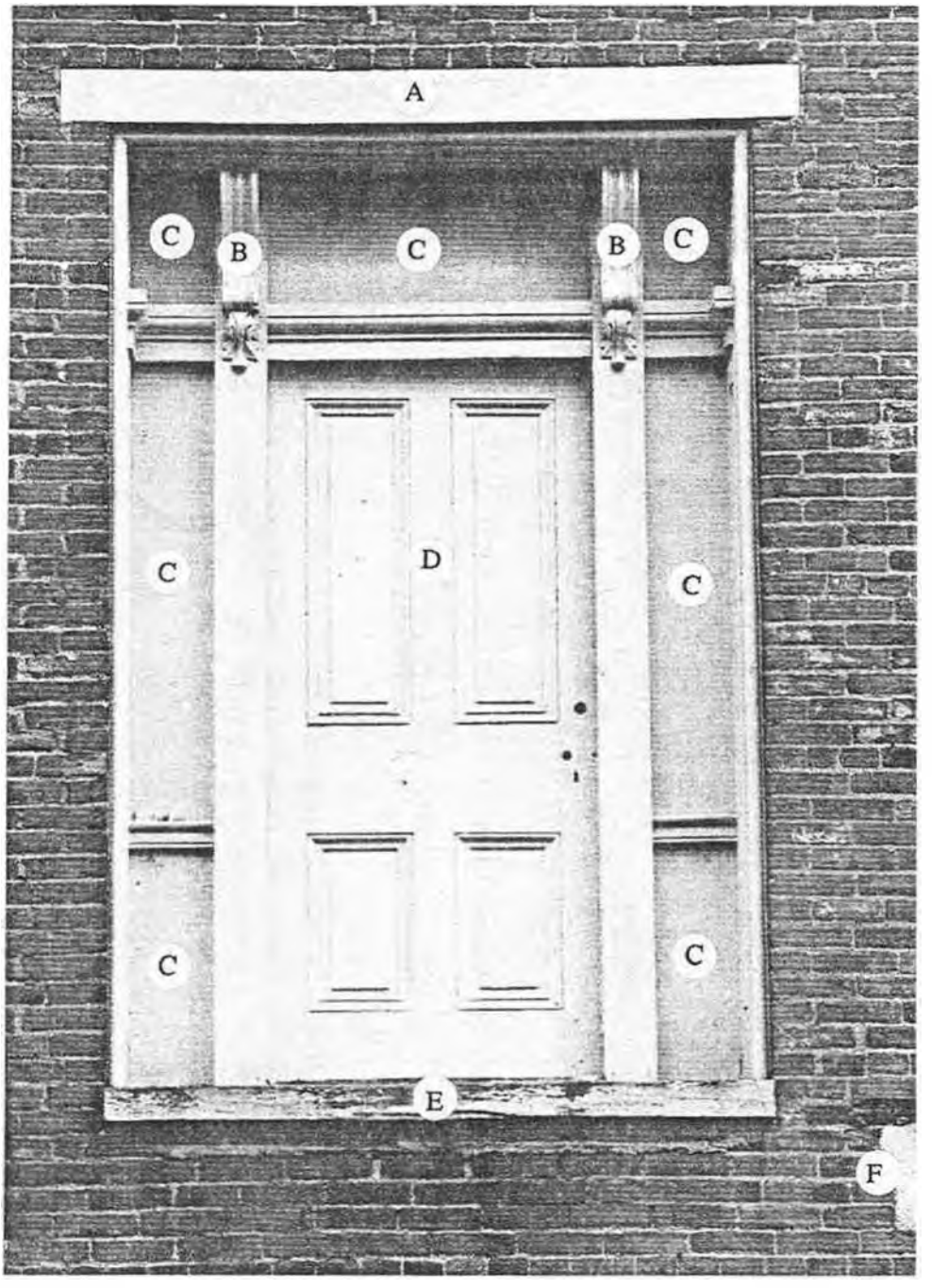


Photo 8
Worthington House, east entry door elevation.

A) Wood door lintel.
B) Carved wood scrolls.
C) Plywood installed in place of windows and panels.
D) Raised 4-panel door.
E) Wood door sill.
F) Porch floor joist pockets, filled with mortar.



Photo 8
Worthington House, east entry door elevation.
Photographed by David Amundson
May, 1994

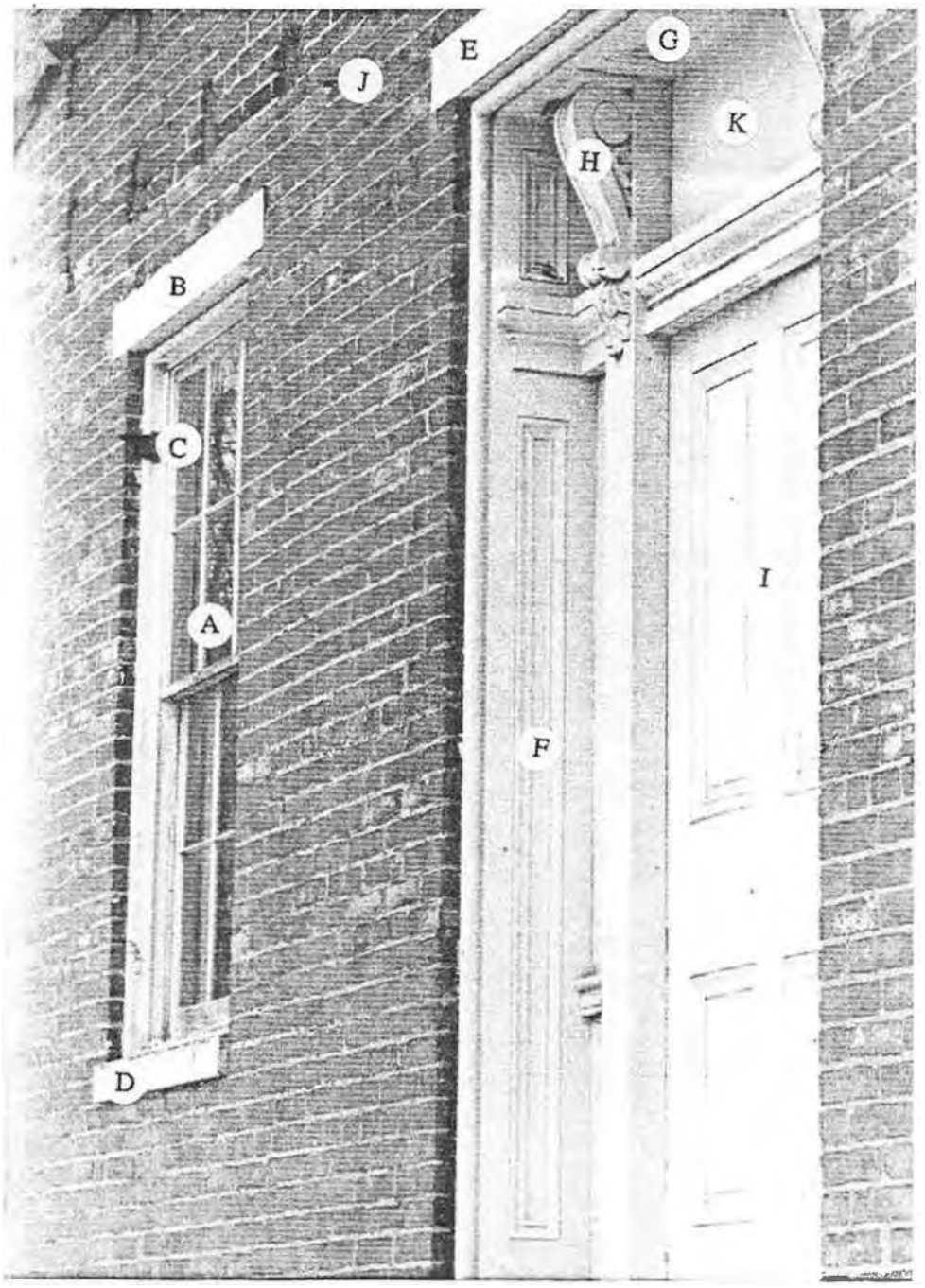


Photo 9
Worthington House, east entry and window, oblique view.

A) Parlor window.
B) Wood lintel over window opening.
C) Iron shutter hinge.
D) Wood window sill.
E) Wood door lintel.
F) Wood raised panel door jamb.
G) Wood raised panel door soffit.
H) Carved wood scroll.
I) Raised 4-panel door.
J) Iron loops in masonry at sides of door.
K) Plywood installed in place of transom window.



Photo 9
Worthington House, east entry and window, oblique view.
Photographed by David Amundson
March, 1995

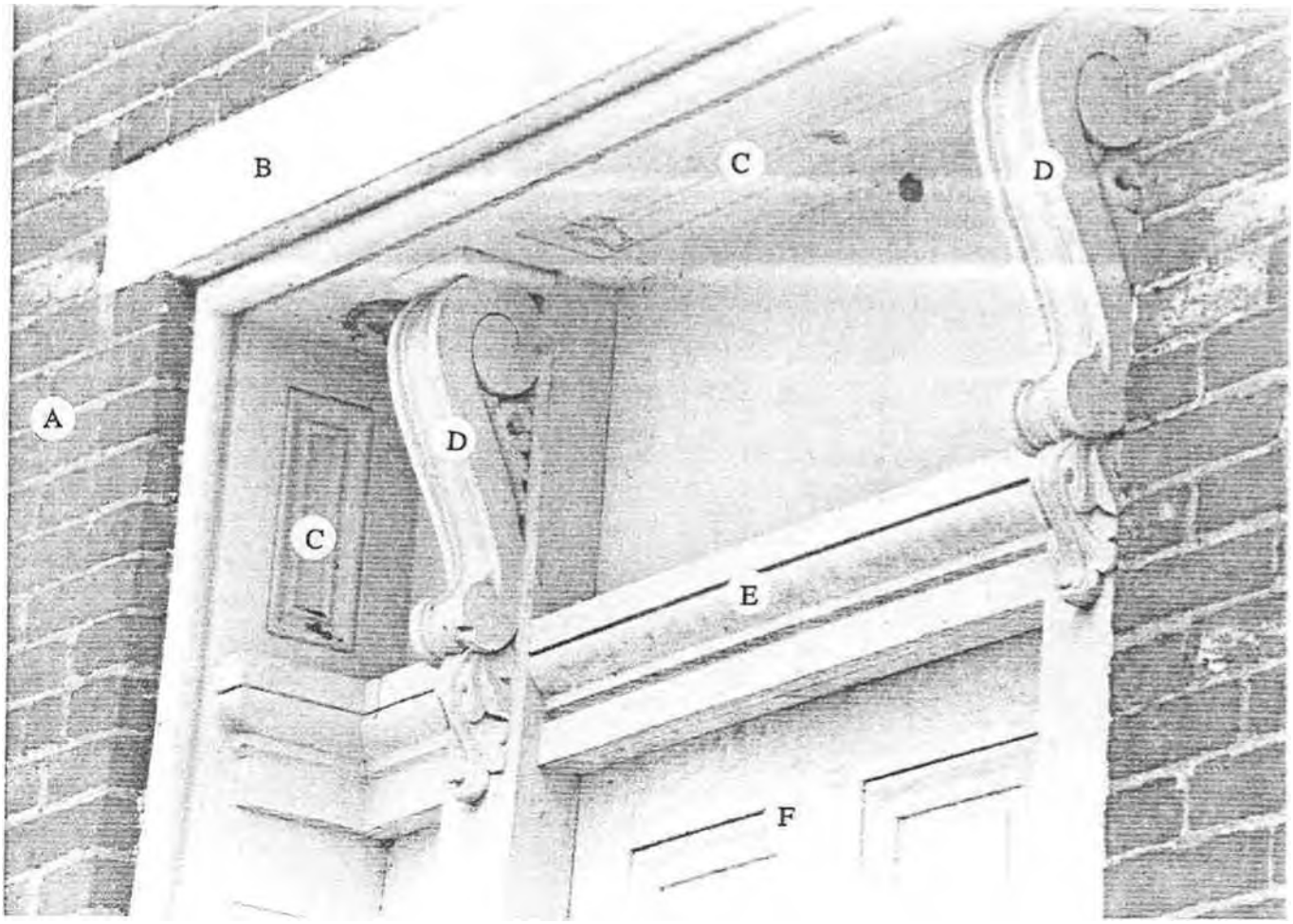


Photo 10
Worthington House, detail of brackets and transom at east entry.

A) Brick masonry.
B) Wood door lintel.
C) Raised panel door jamb and soffit.
D) Carved wood scrolls.
E) Moulded door head.
F) Raised 4-panel door.



Photo 10
Worthington House, detail of brackets and transom at east entry.
Photographed by David Amundson
March, 1995



Photo 11
Worthington House, detail at north elevation.

A) Corrugated galvanized metal roof.
B) Metal snow birds.
C) Flat wood rake board.
D) Louvers in place of window sash.
E) Corbelled brick at top of wall. Left end of corbel rebuilt 1983 (light colored mortar).
F) Wood window lintel, typical.
G) Six light window sash, typical.



Photo 11
Worthington House, detail at north elevation.
Photographed by David Amundson
March, 1995

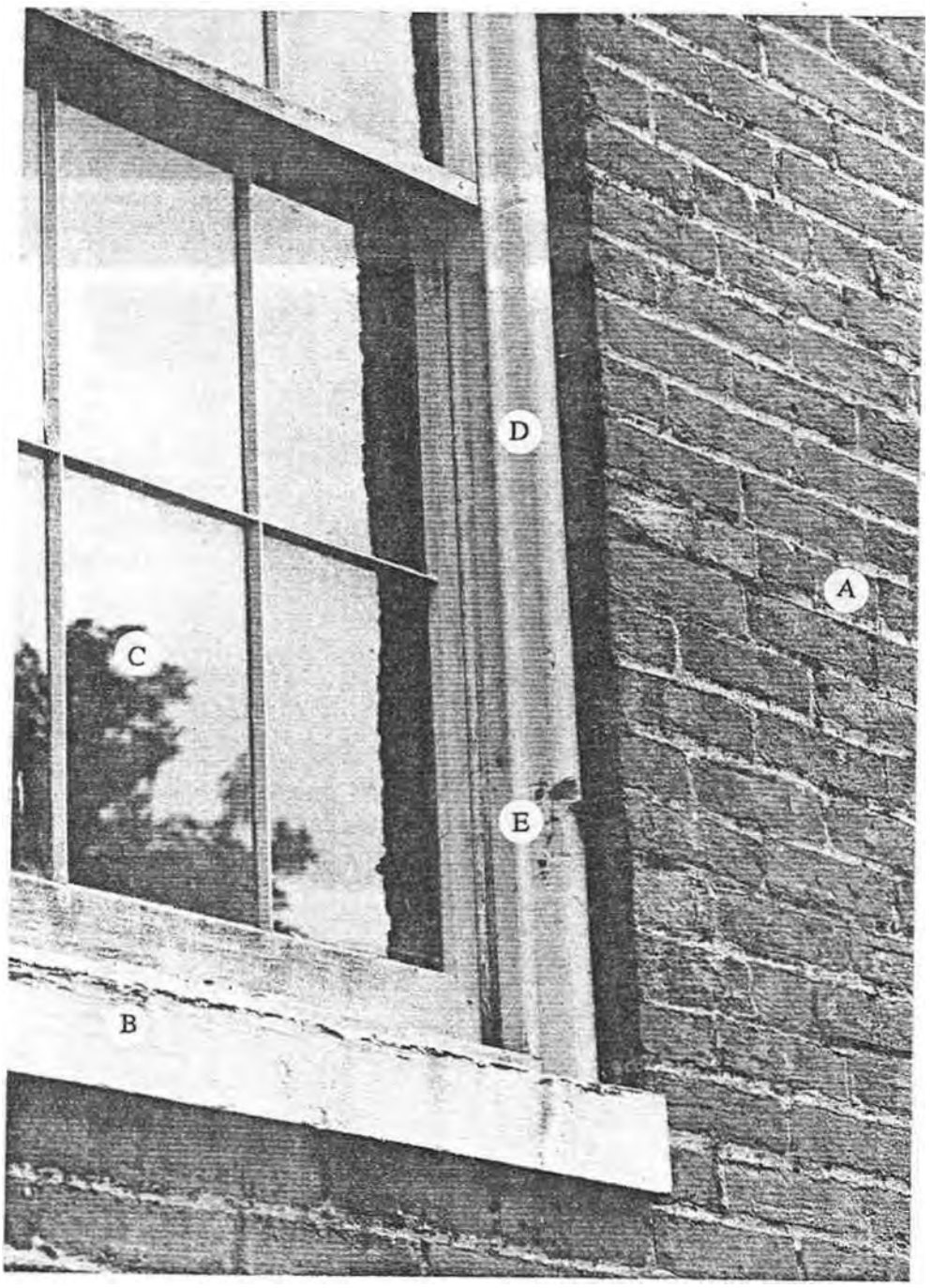


Photo 12
Worthington House, typical window, east elevation.

A) Common bond brick masonry, typical.
B) Wood window sill.
C) Typical six light window sash.
D) Typical exterior window mouldings.
E) Notch in moulding for shutter hinge, with slot for shutter latch.



Photo 12
Worthington House, typical window, east elevation.
Photographed by David Amundson
May, 1994

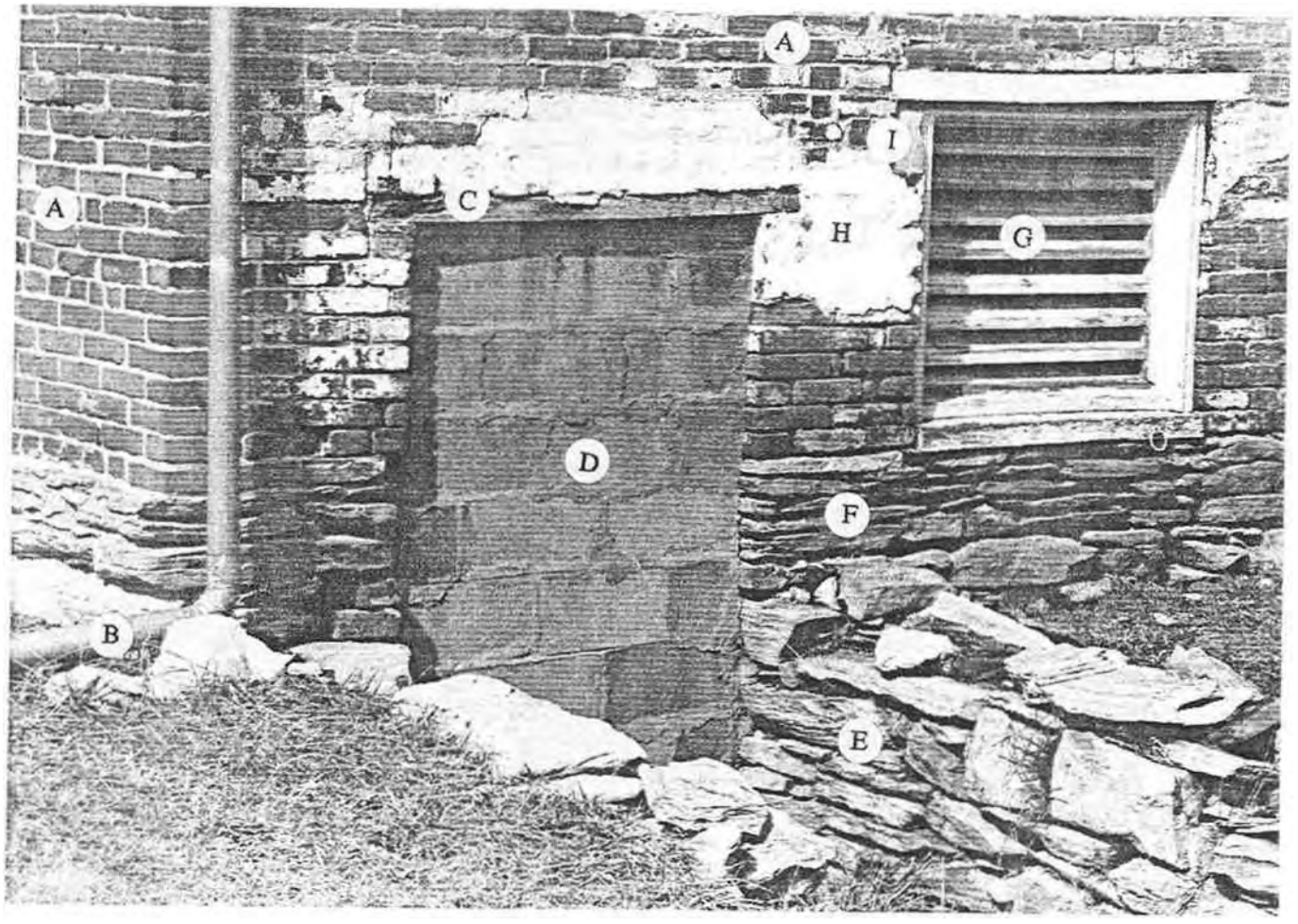


Photo 13
Worthington House, exterior detail, southwest corner of ell.

A) Brick masonry rebuilt 1983 (areas with light colored mortar).
B) Galvanized downspout and downspout extension.
C) Deteriorated wood door lintel.
D) Blocked in basement doorway.
E) Stone masonry areaway to basement doorway.
F) Rubble stone masonry foundation.
G) Wood louver in wood window frame.
H) Paint on brick masonry where protected by missing porch.
I) Porch floor joist pocket, filled with urethane foam.



Photo 13
Worthington House, exterior detail, southwest corner of ell.
Photographed by David Amundson
March, 1995

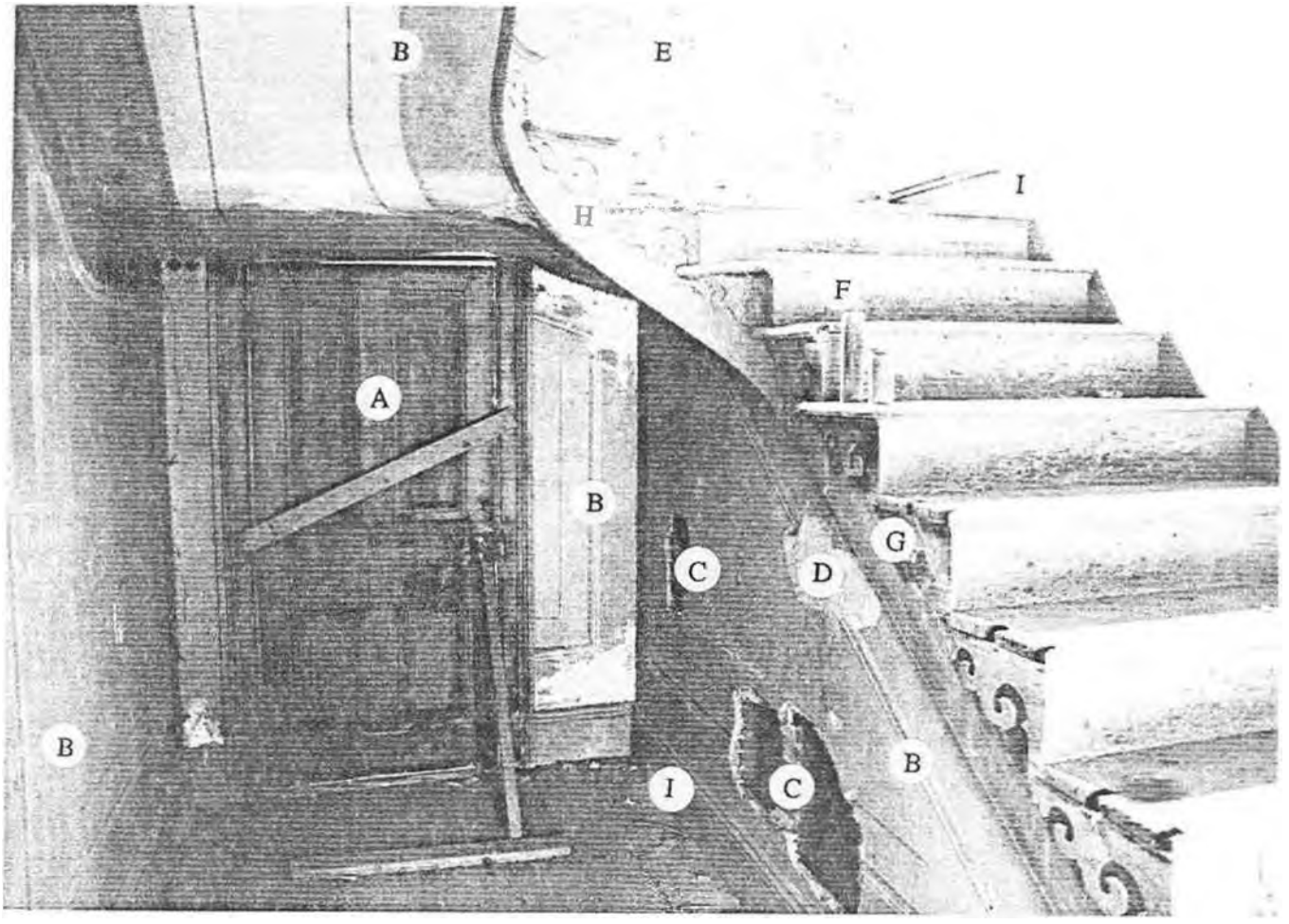


Photo 14
Worthington House, stair hall looking west.

A) West entry door, secured with wood blocking. Door casing moulding set "A".
B) Decorative paint on plaster.
C) Holes in plaster under stair.
D) Holes in plaster patched with hard mortar.
E) Plaster missing from west wall.
F) Missing and broken balusters at main stair.
G) Damaged wave mouldings at side of main stair.
H) Curved stringer at main stair.
I) Wood base at floor and side of stairs.



Photo 14
Worthington House, stair hall looking west.
Photographed by David Amundson
May, 1994

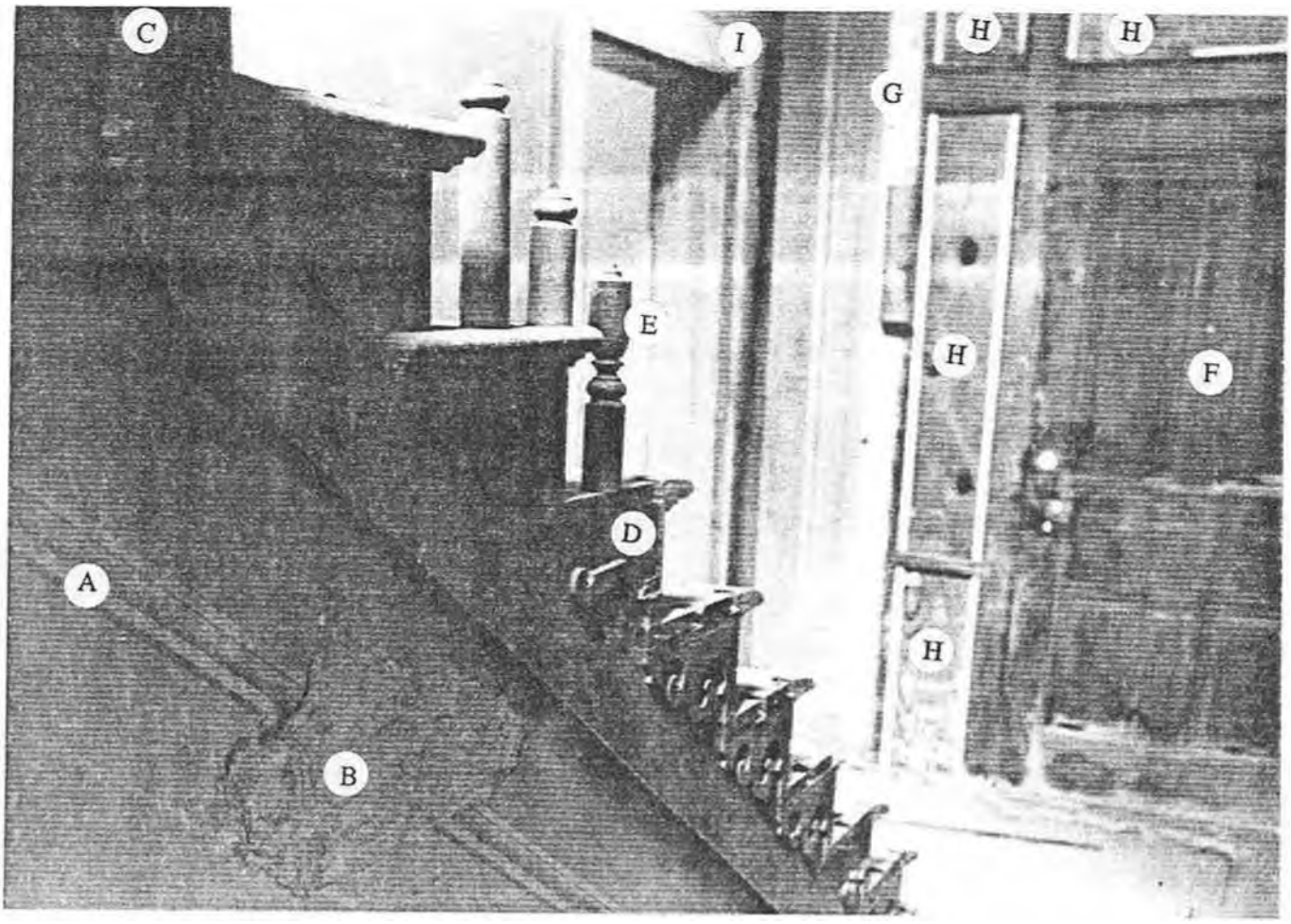


Photo 15
Worthington House, stair hall looking east.

A) Plaster and decorative paint under main stair.
B) Holes in plaster patched with hard mortar.
C) Curved stair stringer.
D) Damaged wave moulding at side of stair.
E) Missing and broken balusters at main stair.
F) East entry door.
G) Missing mouldings at perimeter of interior of east entry door.
H) Plywood in sidelights, side panels and transom of east entry door.
I) Missing mouldings at door to dining room.



Photo 15
Worthington House, stair hall looking east.
Photographed by David Amundson
March, 1995

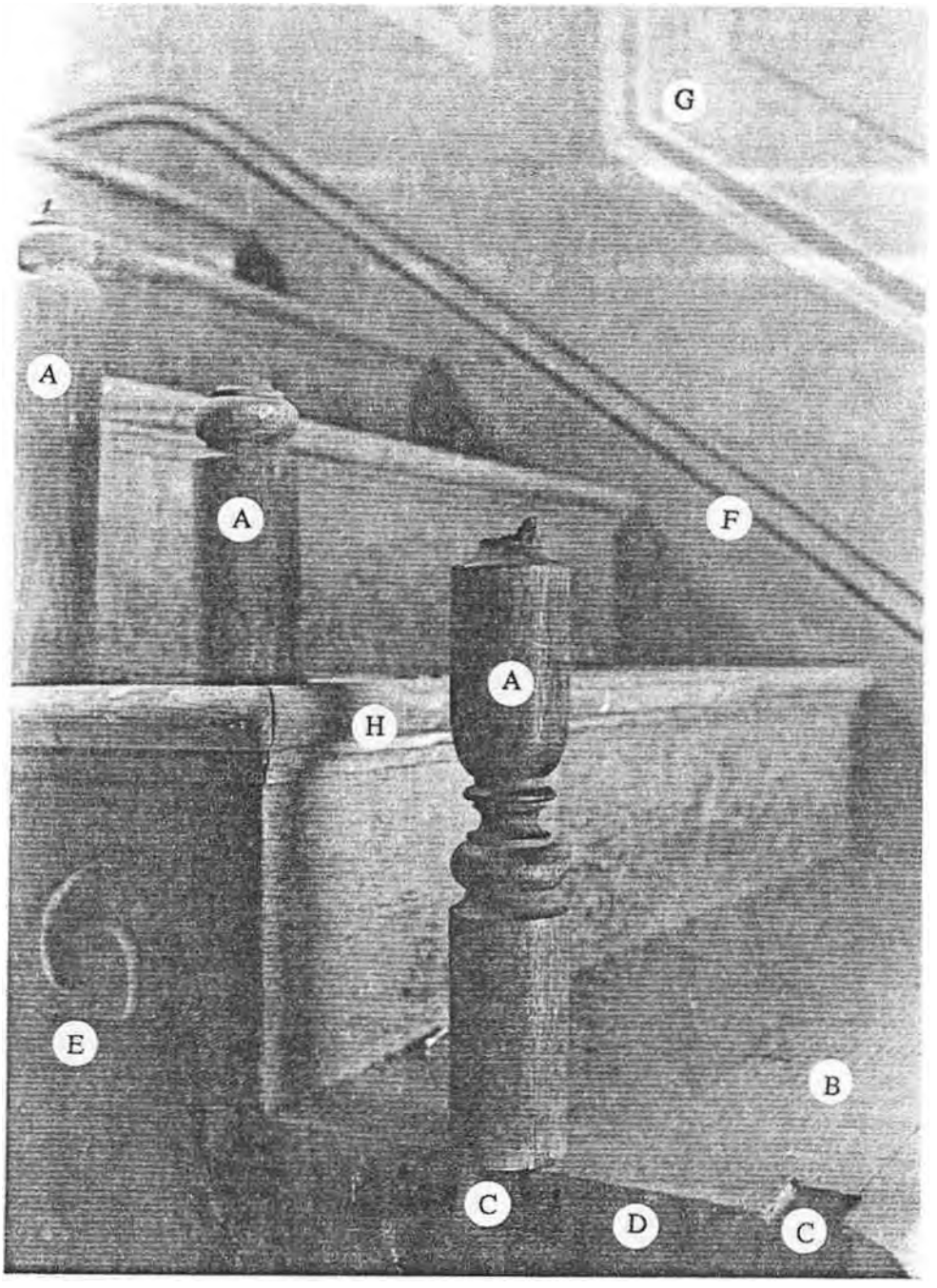


Photo 16
Worthington House, main stair detail.

A) Broken balusters.
B) Missing baluster.
C) Baluster dovetail.
D) Missing tread return moulding.
E) Damaged and missing wave mouldings at stair stringer.
F) Wood base at wall.
G) Decorative paint on plaster wall.
H) Wood nosing with cove moulding.



Photo 16
Worthington House, main stair detail.
Photographed by David Amundson
March, 1995

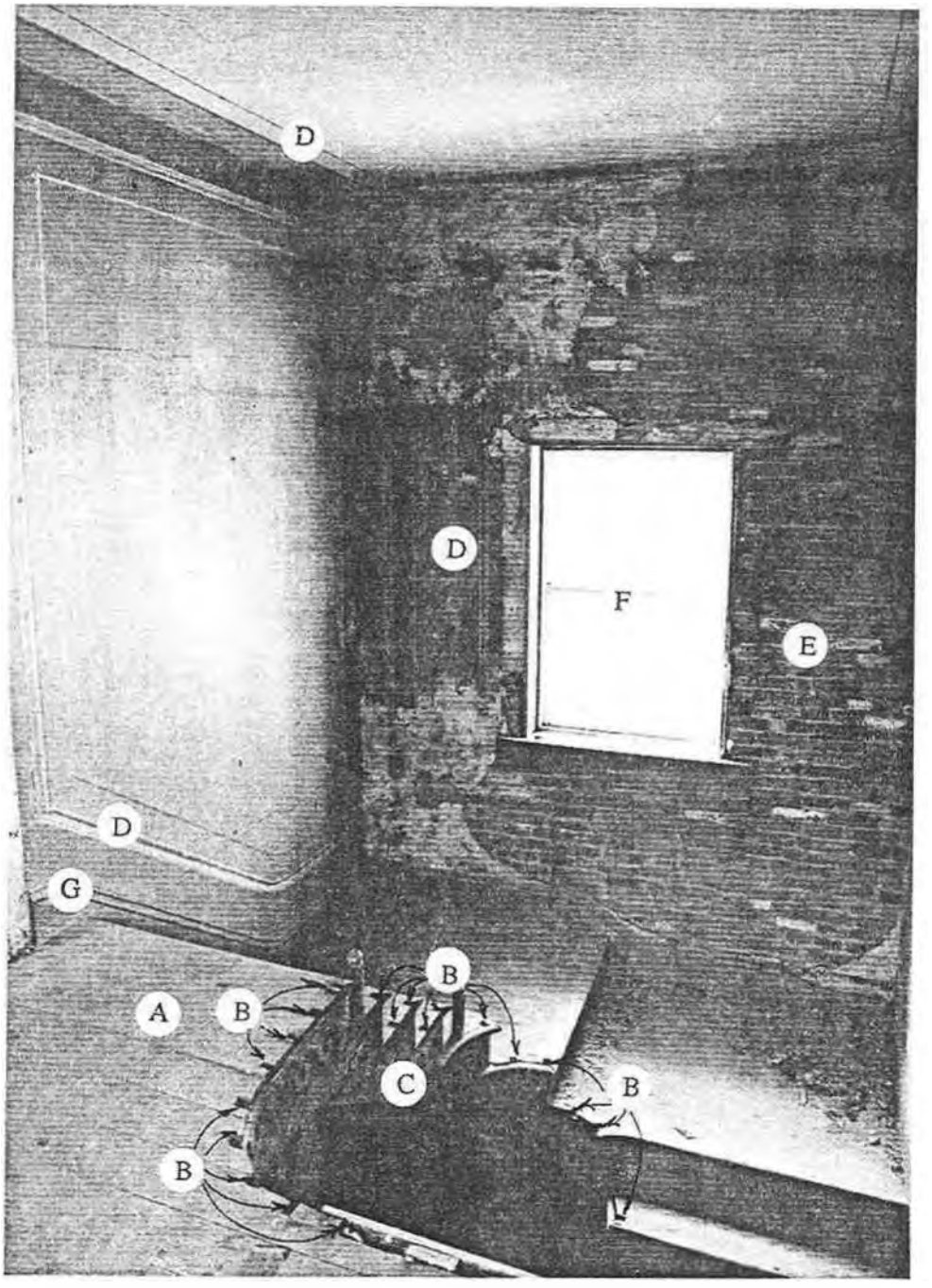


Photo 17
Worthington House, stair hall looking east from 2nd floor landing.

A) 2nd floor landing, cantilevered at top of stairs.
B) Dovetail slots for missing balusters.
C) Curved stringer with missing and damaged wave mouldings
D) Decorative paint on plaster.
E) Missing plaster on west wall.
F) Six over six window with missing trim.
G) Wood base.



Photo 17
Worthington House, stair hall looking east from 2nd floor landing.
Photographed by David Amundson
May, 1994

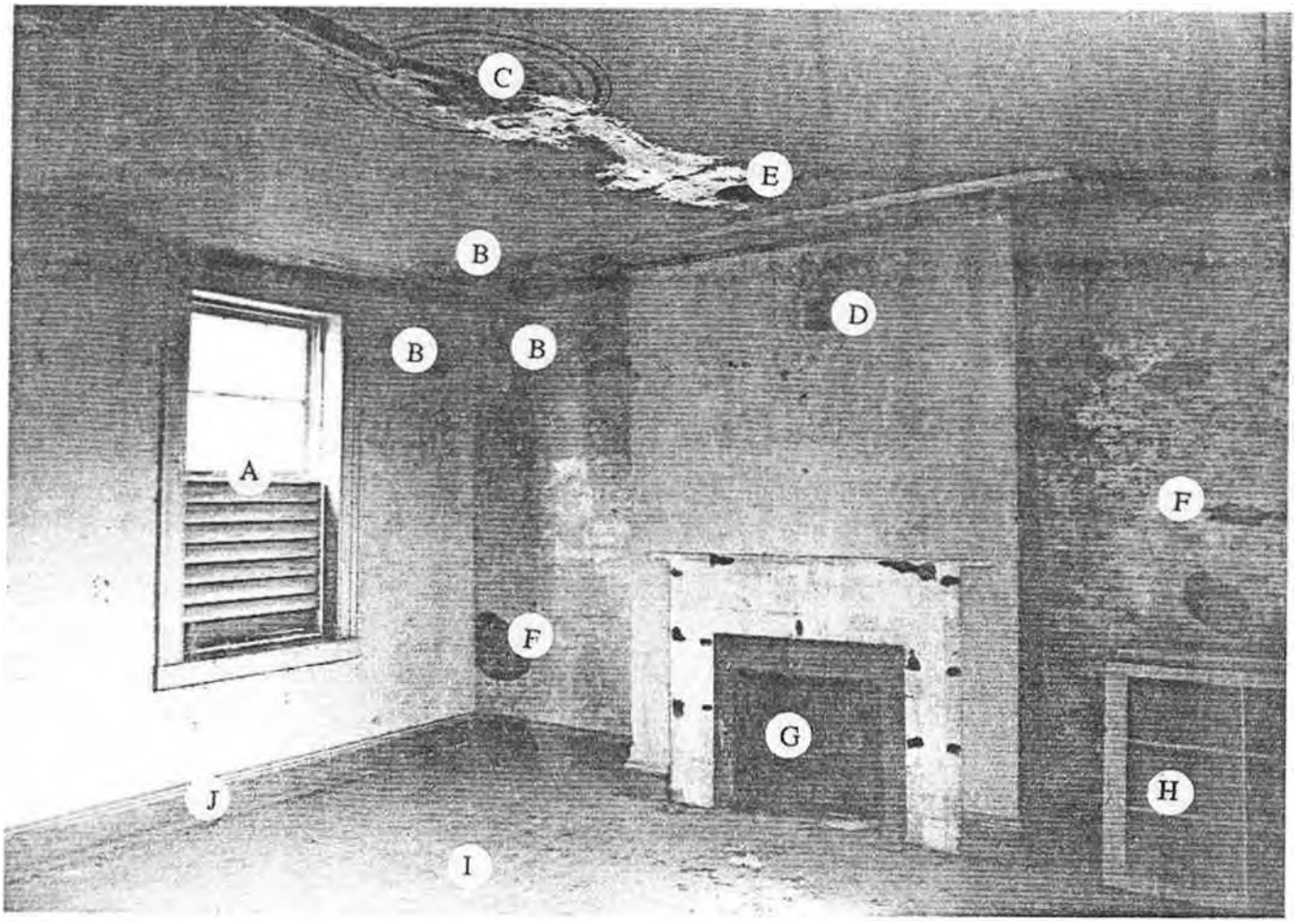


Photo 18
Worthington House, parlor looking southeast.

A) East window, with louver in place of lower sash. Casing and sill, moulding set "A".
B) Decorative paint on plaster walls and ceiling.
C) Damaged plaster and decorative paint rosette at ceiling light fixture.
D) Opening for stovepipe connection to chimney.
E) Opening for heat circulation to 2nd floor.
F) Damaged plaster and decorative paint.
G) Parlor fireplace with missing wood mantel outlined by paint.
H) Stored window sash (sash replaced with louvers in window frames).
I) Wood floor.
J) Wood base.



Photo 18
Worthington House, parlor looking southeast.
Photographed by David Amundson
May, 1994

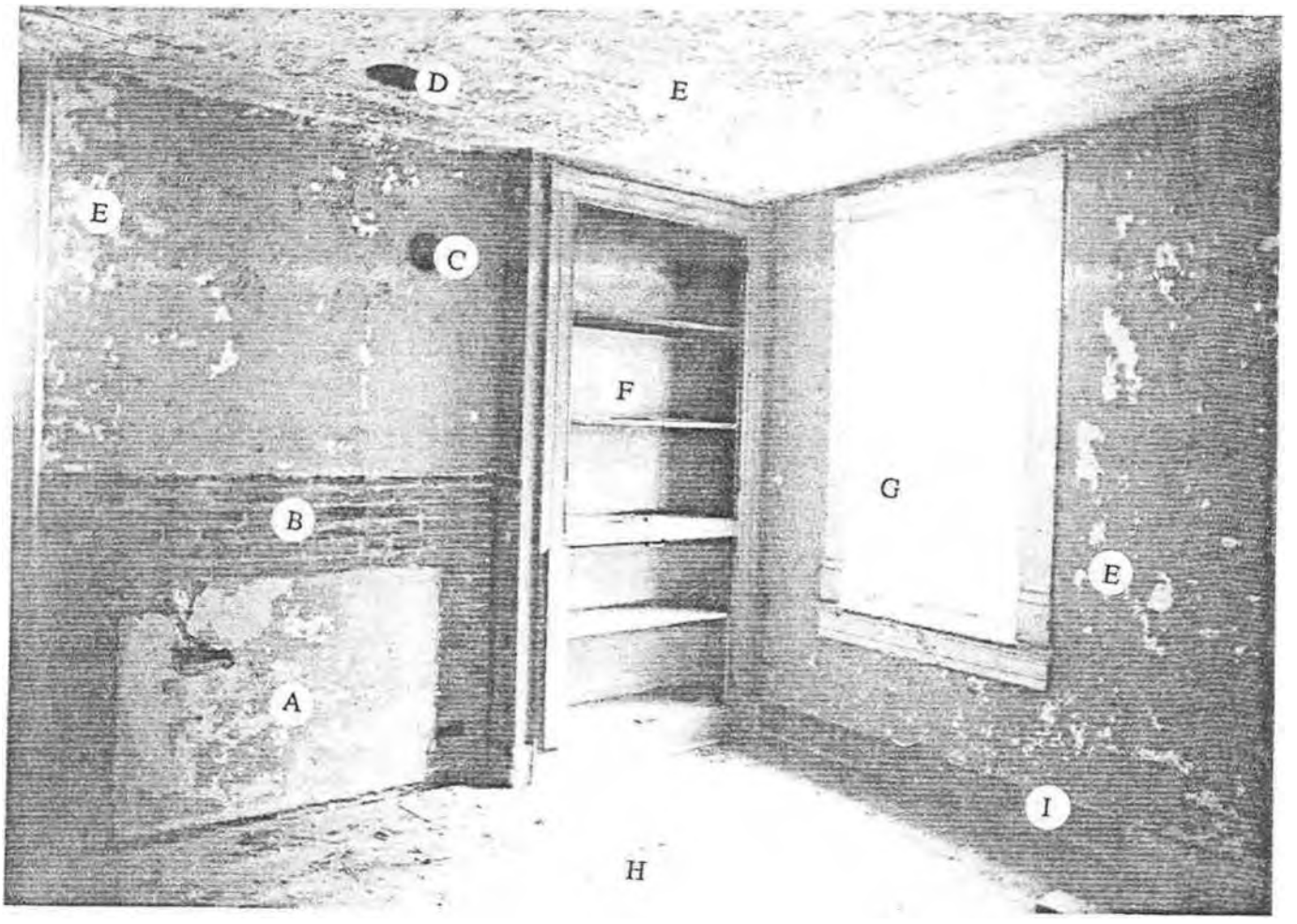


Photo 19
Worthington House, dining room looking northeast.

A) Blocked in and plastered fire box.
B) Outline of missing wood mantel.
C) Thimble for stovepipe connection to chimney.
D) Opening for heat circulation to 2nd floor.
E) Peeling paint on plaster, typical.
F) Wood built-in cabinet.
G) Wood window frame and sash, moulding set "B".
H) Wood floor.
I) Wood base.



Photo 19
Worthington House, dining room looking northeast.
Photographed by David Amundson
May, 1994

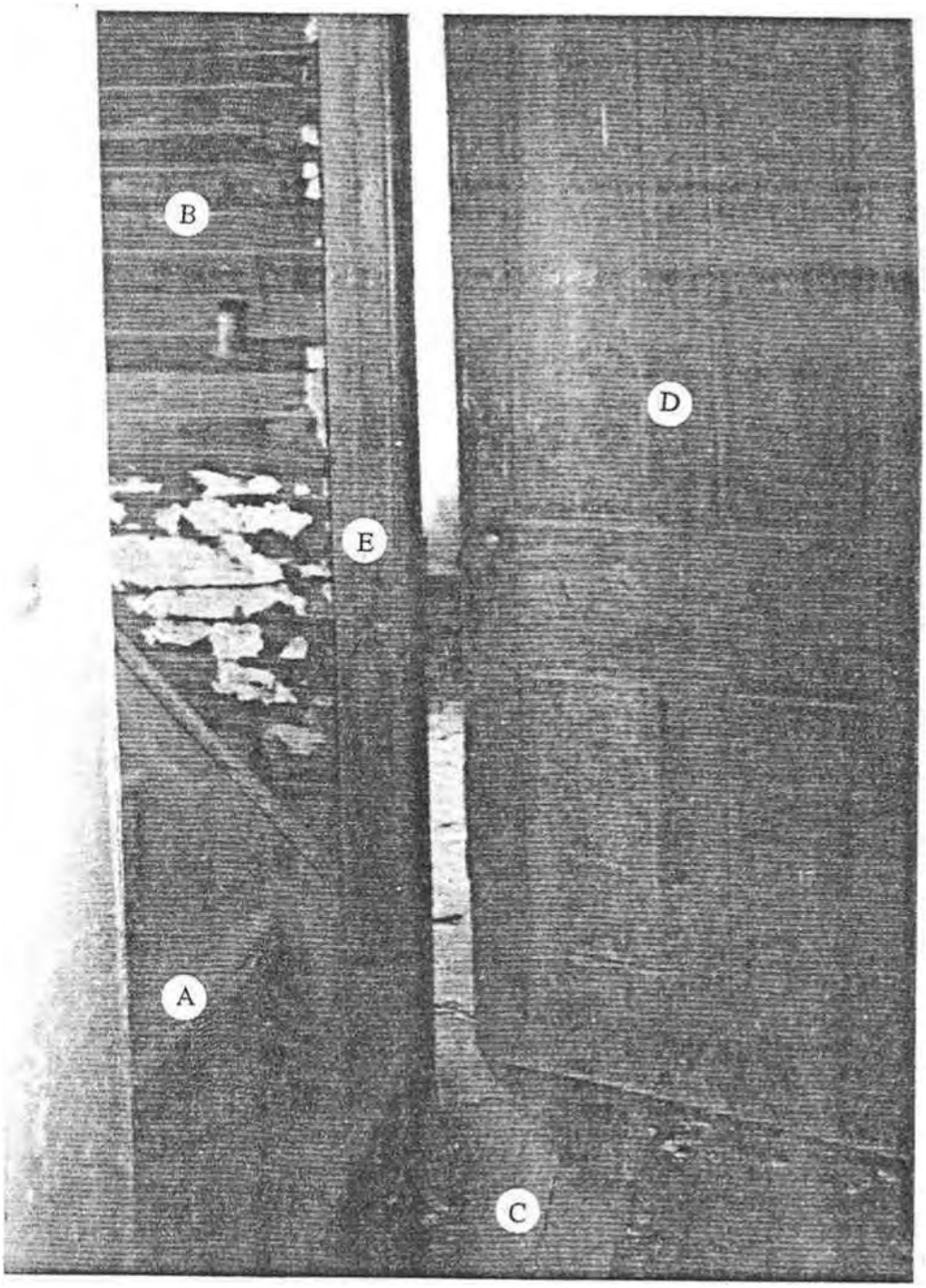


Photo 20
Worthington House, north door between dining room and ell.

A) Bottom of servant stair.
B) Beaded board siding on inside of servant stair, fastened with wire nails (not original to house).
C) Wood floor.
D) Wood 4-panel door to ell.
E) Frame of door to dining room, moulding set "C".



Photo 20
Worthington House, north door between dining room and ell.
Photographed by David Amundson
March, 1995



Photo 21
Worthington House, 1st floor ell interior looking northwest.

A) Brick masonry rebuilt 1983.
B) Openings for stovepipe connections to chimneys.
C) Peeling paint on plaster, typical.
D) Missing lath and plaster at ceiling, from water infiltration.
E) Gas range.
F) Water pipe, not connected to source.



Photo 21
Worthington House, 1st floor ell interior looking northwest.
Photographed by David Amundson
March, 1995

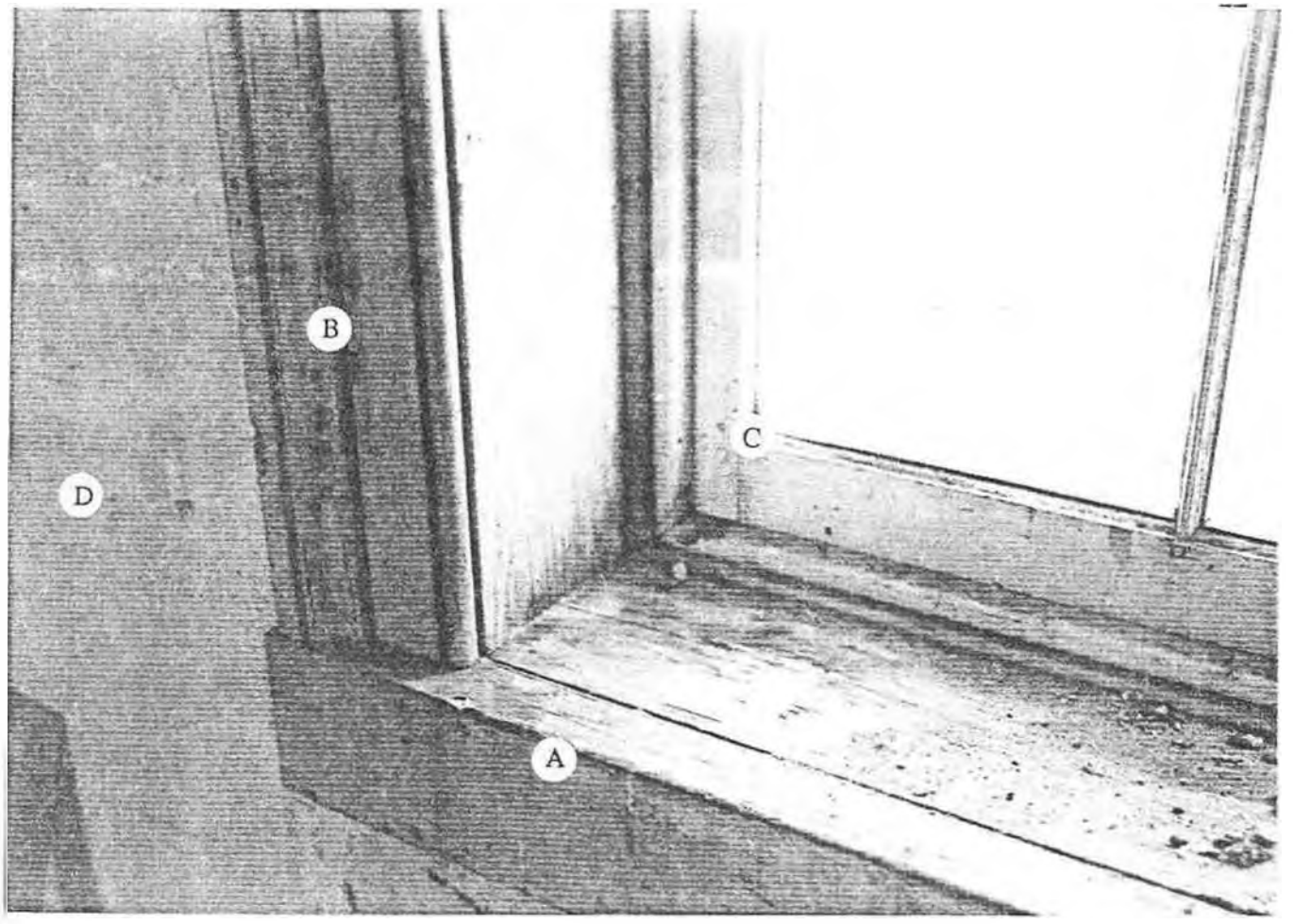


Photo 22
Worthington House, parlor window jamb and sill, moulding set "A".

A) Wood sill.
B) Wood casing.
C) Wood sash.
D) Plaster wall.



Photo 22
Worthington House, parlor window jamb and sill, moulding set "A".
Photographed by David Amundson
March, 1995



Photo 23
Worthington House, dining room window jamb and sill, moulding set "B".

A) Wood sill.
B) Wood casing.
C) Wood louver in place of six light sash.
D) Masonry wall with missing plaster and deteriorated brick.



Photo 23
Worthington House, dining room window jamb and sill, moulding set "B".
Photographed by David Amundson
March, 1995

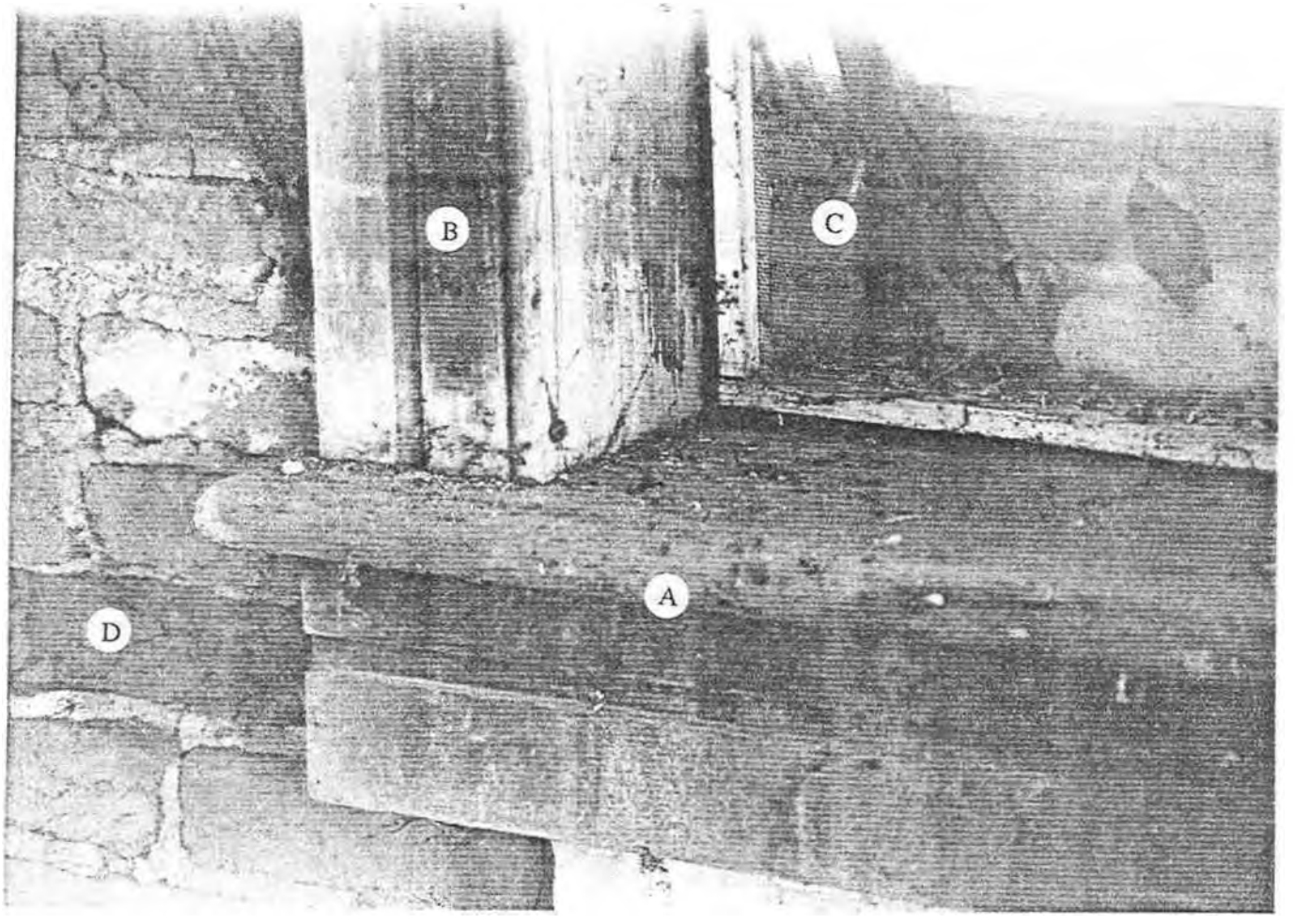


Photo 24
Worthington House, north bedroom window jamb and sill, moulding set "C".

A) Wood sill.
B) Wood casing.
C) Wood louver.
D) Masonry wall with missing plaster and deteriorated brick.



Photo 24
Worthington House, north bedroom window jamb and sill, moulding set "C".
Photographed by David Amundson
March, 1995

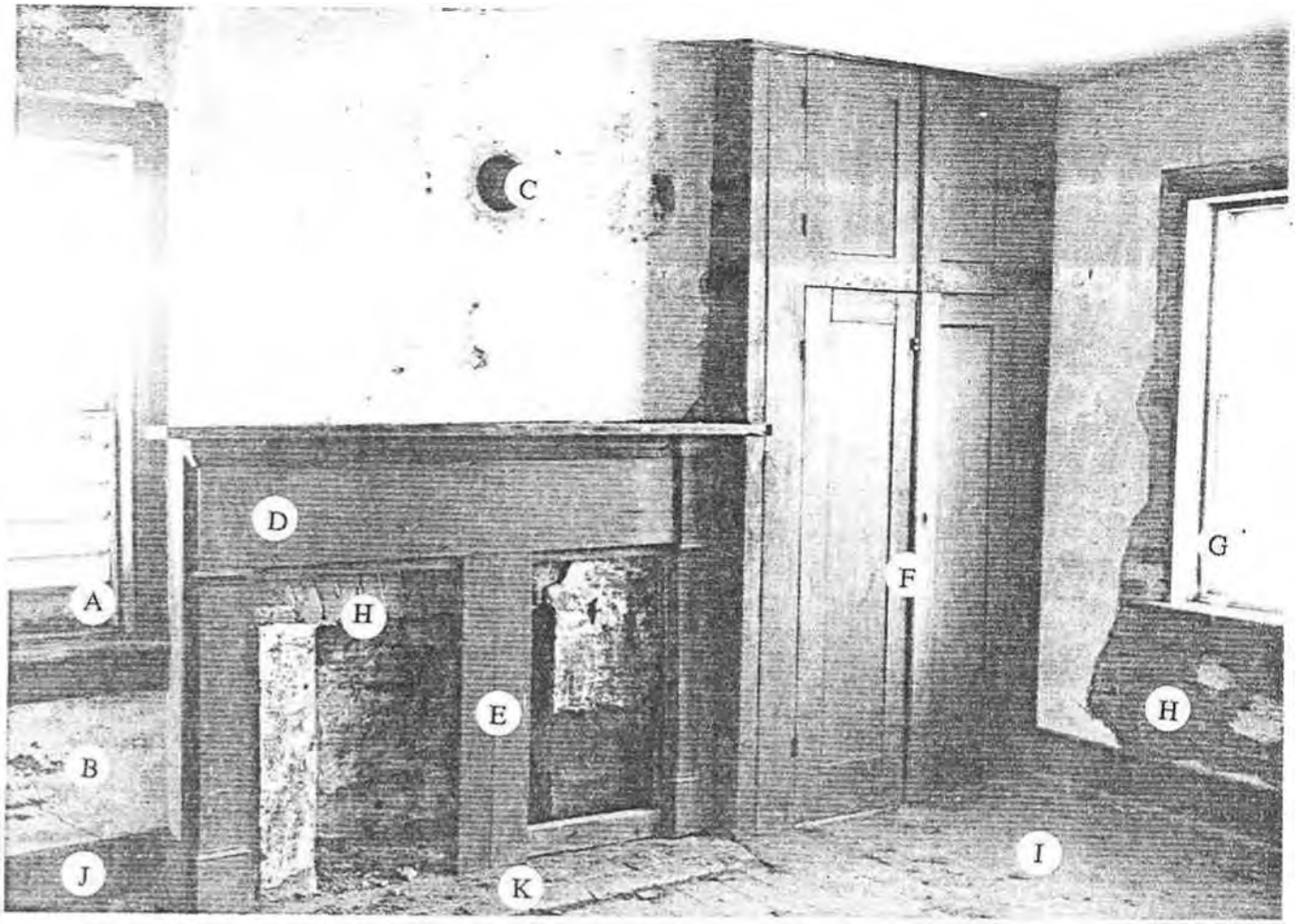


Photo 25
Worthington House, north bedroom looking northeast.

A) North window, moulding set "C".
B) Plaster wall.
C) Thimble for woodstove connection to chimney.
D) Wood fireplace mantel.
E) Wood fireplace divider for room divider wall.
F) Wood closet with panel doors and grained finish.
G) East window, missing wood casing.
H) Plaster missing from masonry wall and firebox.
I) Wood floor.
J) Wood base.
K) Brick hearth.



Photo 25
Worthington House, north bedroom looking northeast.
Photographed by David Amundson
March, 1995

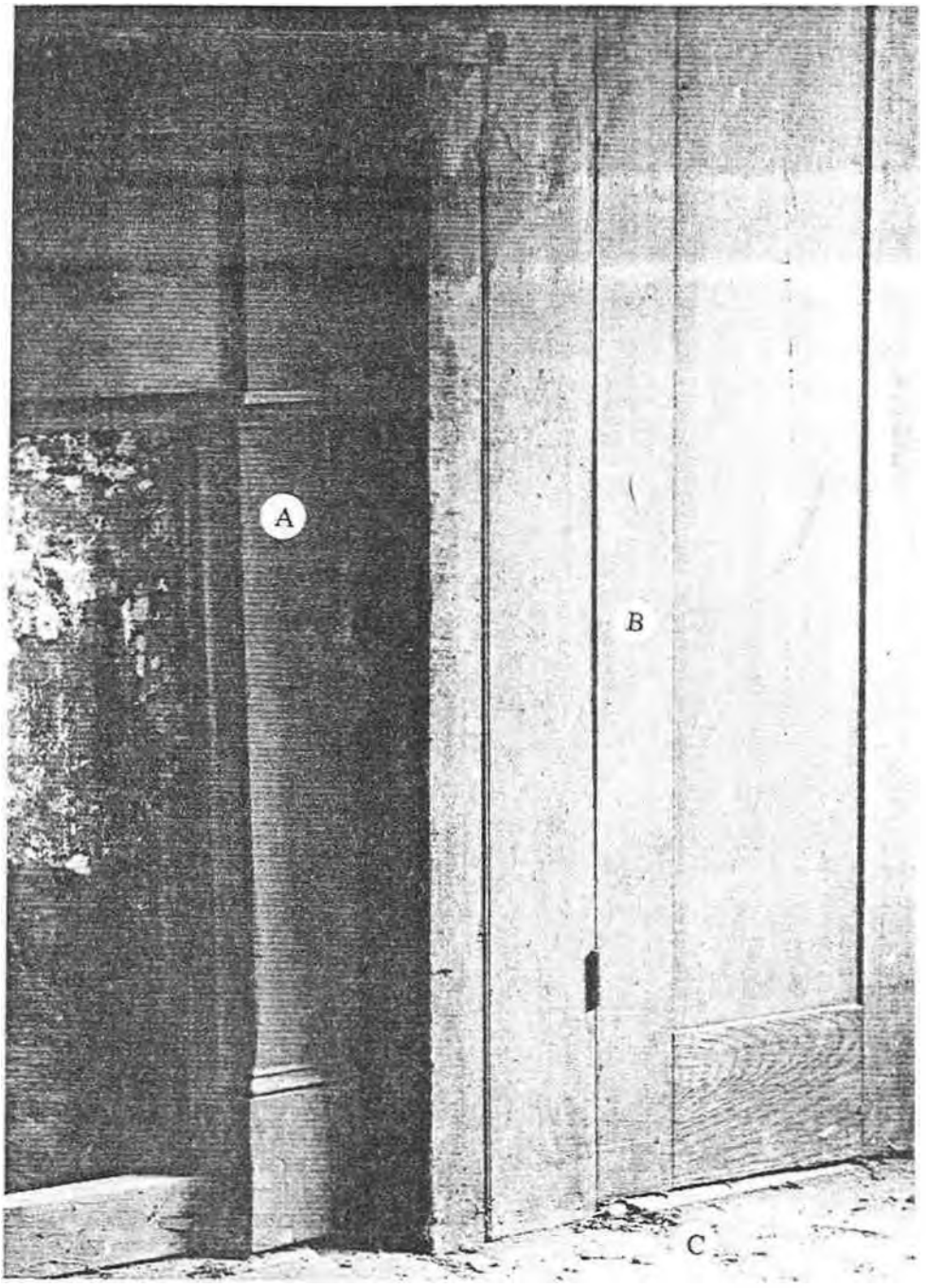


Photo 26
Worthington House, north bedroom, detail of mantel and closet.

A) Wood mantel.
B) Wood closet door with grained finish.
C) Wood floor.



Photo 26
Worthington House, north bedroom, detail of mantel and closet.
Photographed by David Amundson
May, 1994

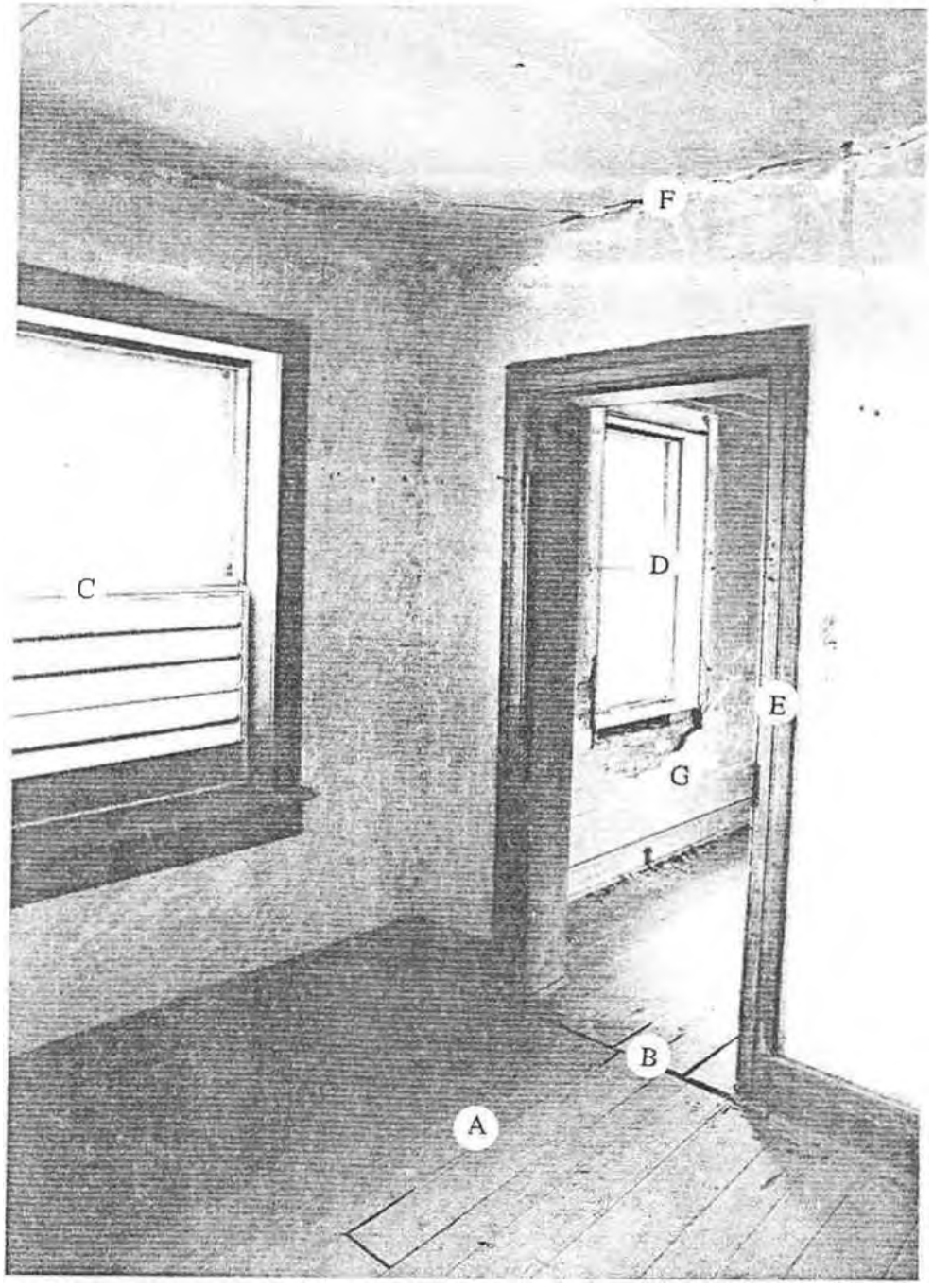


Photo 27
Worthington House, north bedroom looking southeast.

A) Wood floor in north bedroom.
B) Change of flooring between stair hall and north bedroom.
C) Louver and six light sash in wood frame.
D) Six over six double hung window in stair hall, casing missing.
E) Wood door frame, moulding set "C".
F) Plaster walls and ceiling, with cracks and deteriorated finish.
G) Decorative paint on deteriorated plaster in stair hall.



Photo 27
Worthington House, north bedroom looking southeast.
Photographed by David Amundson
May, 1994

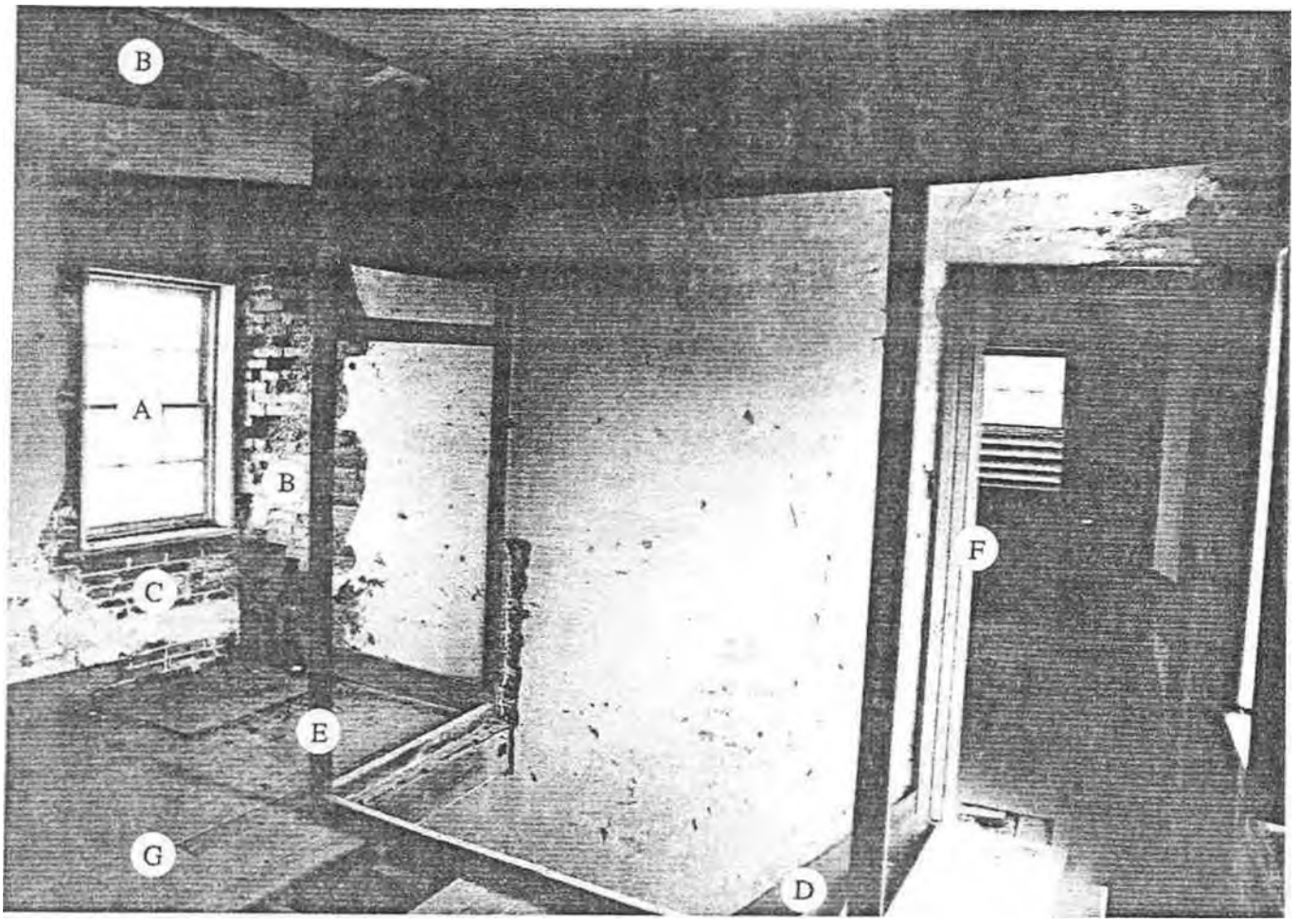


Photo 28
Worthington House, 2nd floor ell, looking east.

A) North window.
B) Deteriorated plaster, damaged by water penetration.
C) Brick masonry rebuilt 1983.
D) Servant stair.
E) Wood stair enclosure, mid 20th century.
F) Door to north bedroom.
G) Wood floor, missing boards and covered with plywood patches.



Photo 28
Worthington House, 2nd floor ell, looking east.
Photographed by David Amundson
May, 1994

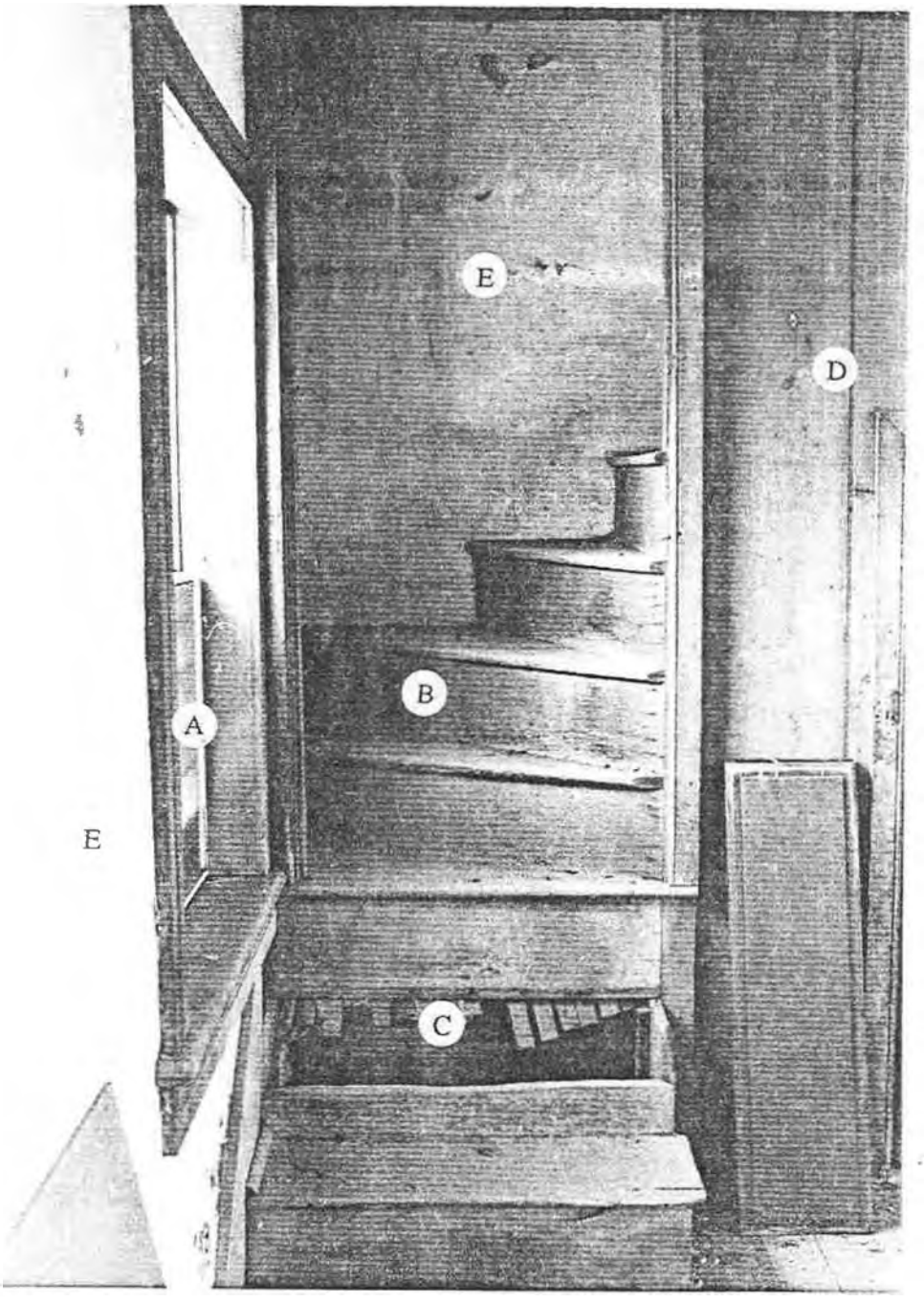


Photo 29
Worthington House, stair to attic from ell.

A) South window, with louver in place of lower sash.
B) Stair to attic.
C) Missing tread, and lath from closet ceiling.
D) Beaded boards at closet enclosure.
E) Plaster walls.



Photo 29
Worthington House, stair to attic from ell.
Photographed by David Amundson
March, 1995

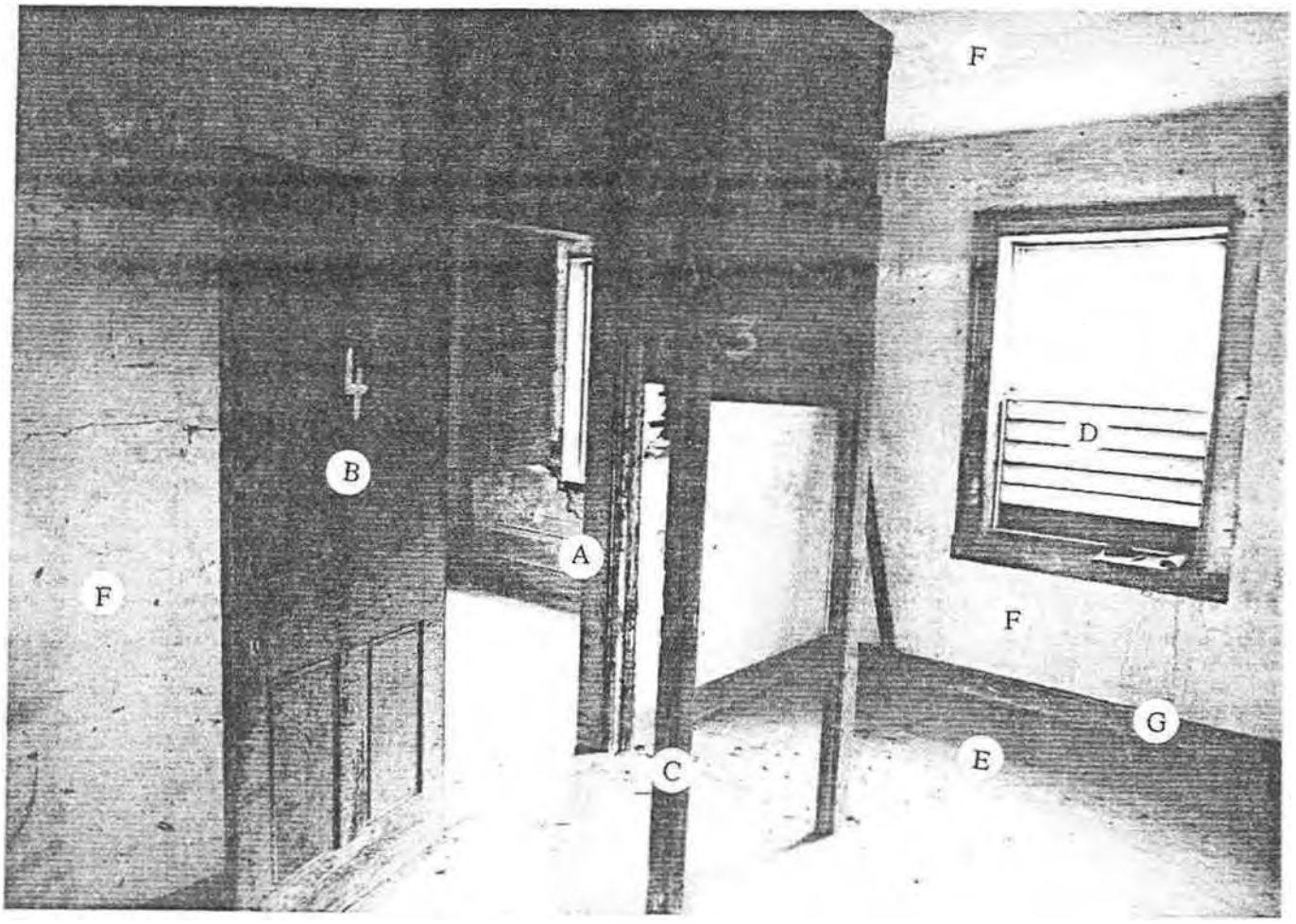


Photo 30
Worthington House, south bedroom looking northeast.

A) Doorway to stair hall.
B) Four panel wood door.
C) Vestibule to divided room, mid 20th century.
D) Wood window with six light sash and wood louver, moulding set "A".
E) Wood floor.
F) Plaster walls and ceiling.
G) Wood base.



Photo 30
Worthington House, south bedroom looking northeast.
Photographed by David Amundson
May, 1994

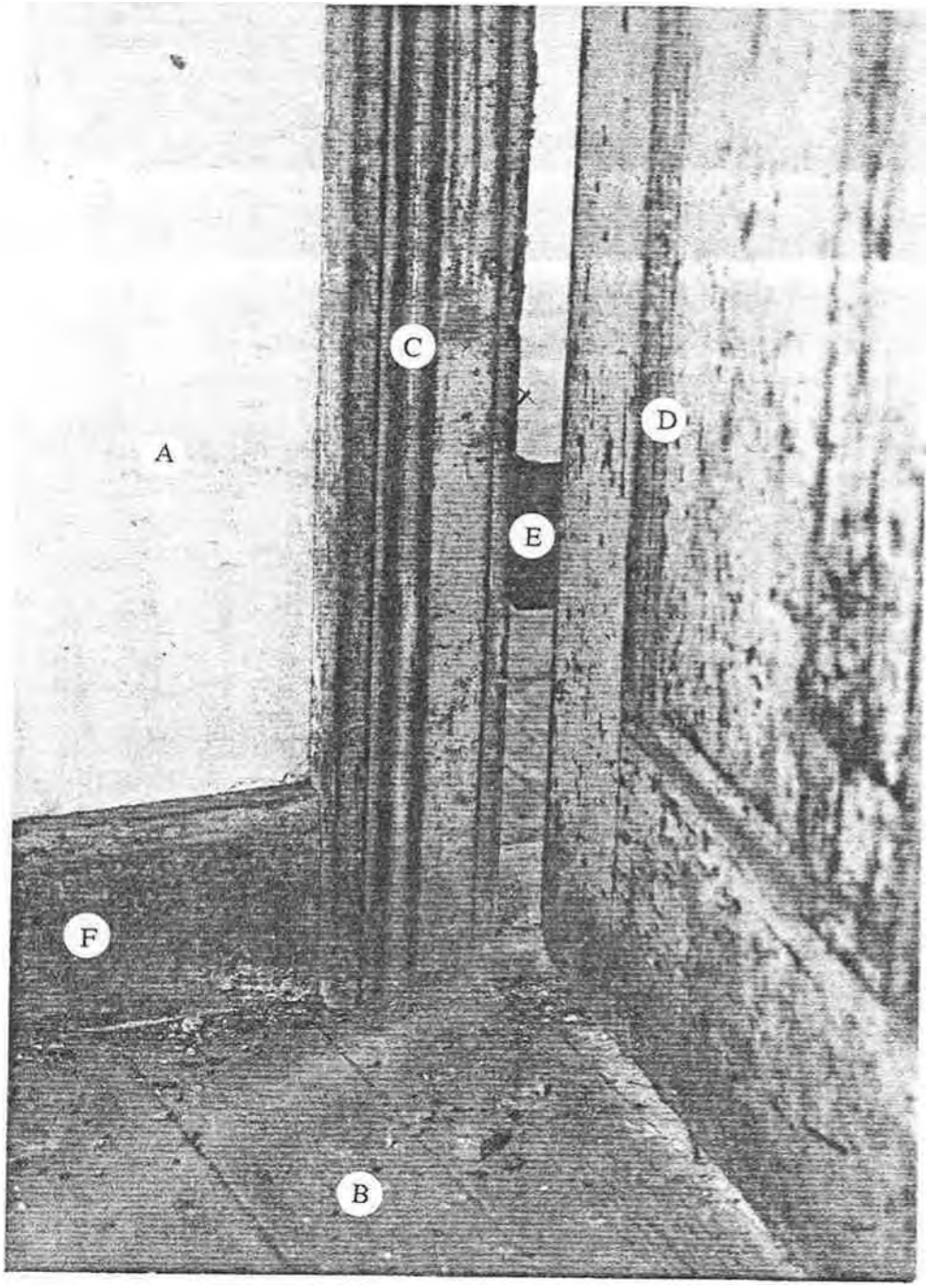


Photo 31
Worthington House, south bedroom door and base detail.

A) Plaster wall.
B) Wood floor.
C) Wood door casing, moulding set "A".
D) Four panel wood door.
E) Cast iron lift off hinge.
F) Wood base.



Photo 31
Worthington House, south bedroom door and base detail.
Photographed by David Amundson
May, 1994

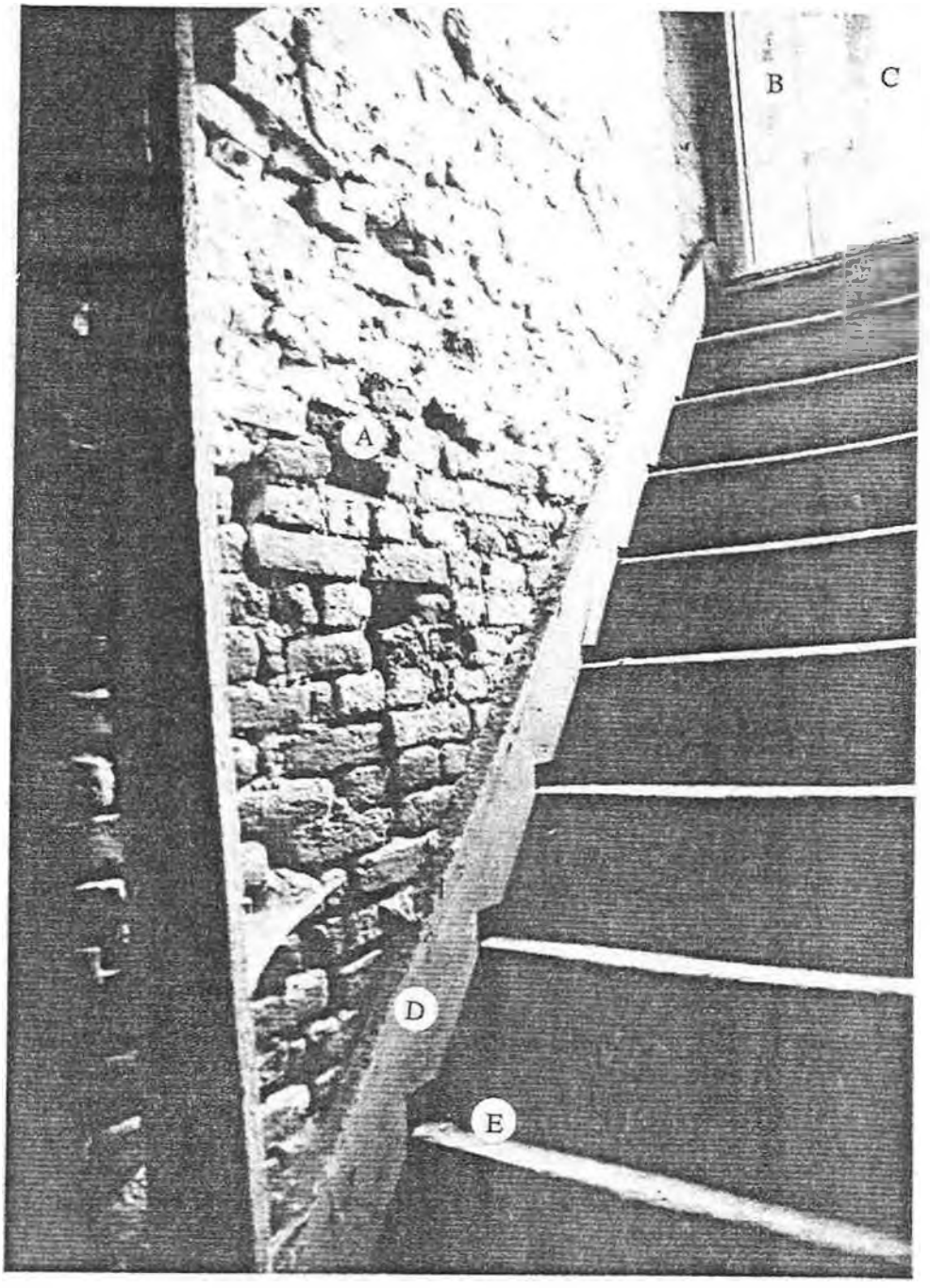


Photo 32
Worthington House, servant stair from basement to 1st floor.

A) Brick masonry wall between main block and ell.
B) Door to dining room.
C) South window at 1st floor.
D) Wood stringer at brick wall.
E) Wood treads and risers, loose and fallen from wood stringer at wall.



Photo 32
Worthington House, servant stair from basement to 1st floor.
Photographed by David Amundson
May, 1994

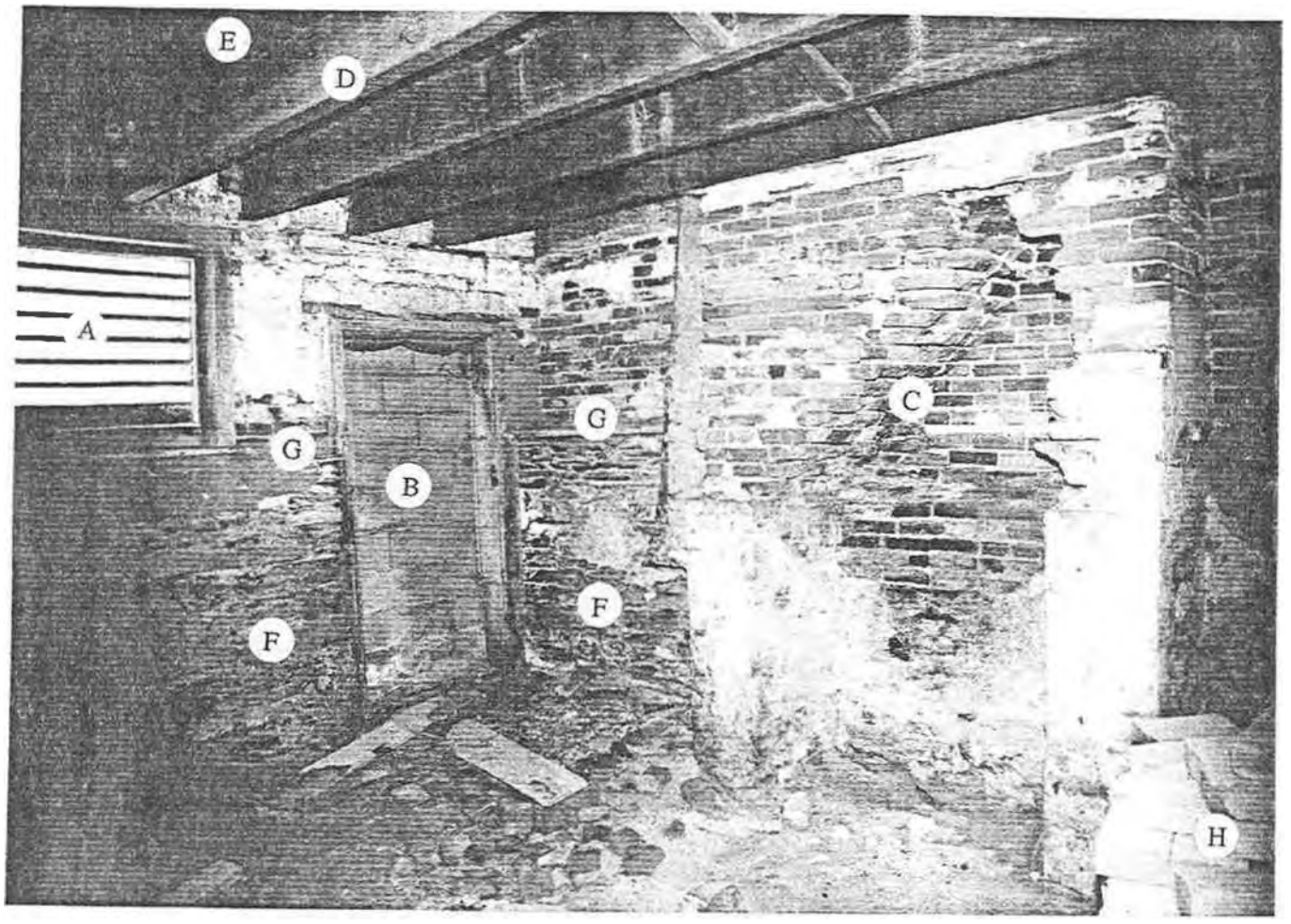


Photo 33
Worthington House, basement ell looking southwest.

A) South window with wood louver.
B) Basement door, blocked in with CMU.
C) Fireplace and chimney, with deteriorated brick and plaster.
D) Wood floor joists.
E) Wood floor above.
F) Rubble stone masonry foundation.
G) 4" shelf at top on stone foundation wall.
H) Stored brick.



Photo 33
Worthington House, basement ell looking southwest.
Photographed by David Amundson
May, 1994

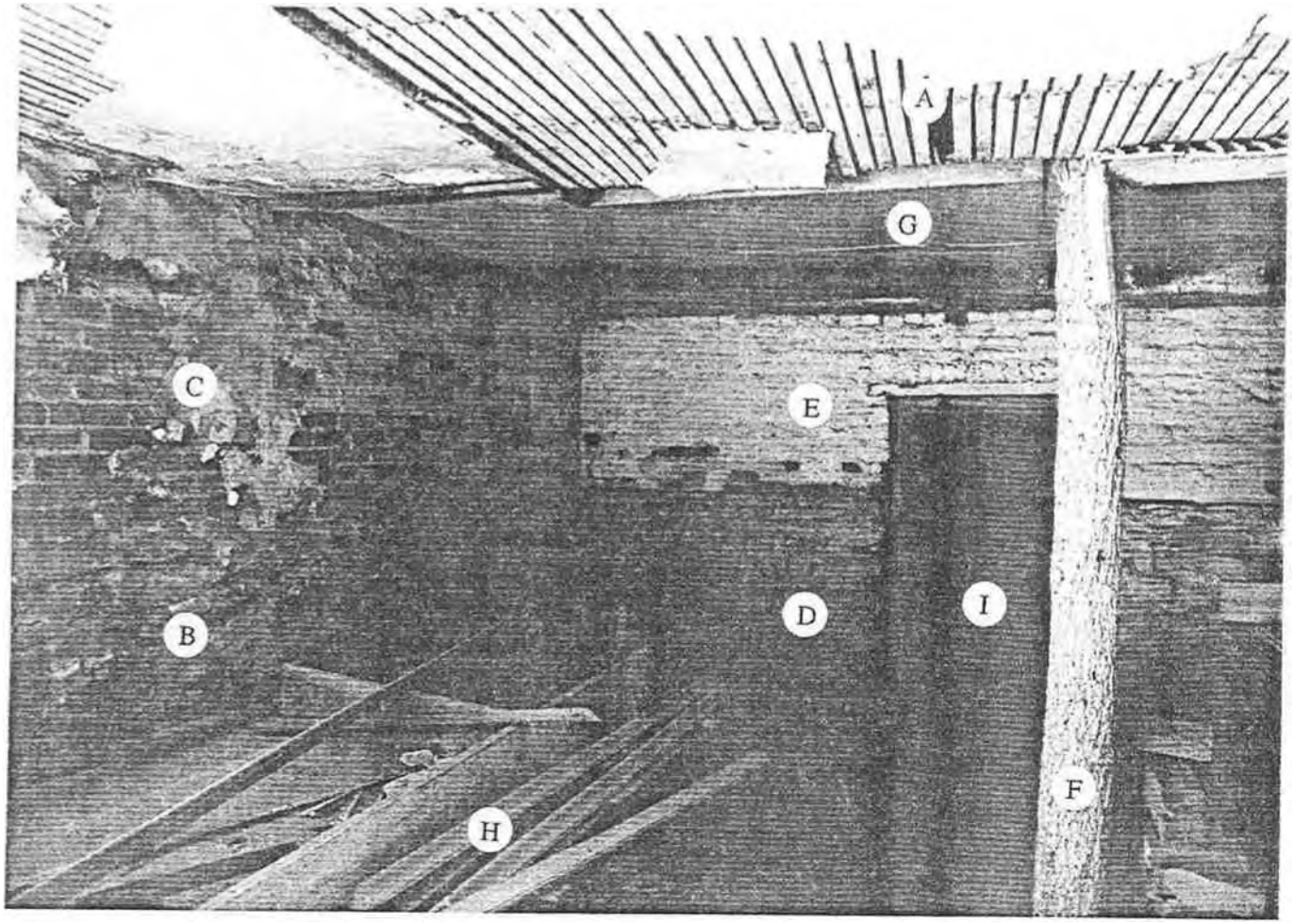


Photo 34
Worthington House, basement south room looking north.

A) Lath and plaster ceiling with fallen plaster.
B) West rubble stone foundation wall with deteriorated plaster finish.
C) West brick masonry wall with deteriorated plaster finish.
D) Rubble stone foundation wall below north wall of stair hall.
E) Brick masonry wall below north wall of stair hall.
F) Wood post supporting beam under south wall of stair hall.
G) Drywall ceiling below stair hall.
H) Stored parts from demolished porch.
I) Door to basement north room.



Photo 34
Worthington House, basement south room looking north.
Photographed by David Amundson
May, 1994

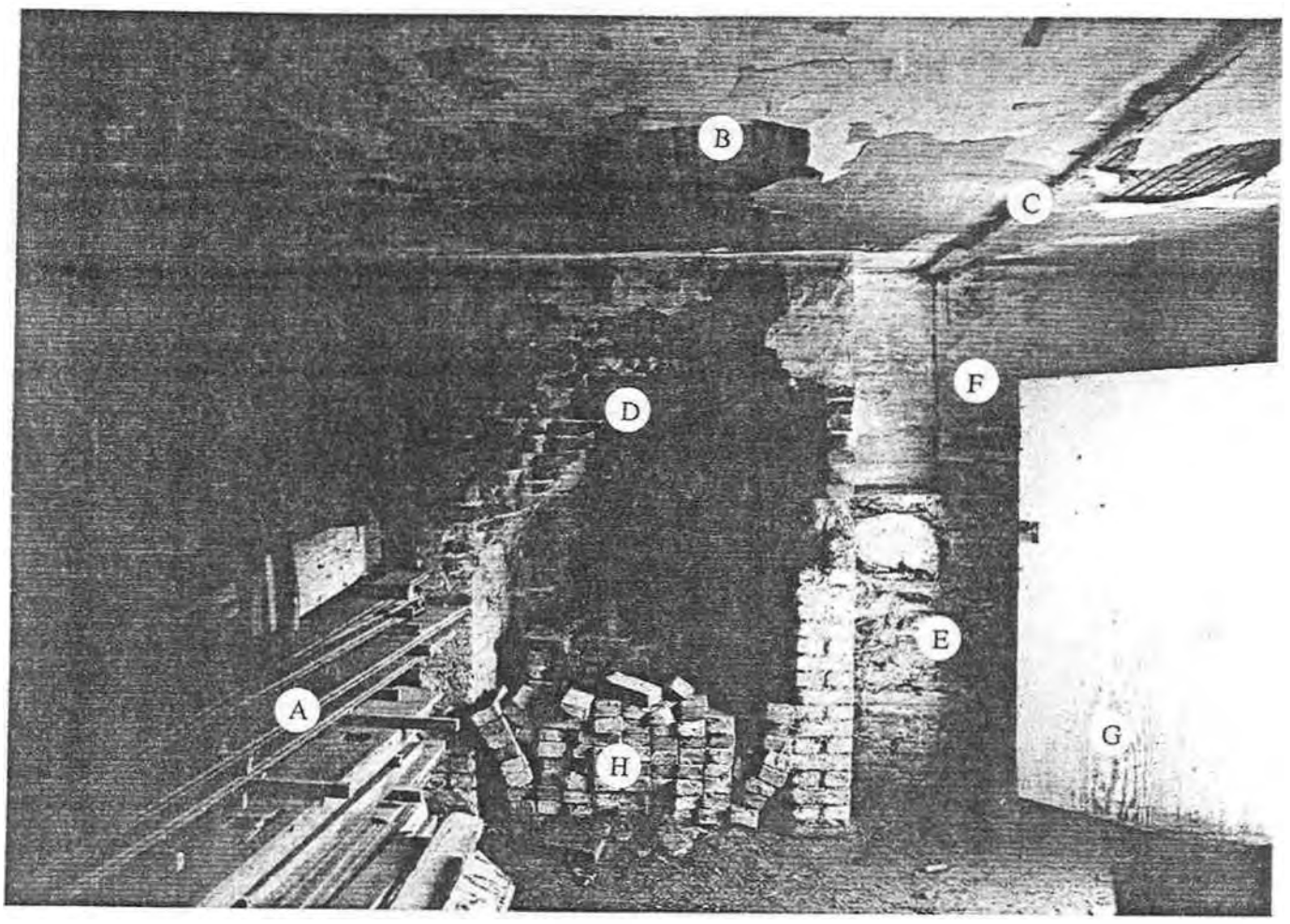


Photo 35
Worthington House, basement south room looking south.

A) Stored parts from demolished porch.
B) Deteriorated lath and plaster ceiling.
C) Beaded board wall cut off just below ceiling.
D) Brick fireplace with fallen chimney breast and deteriorated brick masonry.
E) Rubble stone foundation wall.
F) Brick masonry wall with whitewash finish.
G) Plywood basement entry door.
H) Stored brick.



Photo 35
Worthington House, basement south room looking south.
Photographed by David Amundson
May, 1994

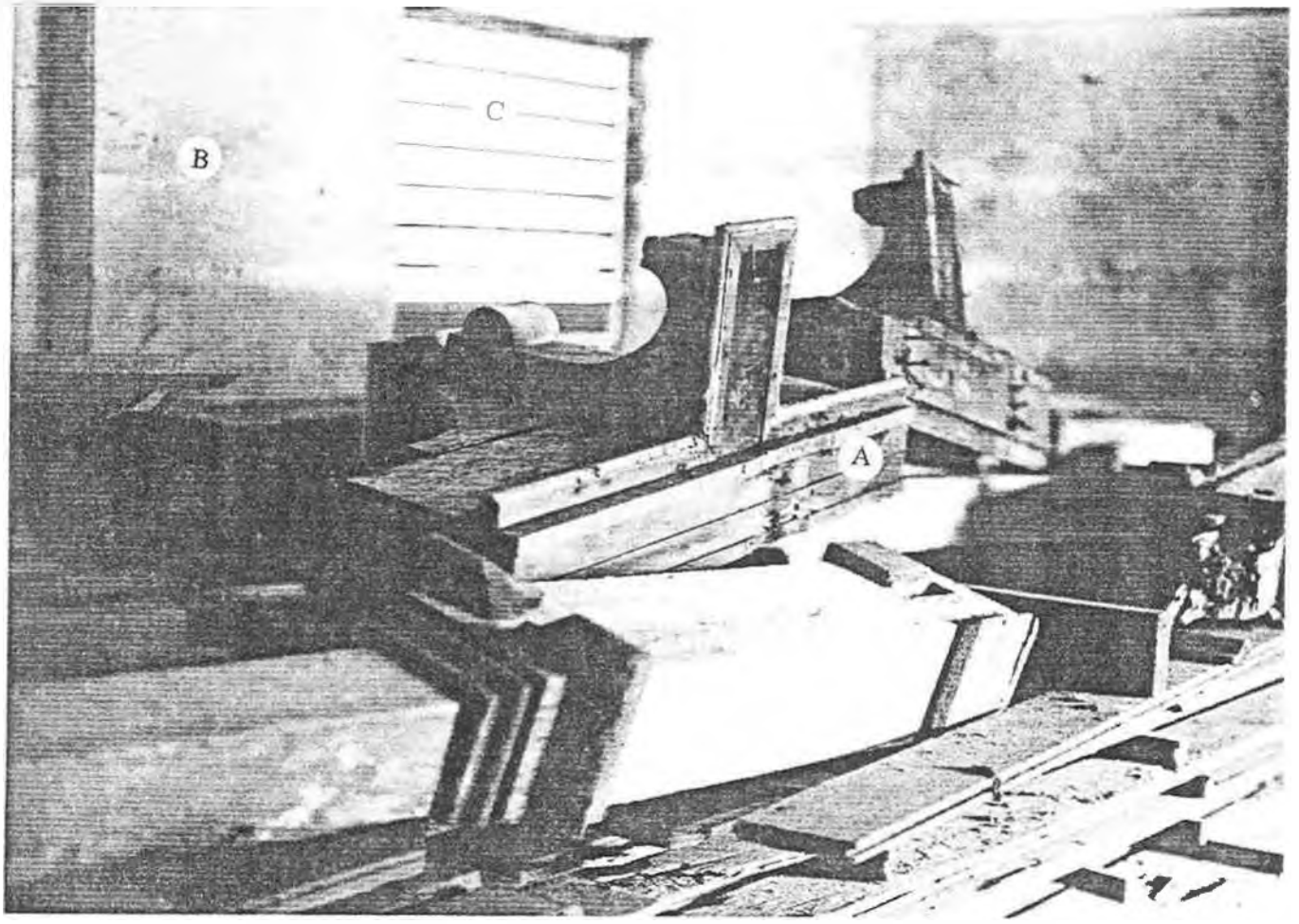


Photo 36
Worthington House, basement south room looking southeast.

A) Stored parts from demolished porch.
B) Plaster on brick wall.
C) Wood louver in window opening.



Photo 36
Worthington House, basement south room looking southeast.
Photographed by David Amundson
March, 1995

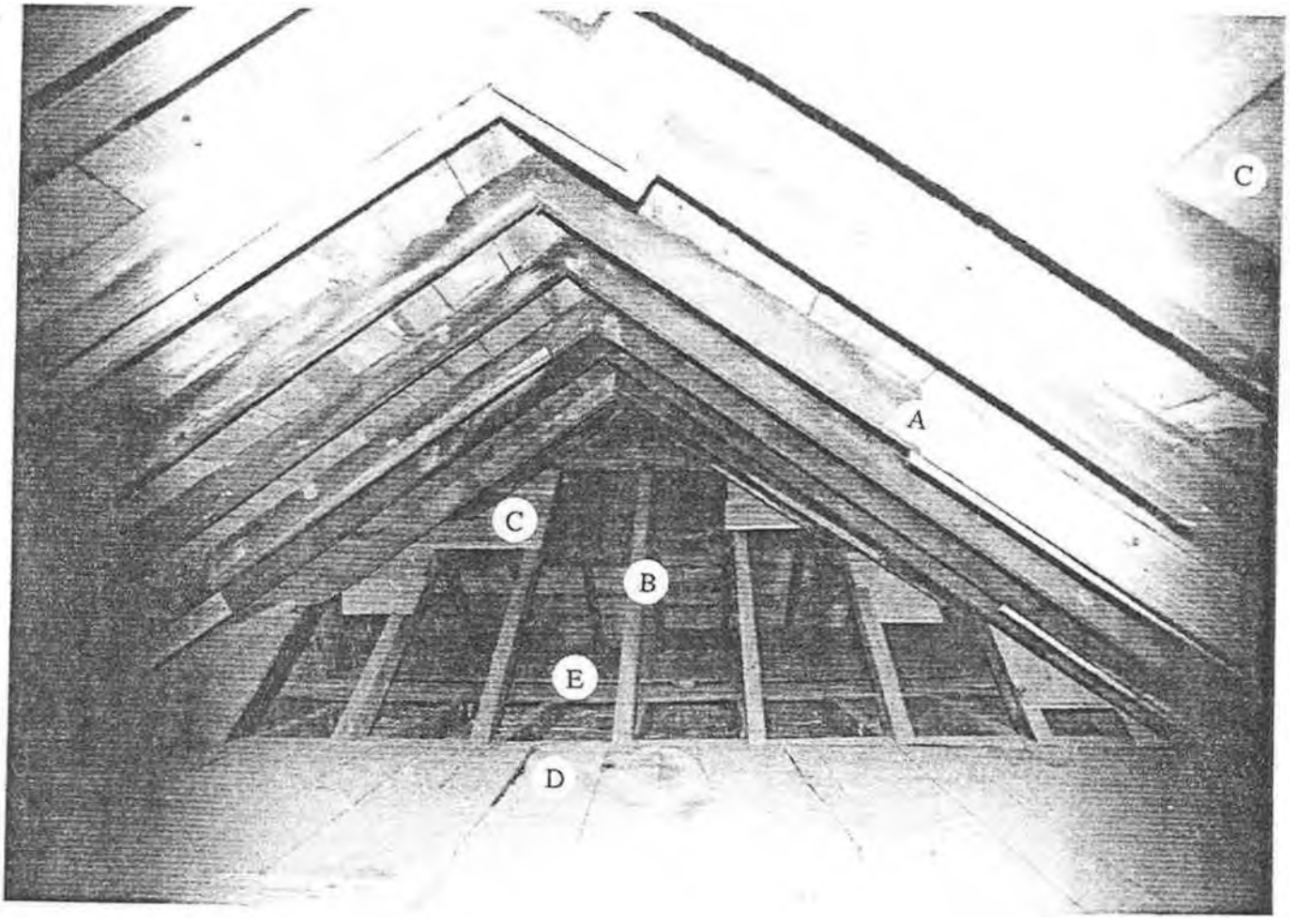


Photo 37
Worthington House, attic looking east from west end of ell.

A) Ell roof rafters with replaced and sistered members.
B) Main block roof rafters, with ell rafters resting on top of sheathing.
C) Wood roof sheathing.
D) Wood floor in ell.
E) Wood floor in main block, with missing boards exposing floor joists.



Photo 37
Worthington House, attic looking east from west end of ell.
Photographed by David Amundson
March, 1995

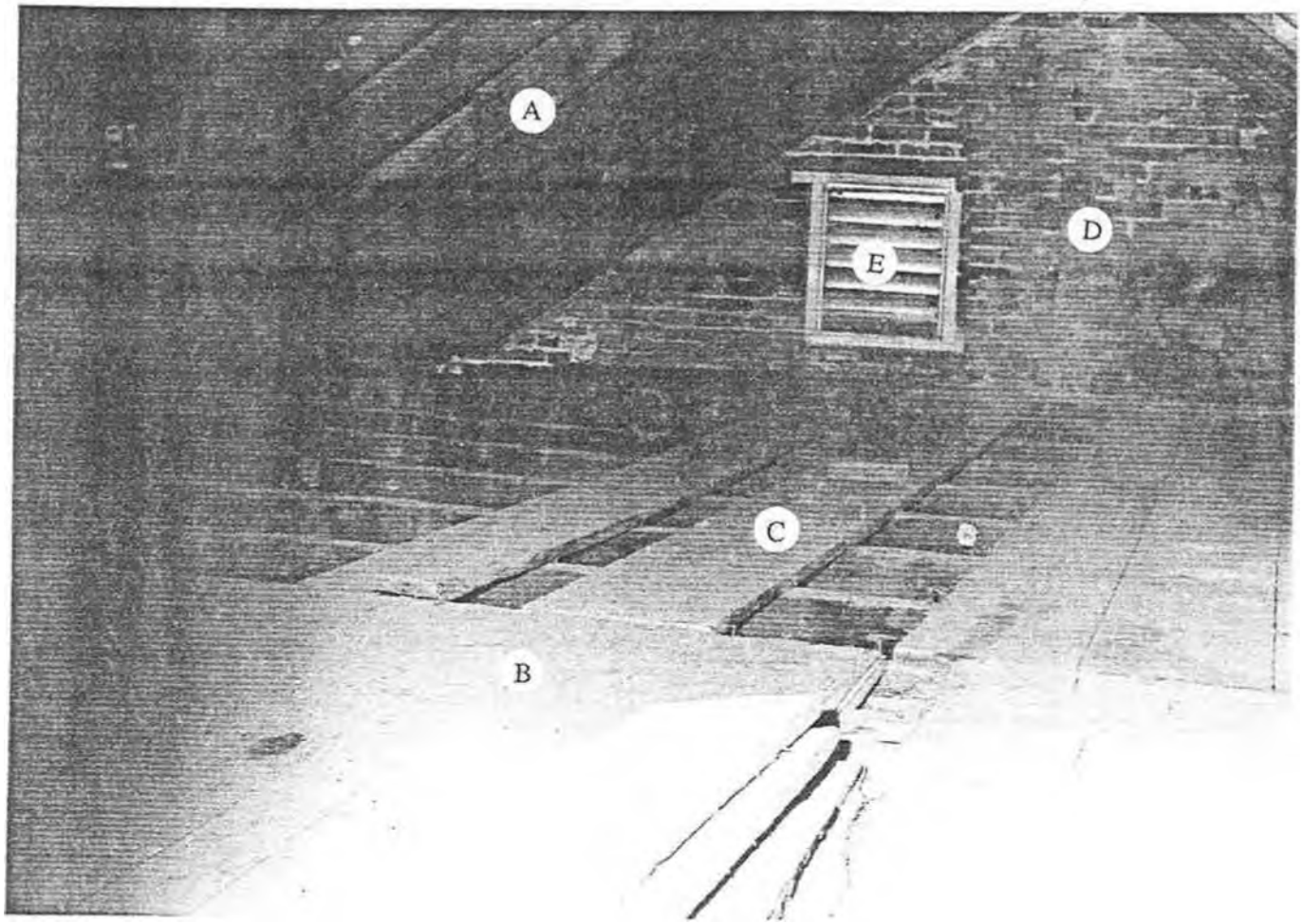


Photo 38
Worthington House, attic looking north from south end of main block.

A) Roof rafters.
B) Wood floor over south bedroom and stair hall.
C) Wood floor over north bedroom, boards missing, exposing floor joists.
D) North gable end, with deteriorated whitewash.
E) Window with wood louver.



Photo 38
Worthington House, attic looking north from south end of main block.
Photographed by David Amundson
March, 1995

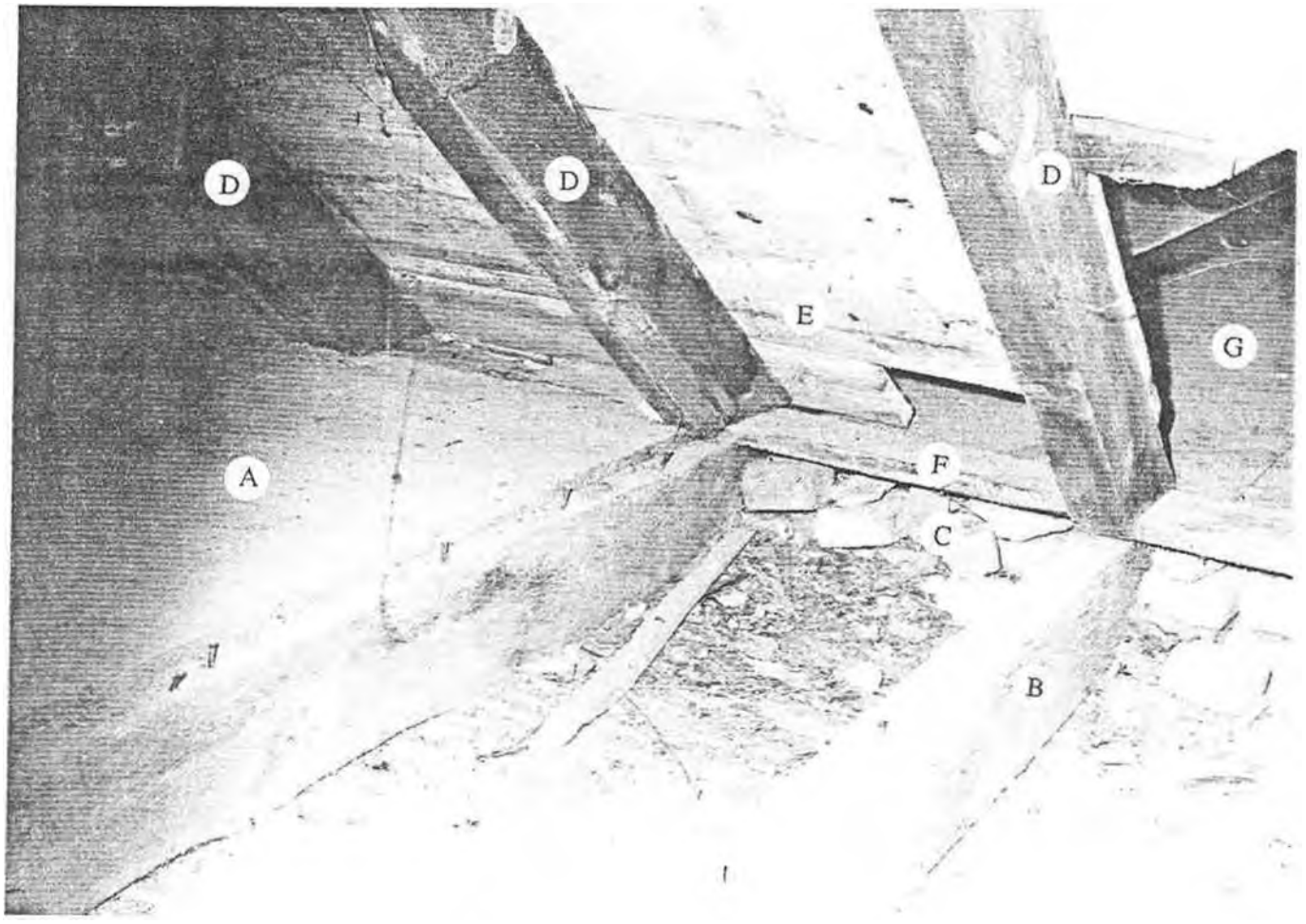


Photo 39
Worthington House, attic over corner at intersection of ell, north bedroom and stair hall.

A) Wood flooring over stair hall.
B) Floor joist over north bedroom.
C) Top of brick masonry wall between main block and ell.
D) Roof rafters.
E) Wood sheathing.
F) Plate at top of wall and at rafter foot.
G) Wood floor at ell.



Photo 39
Worthington House, attic over corner at intersection of ell, north bedroom and stair hall.
Photographed by David Amundson
March, 1995

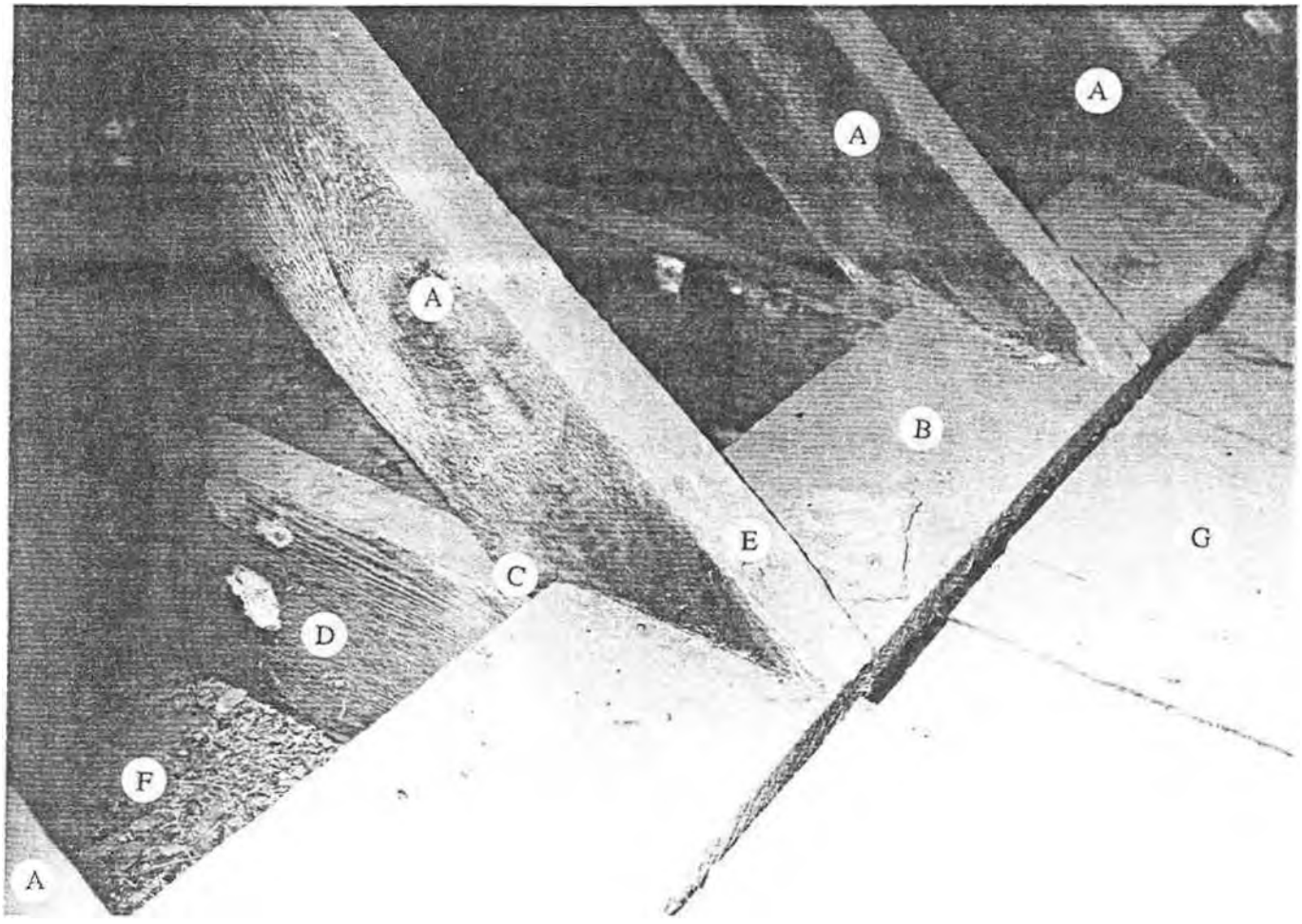


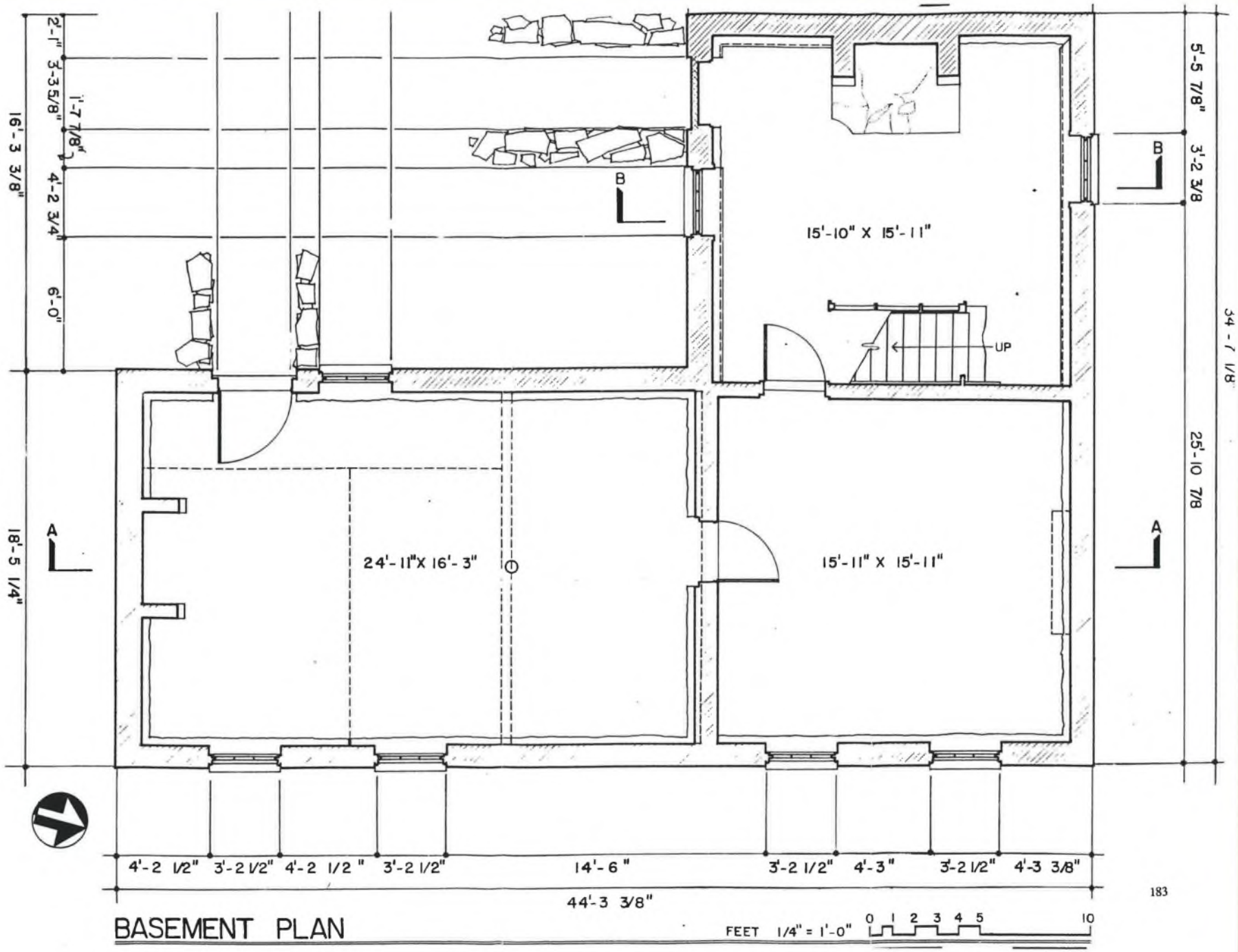
Photo 40
Worthington House, rafter feet.

A) Roof rafters.
B) Plate at top of wall.
C) Seat cut in rafter.
D) Floor joist.
E) Nail from above through rafter, plate and joist.
F) Lath and plaster for ceiling below.
G) Wood floor at ell.



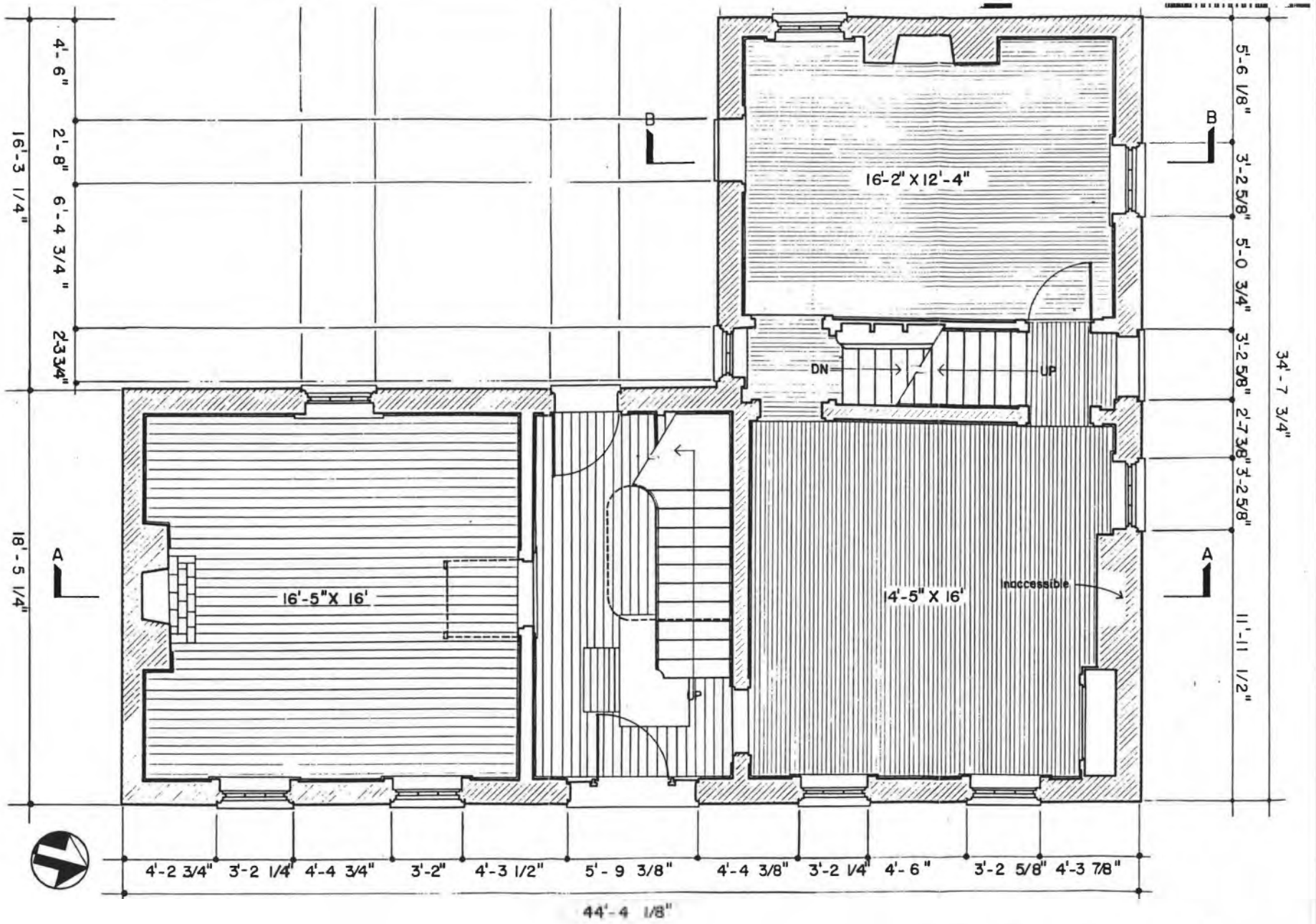
Photo 40
Worthington House, rafter feet.
Photographed by David Amundson
March, 1995

APPENDIX E:
HABS DRAWINGS AND SITE SURVEY



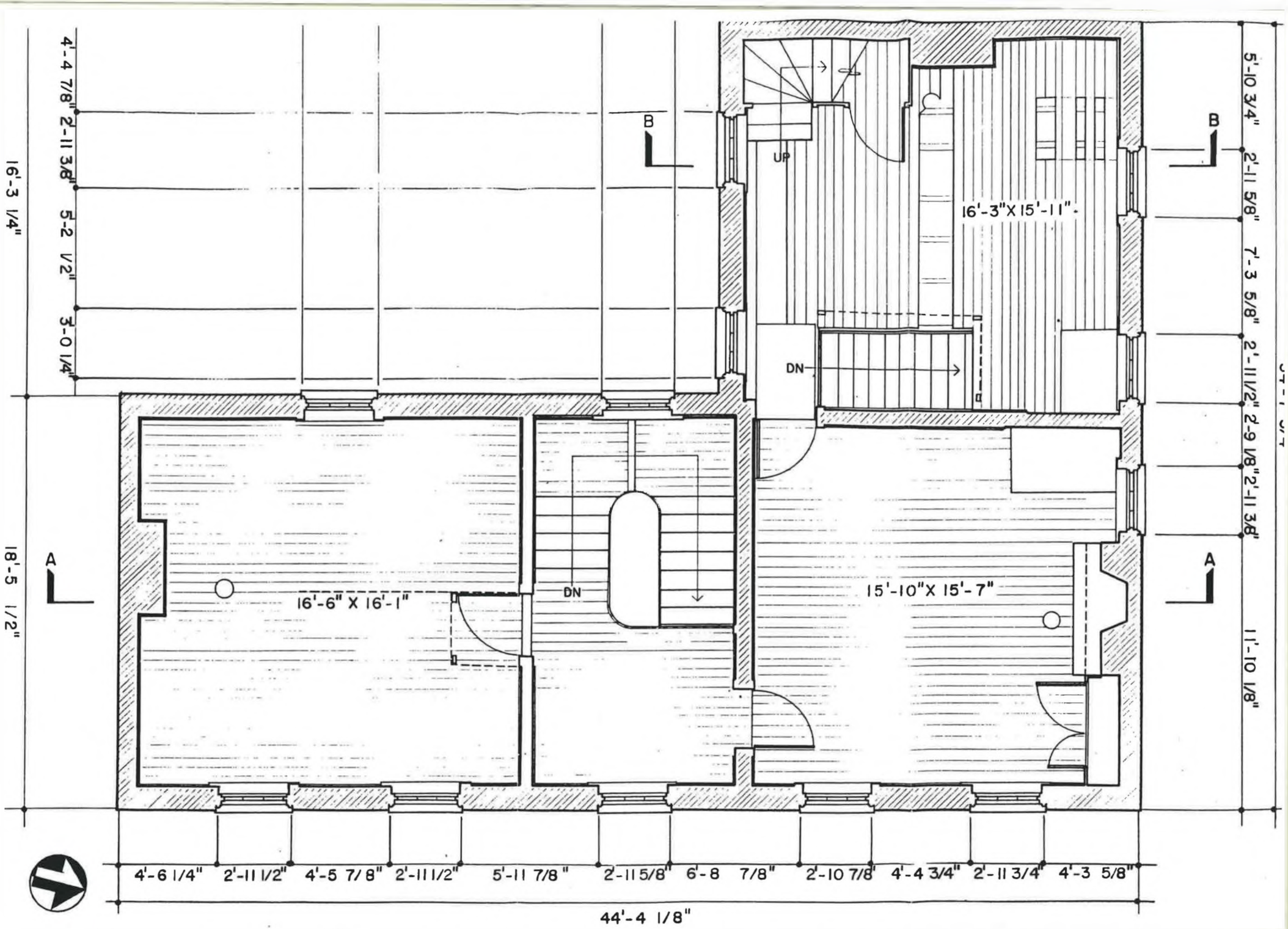
BASEMENT PLAN

FEET 1/4" = 1'-0" 0 1 2 3 4 5 10



FIRST FLOOR PLAN

FEET 1/4" = 1'-0" 0 1 2 3 4 5 10

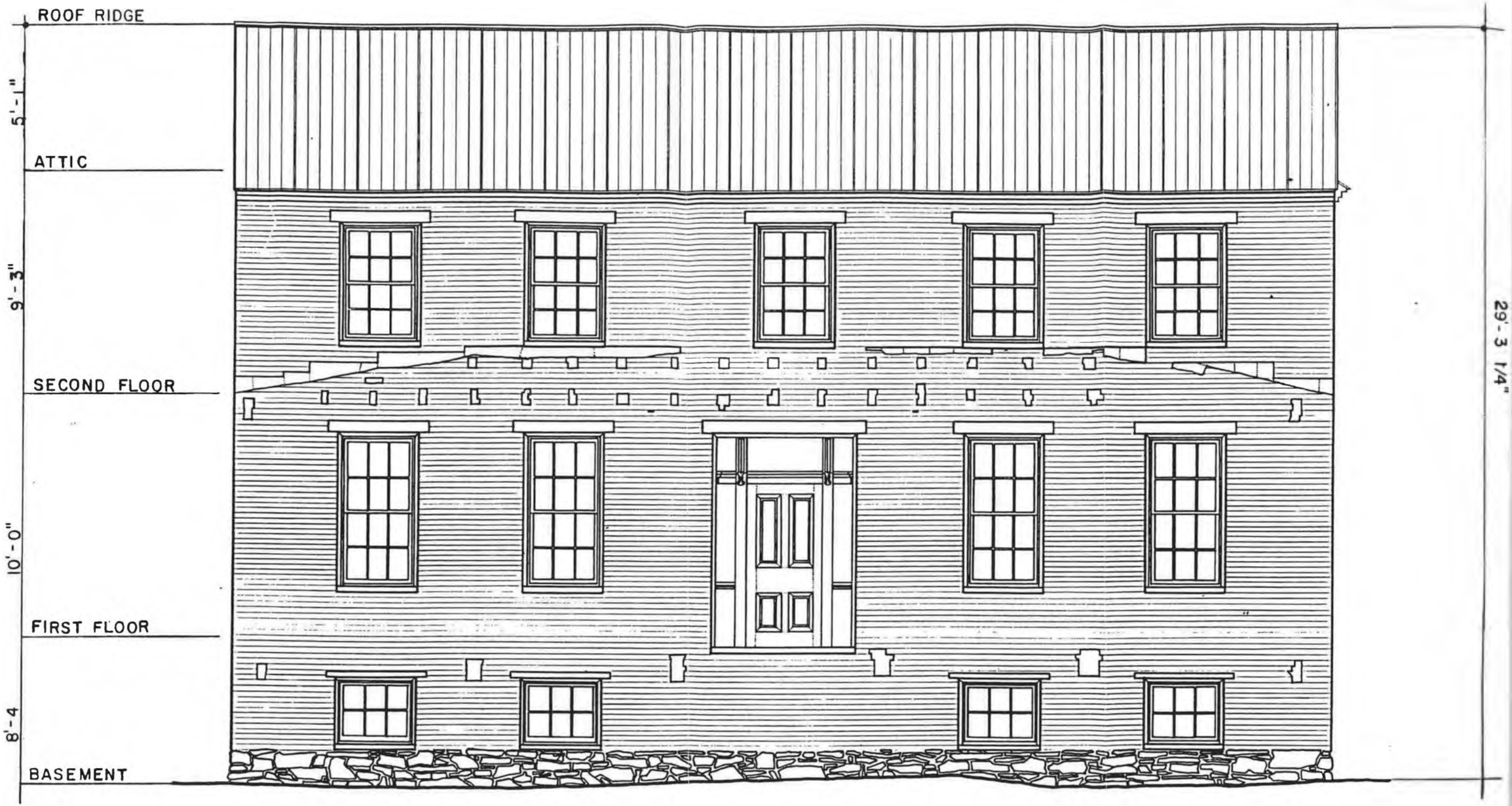


SECOND FLOOR PLAN

DN

FEET 1/4"= 1'-0" 0 1 2 3 4 5 10

METERS 1:48



EAST ELEVATION

E.L.

FEET 1/4"= 1'-0" 0 1 2 3 4 5 10

METERS 1:48 0 1 2 3



NORTH ELEVATION

FEET 1/4"= 1'-0" 0 1 2 3 4 5 10

METERS 1:48 0 1 2 3



WEST ELEVATION

FEET 1/4" = 1'-0 0 1 2 3 4 5 10

METERS 1 : 48 0 1 2 3

MATERIALS

FOUNDATION: FIELD RUBBLE, STONE

WALLS: BRICK, COMMON BOND, CORBELLED EAVE, WOOD SASH WITH WOOD LINTELS & SILLS



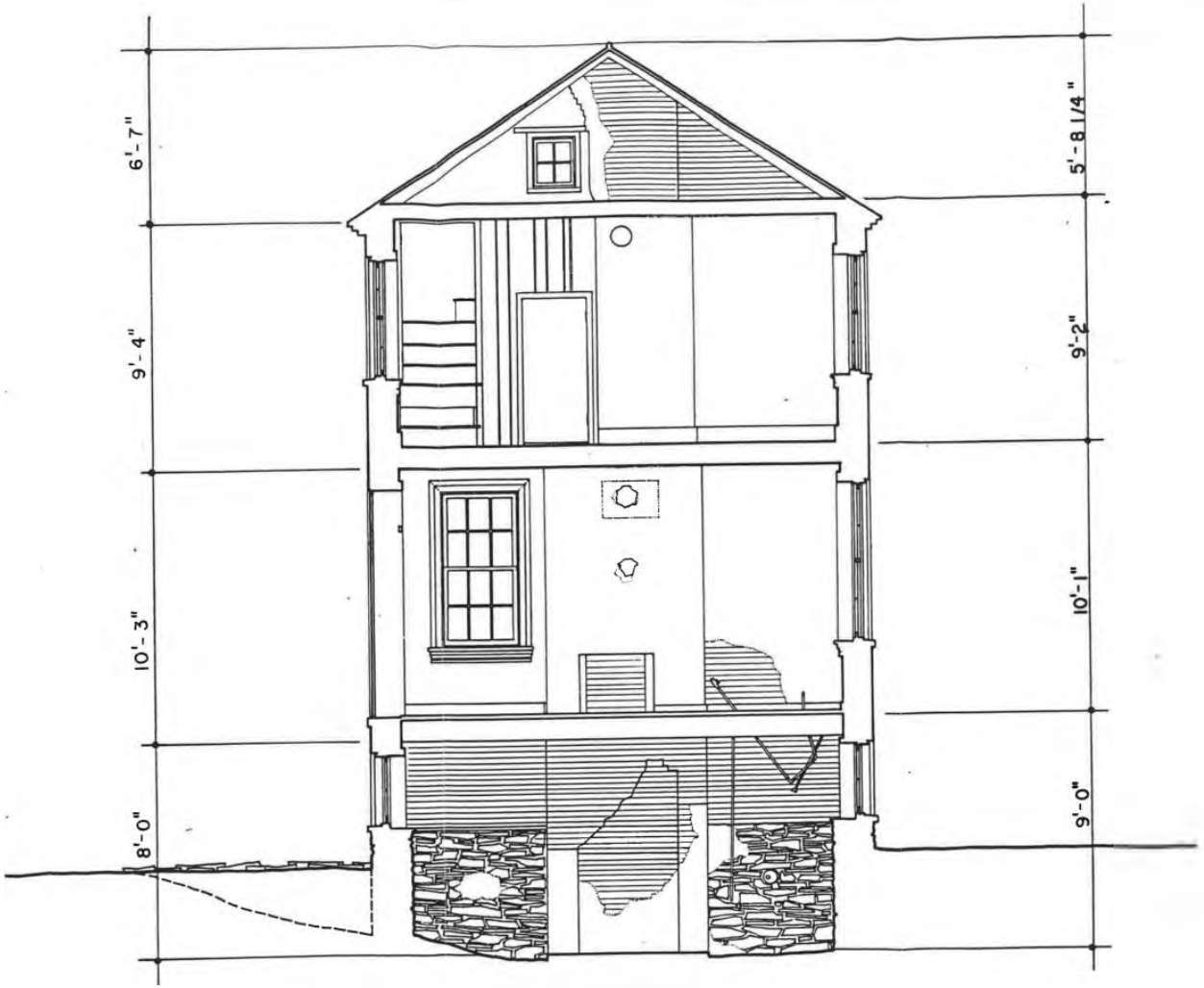
SOUTH ELEVATION

FEET 1/4"=1'-0" 0 1 2 3 4 5 10



SECTION A-A (LONGITUDINAL LOOKING NORTH)

FEET 1/4" = 1'-0 0 1 2 3 4 5 10



SECTION B-B TRANSVERSE THRU ELL LOOKING WEST

K.P.

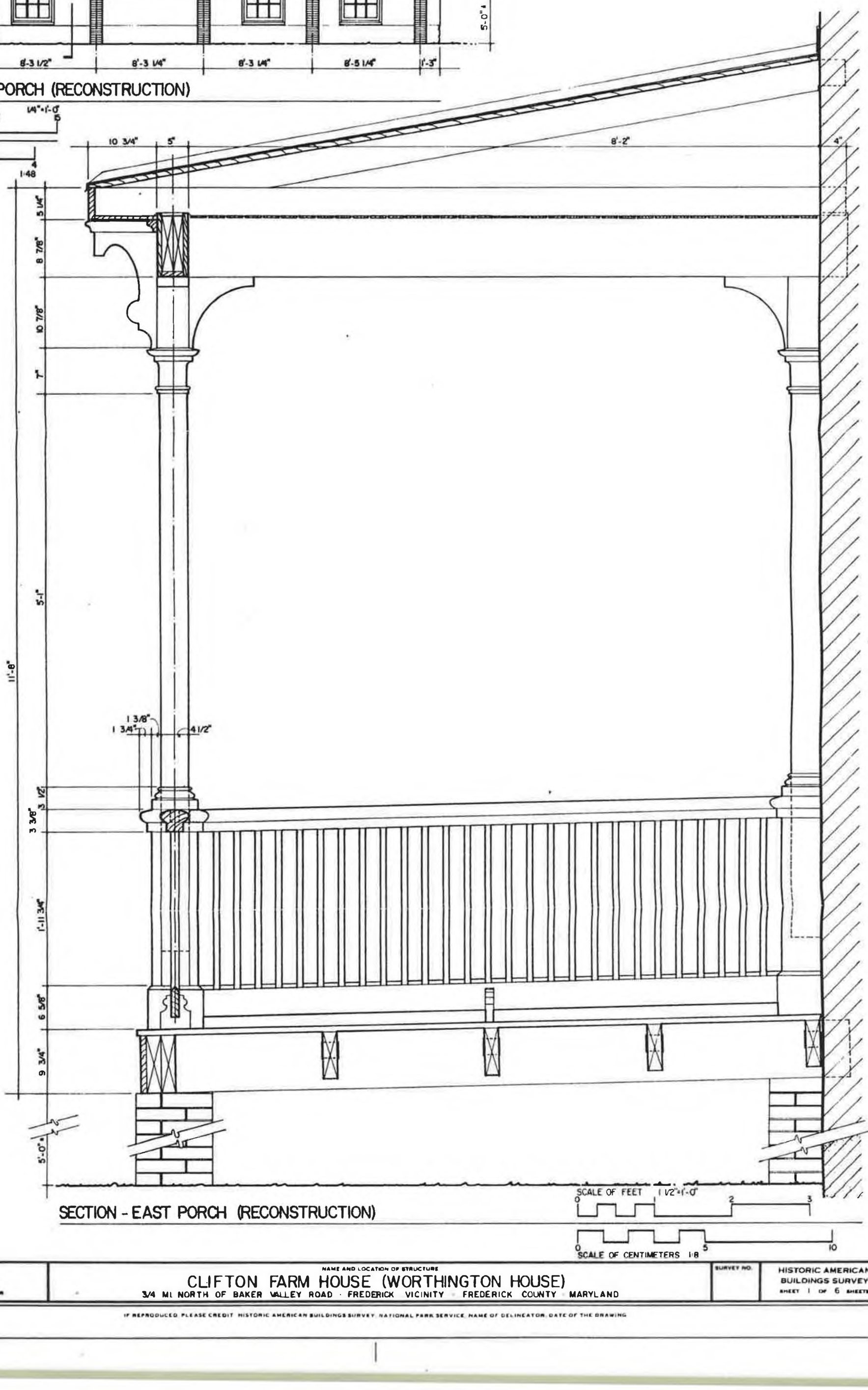
0 1 2 3 4 5 10



ELEVATION - EAST PORCH (RECONSTRUCTION)

SCALE OF FEET 0 5 10 1/4"=1'-0"

SCALE OF METERS 0 1 2 3 4 1:48



SECTION - EAST PORCH (RECONSTRUCTION)

SCALE OF FEET 0 2 3 1 1/2"=1'-0"

SCALE OF CENTIMETERS 0 5 10 1:8

DRAWN BY: DAVID AMUNDSON, 1995

201

NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

NAME AND LOCATION OF STRUCTURE

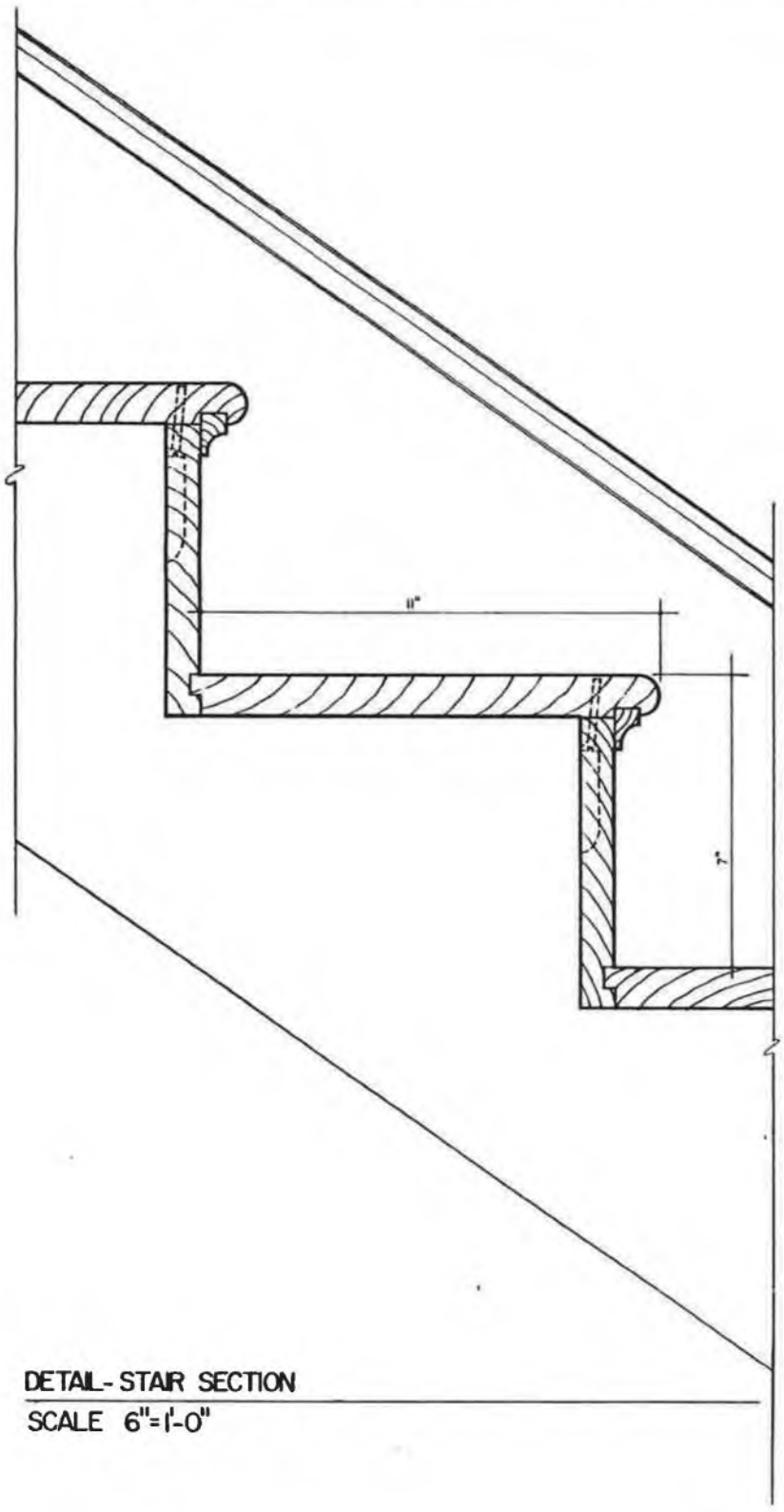
CLIFTON FARM HOUSE (WORTHINGTON HOUSE)

3/4 MI NORTH OF BAKER VALLEY ROAD · FREDERICK VICINITY · FREDERICK COUNTY · MARYLAND

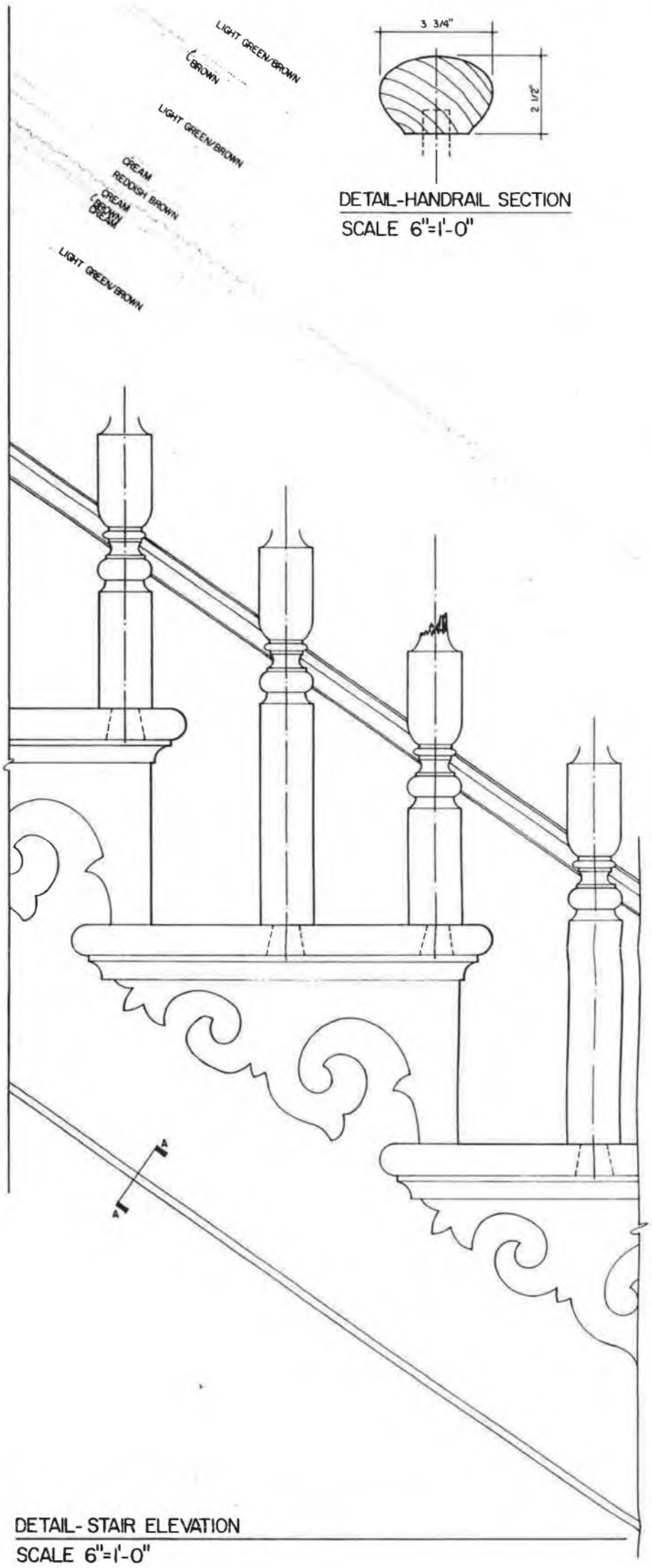
SURVEY NO.

HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 1 OF 6 SHEETS

IF REPRODUCED, PLEASE CREDIT HISTORIC AMERICAN BUILDINGS SURVEY, NATIONAL PARK SERVICE, NAME OF DELINEATOR, DATE OF THE DRAWING



DETAIL- STAIR SECTION
SCALE 6"=1'-0"



DETAIL- STAIR ELEVATION
SCALE 6"=1'-0"

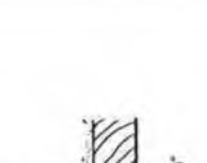
DETAIL-HANDRAIL SECTION
SCALE 6"=1'-0"



DETAIL- STAIR PLAN
SCALE 6"=1'-0"

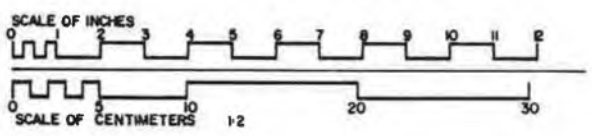


AT PLASTER WALL



AT PLASTER SOFFIT

DETAIL-STRINGER MOULDING SECTION A-A
SCALE 6"=1'-0"



DRAWN BY: DAVID AMUNDSON, 1995

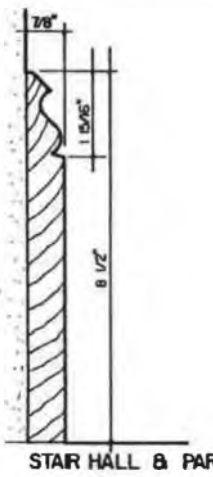
203 NATIONAL PARK SERVICE UNITED STATES DEPARTMENT OF THE INTERIOR

NAME AND LOCATION OF STRUCTURE
CLIFTON FARM HOUSE (WORTHINGTON HOUSE)
3/4 MI. NORTH OF BAKER VALLEY ROAD · FREDERICK VICINITY · FREDERICK COUNTY · MARYLAND

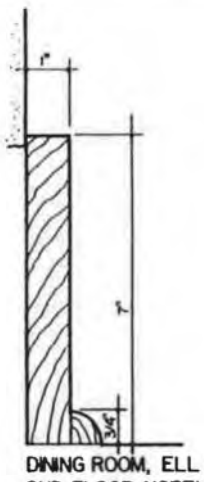
SURVEY NO.

HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 2 OF 6 SHEETS

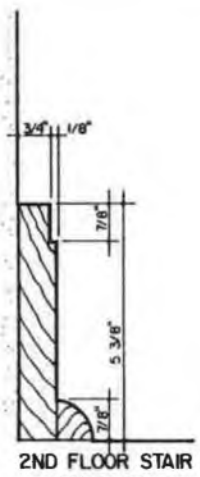
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STAIR HALL & PARLOR



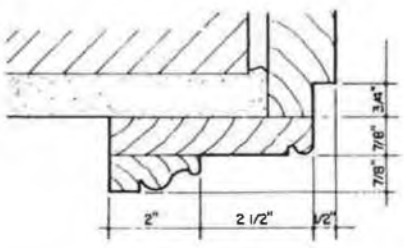
DINING ROOM, ELL & 2ND FLOOR NORTH BEDROOM



2ND FLOOR STAIR HALL & SOUTH BEDROOM

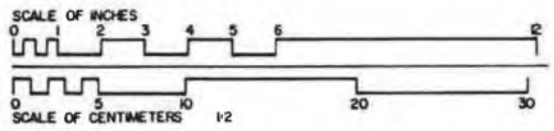
MOULDING DETAILS-BASES

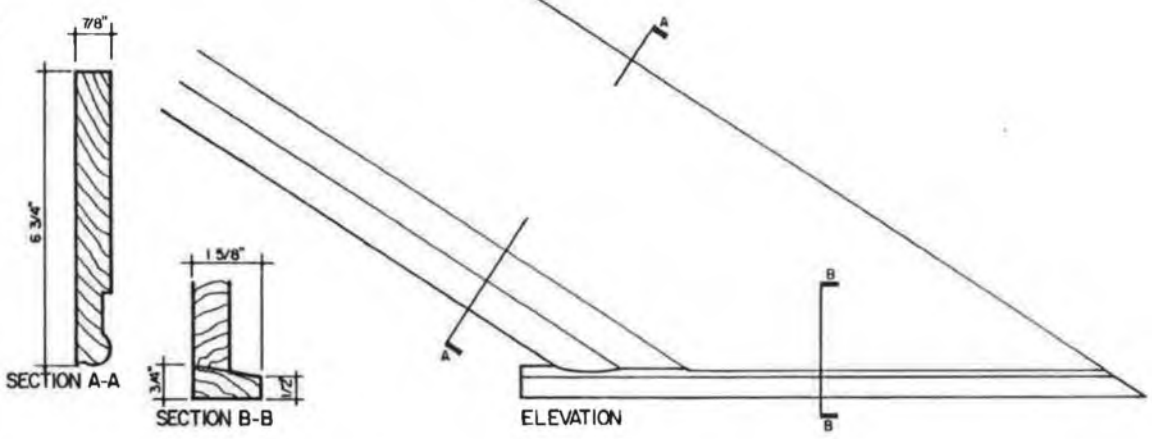
SCALE 6"=1'-0"



DOOR CASING-STAIR HALL

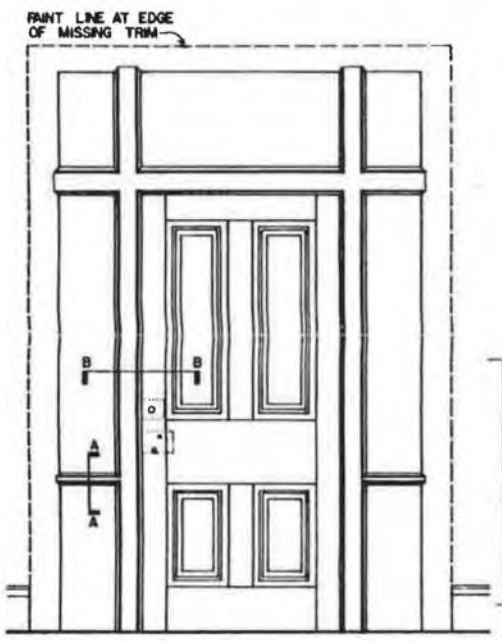
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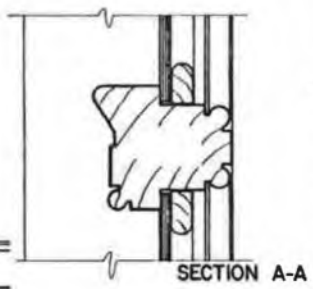


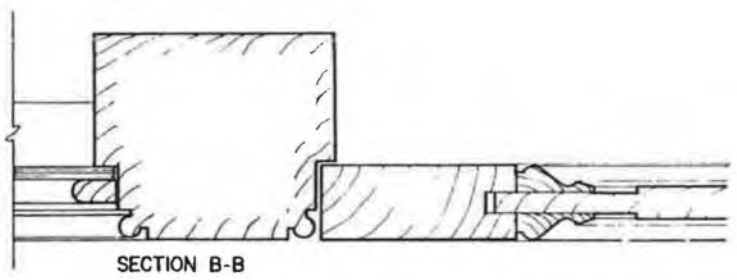


RAKE BOARD DETAILS

SCALE 6"=1'-0"





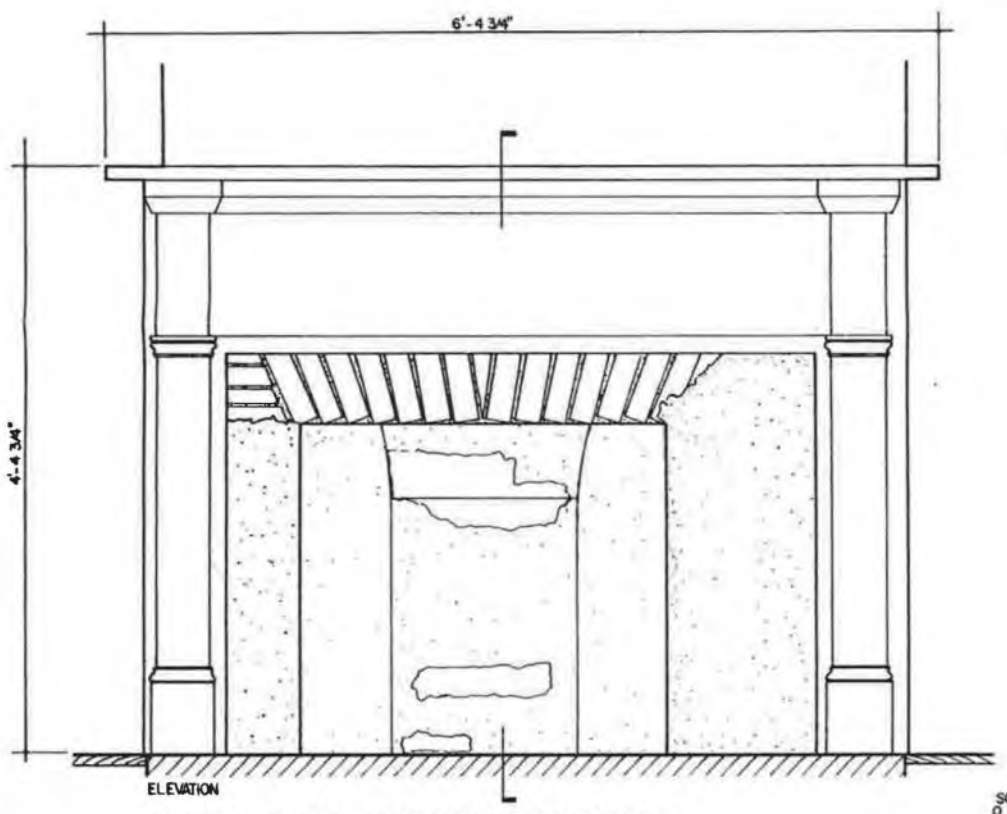


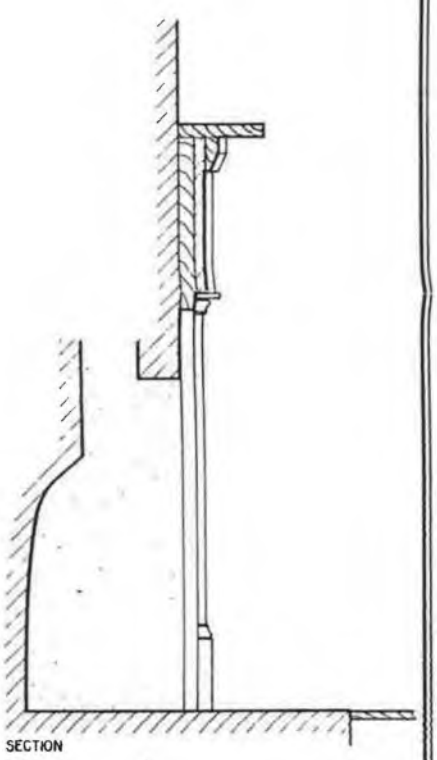
ENTRY DOOR INTERIOR ELEVATION

SCALE 3/4"=1'-0"

ENTRY DOOR DETAILS

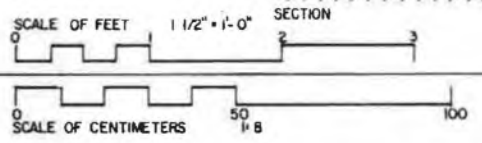
SCALE 6"=1'-0"





FIREPLACE - 2ND FLOOR NORTH BEDROOM

SCALE 1 1/2"=1'-0"



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205

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UNITED STATES DEPARTMENT OF THE INTERIOR

NAME AND LOCATION OF STRUCTURE

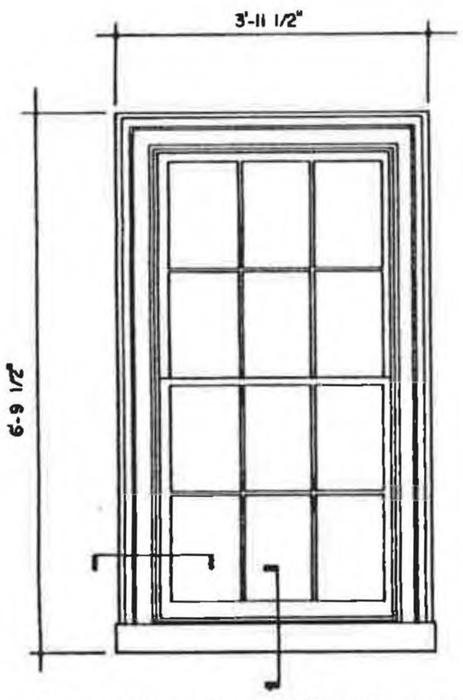
CLIFTON FARM HOUSE (WORTHINGTON HOUSE)

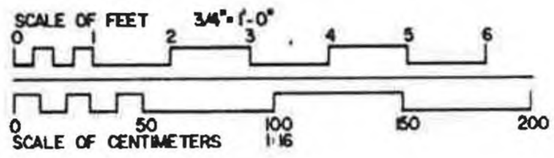
3/4 MI NORTH OF BAKER VALLEY ROAD · FREDERICK VICINITY · FREDERICK COUNTY · MARYLAND

SURVEY NO.

HISTORIC AMERICAN BUILDINGS SURVEY

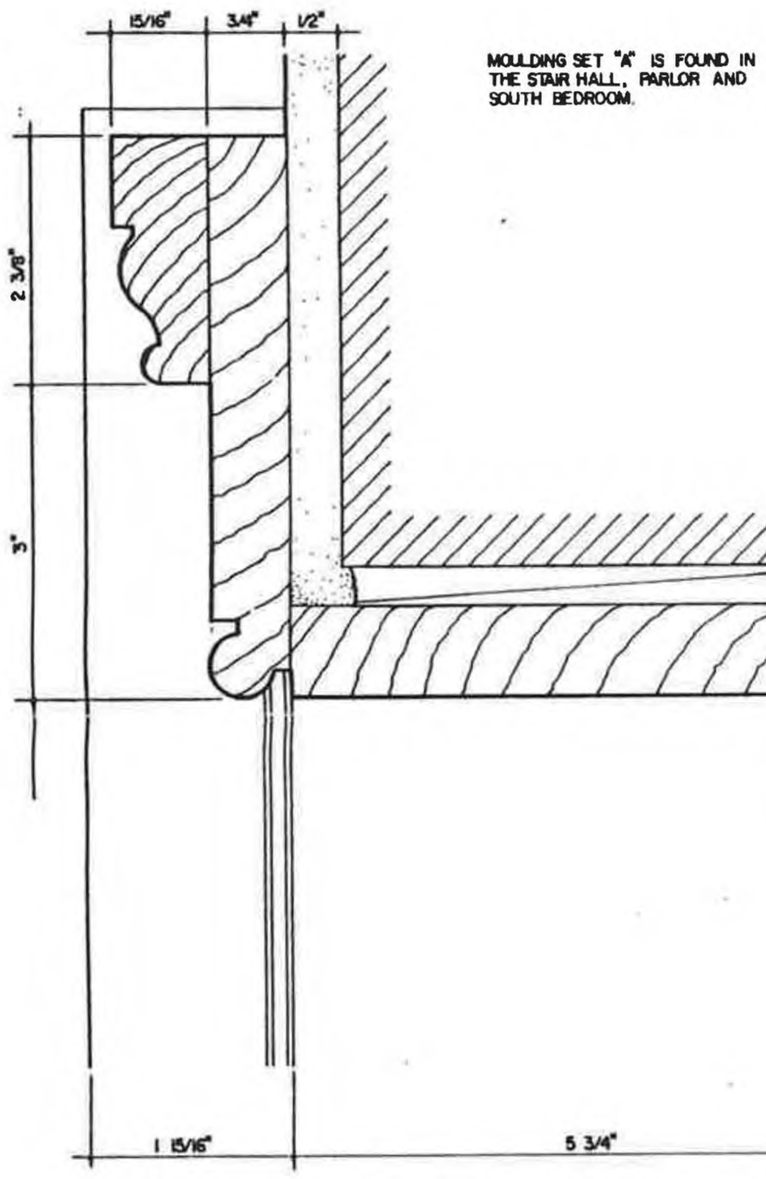
SHEET 3 OF 6 SHEETS





MOULDING SET "A" INT. WINDOW ELEVATION

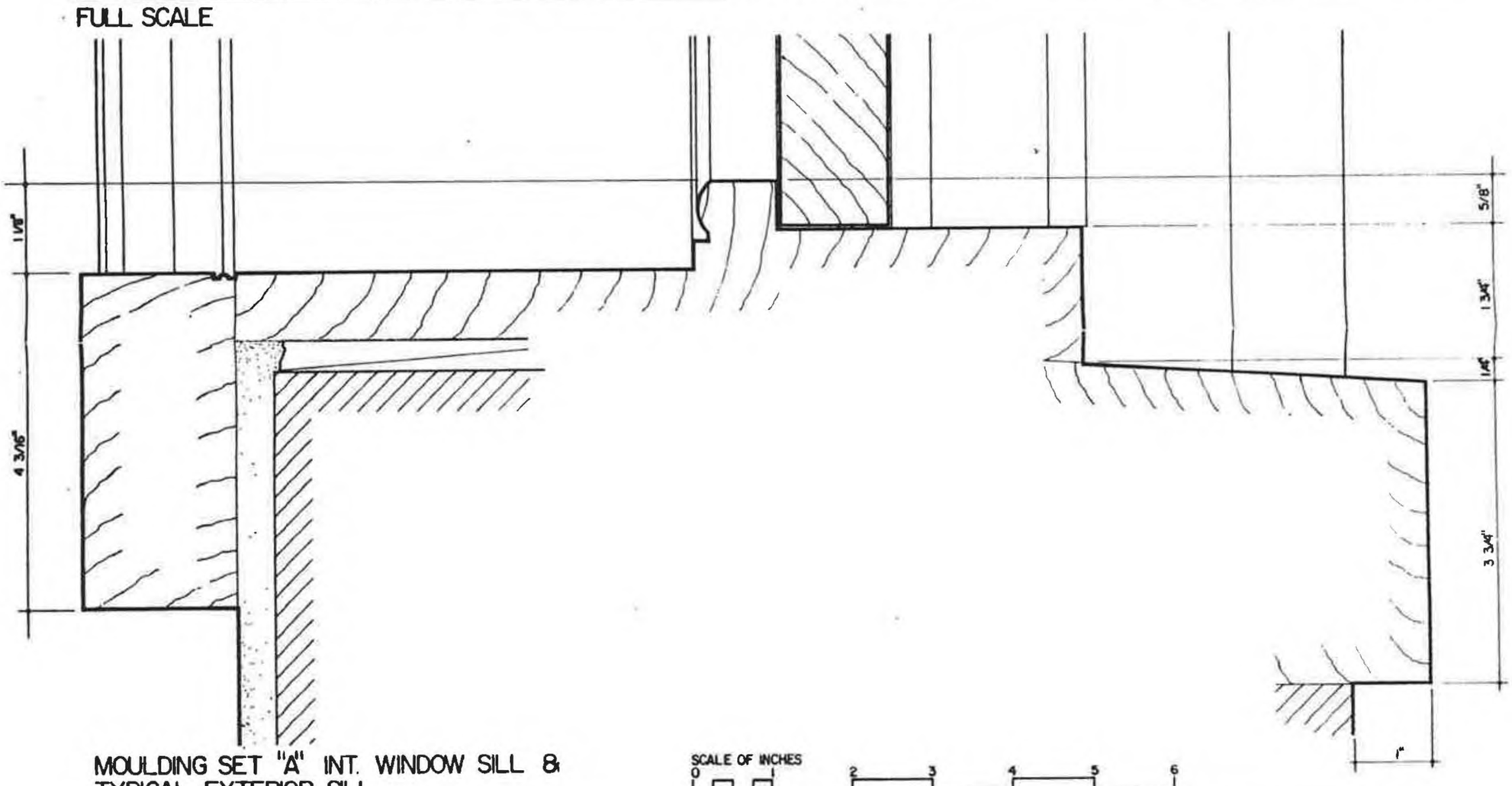
SCALE 3/4"=1'-0"



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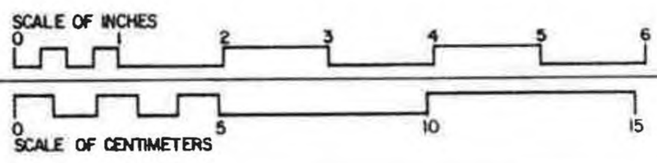
MOULDING SET "A" INT. WINDOW JAMB & TYPICAL EXTERIOR JAMB

FULL SCALE



MOULDING SET "A" INT. WINDOW SILL & TYPICAL EXTERIOR SILL

FULL SCALE



DRAWN BY: DAVID AMUNDSON and MELISSA COHEN, 1995

207

NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

NAME AND LOCATION OF STRUCTURE

CLIFTON FARM HOUSE (WORTHINGTON HOUSE)

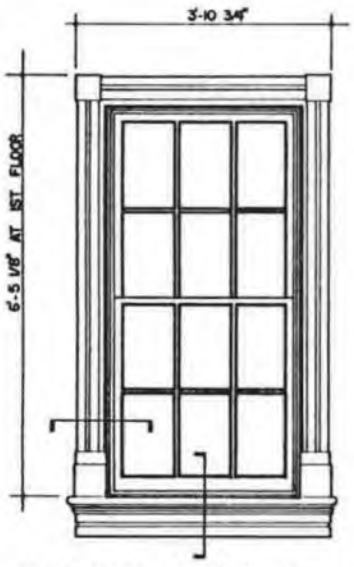
3/4 MI. NORTH OF BAKER VALLEY ROAD · FREDERICK VICINITY · FREDERICK COUNTY · MARYLAND

SURVEY NO.

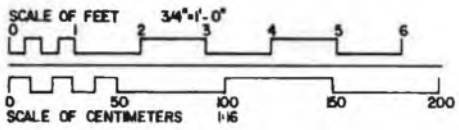
HISTORIC AMERICAN BUILDINGS SURVEY

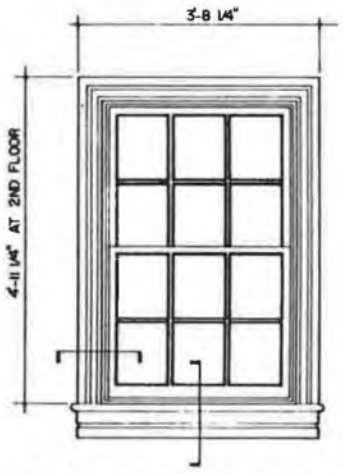
SHEET 4 OF 6 SHEETS

IF REPRODUCED PLEASE CREDIT HISTORIC AMERICAN BUILDINGS SURVEY, NATIONAL PARK SERVICE, NAME OF DELINEATOR, DATE OF THE DRAWING



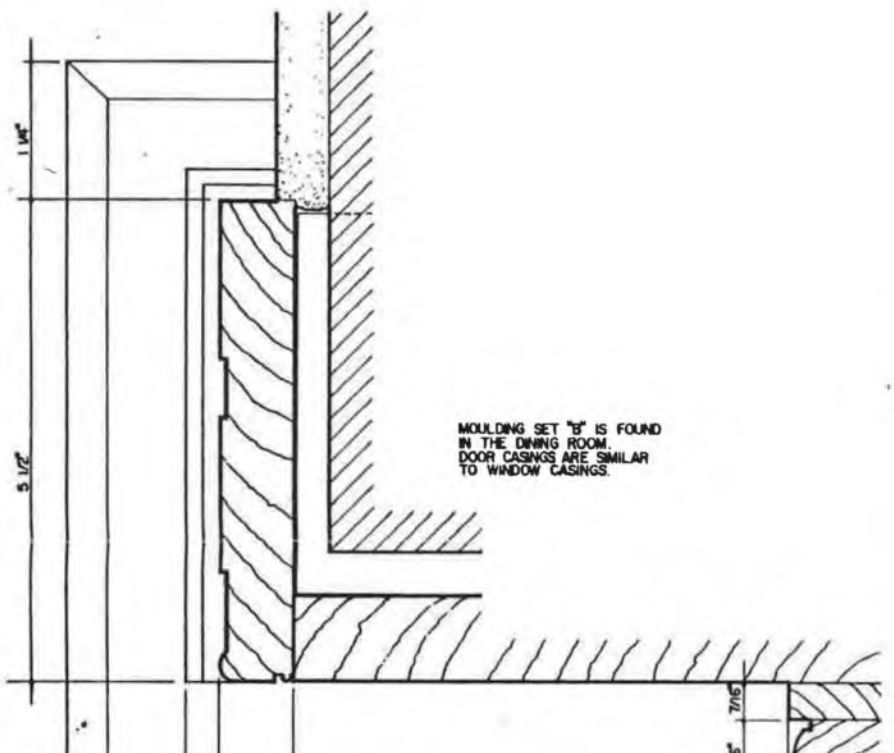
MOULDING SET "B" INT. WINDOW ELEVATION





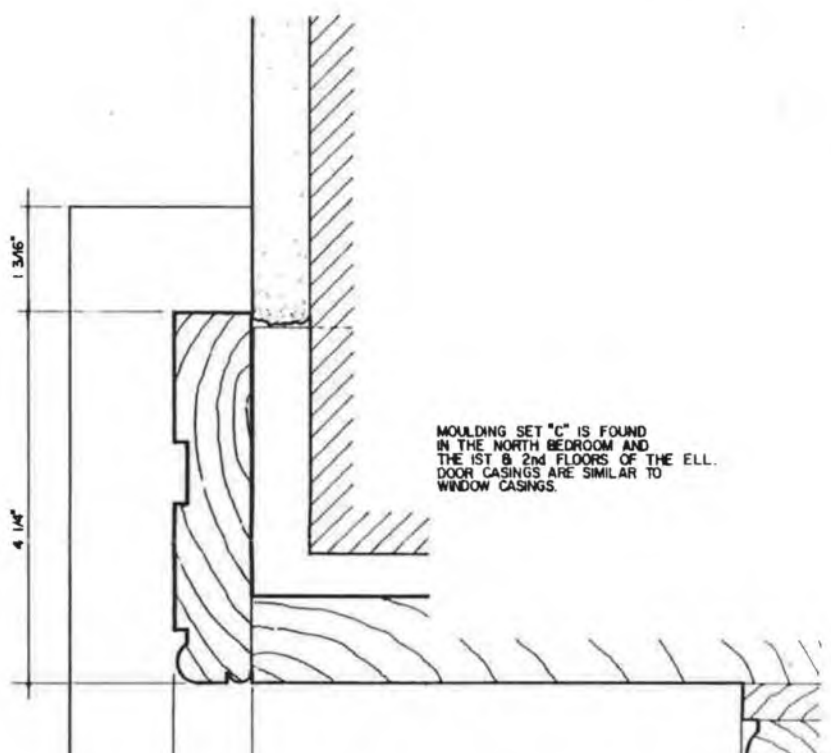
MOULDING SET "C" INT. WINDOW ELEVATION

SCALE 3/4"=1'-0"



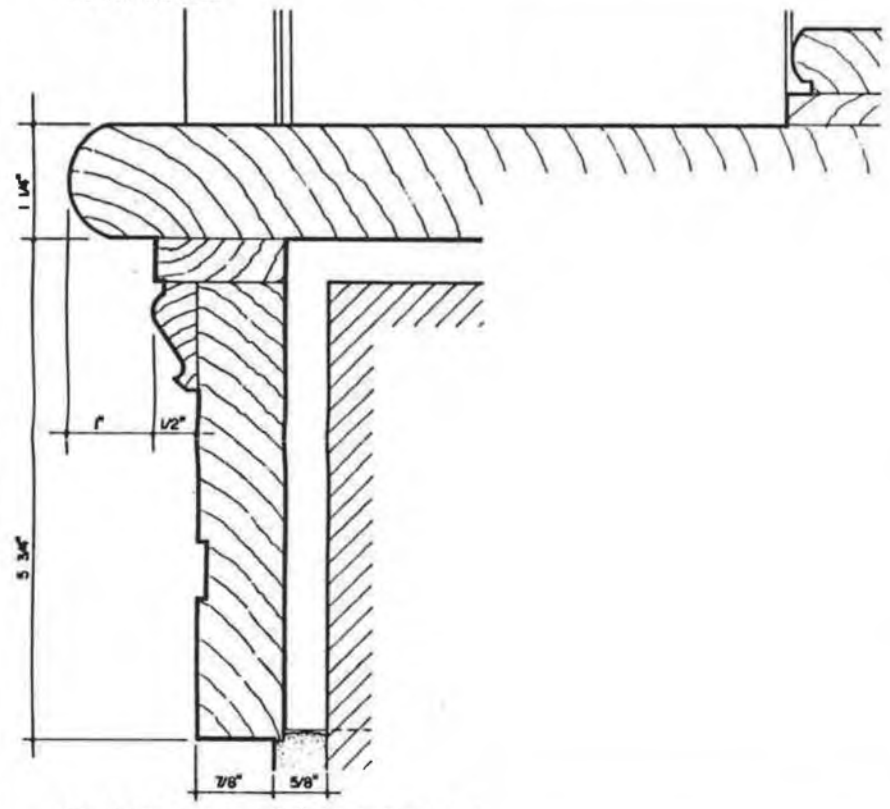
MOULDING SET "B" INTERIOR JAMB

FULL SCALE



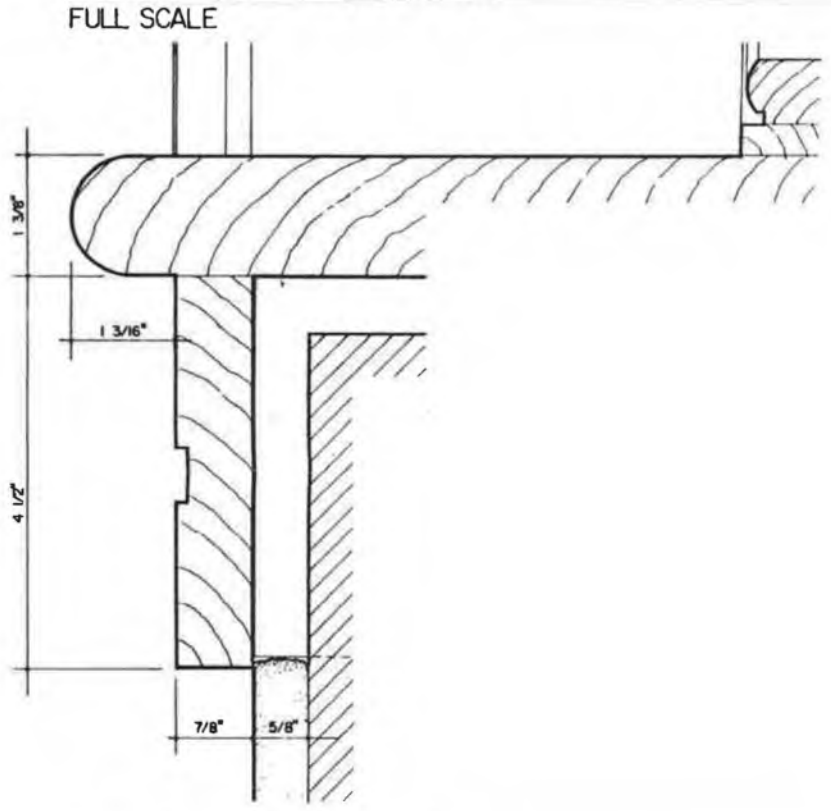
MOULDING SET "C" INTERIOR JAMB

FULL SCALE



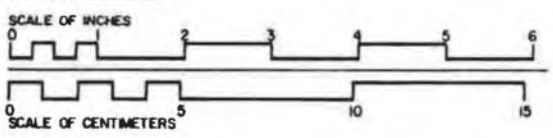
MOULDING SET "B" INTERIOR SILL

FULL SCALE



MOULDING SET "C" INTERIOR SILL

FULL SCALE



DRAWN BY: DAVID AMUNDSON AND MELISSA COHEN, 1995

209

NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

NAME AND LOCATION OF STRUCTURE

CLIFTON FARM HOUSE (WORTHINGTON HOUSE)

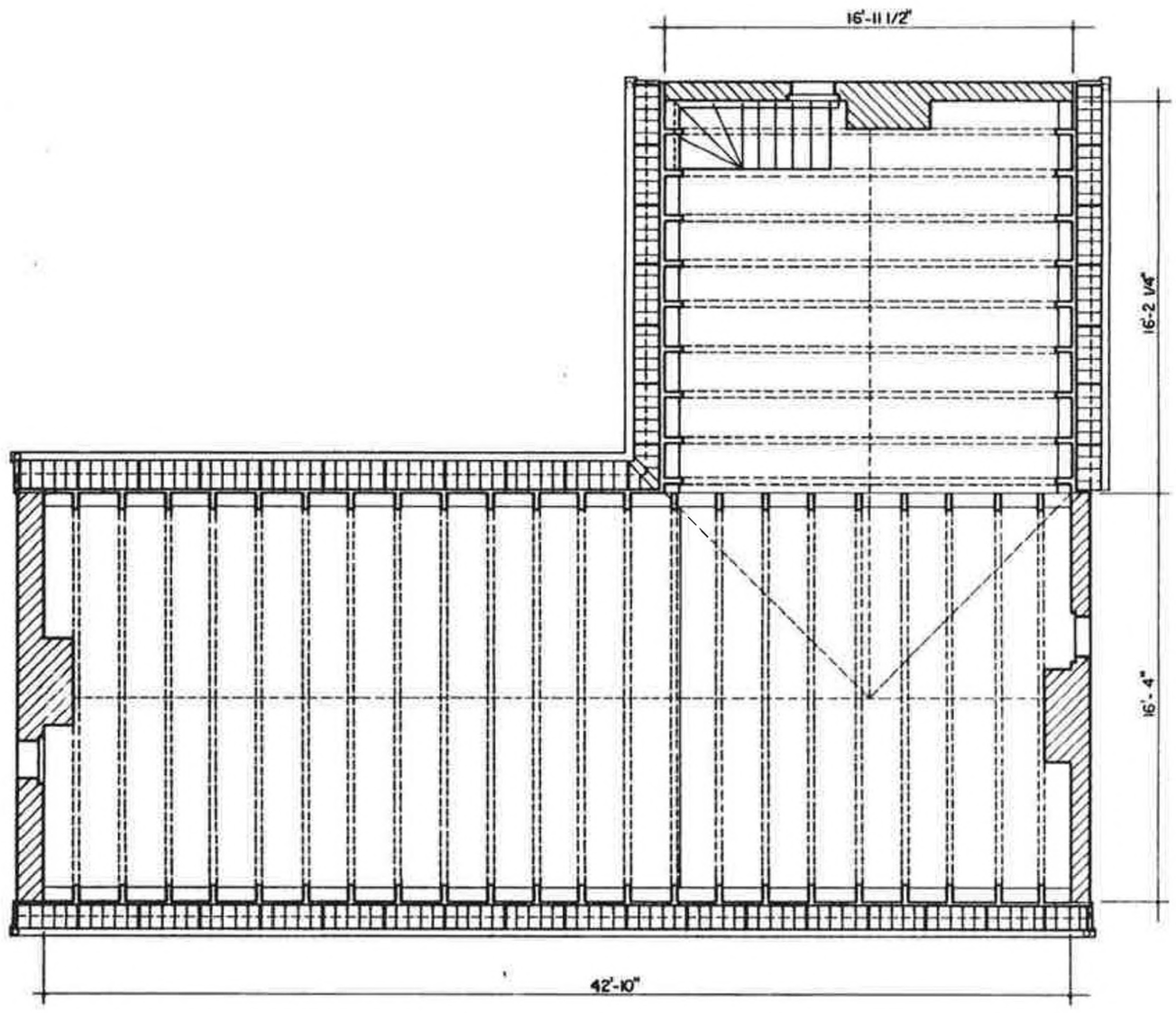
3/4 MI. NORTH OF BAKER VALLEY ROAD · FREDERICK VICINITY · FREDERICK COUNTY · MARYLAND

SURVEY NO.

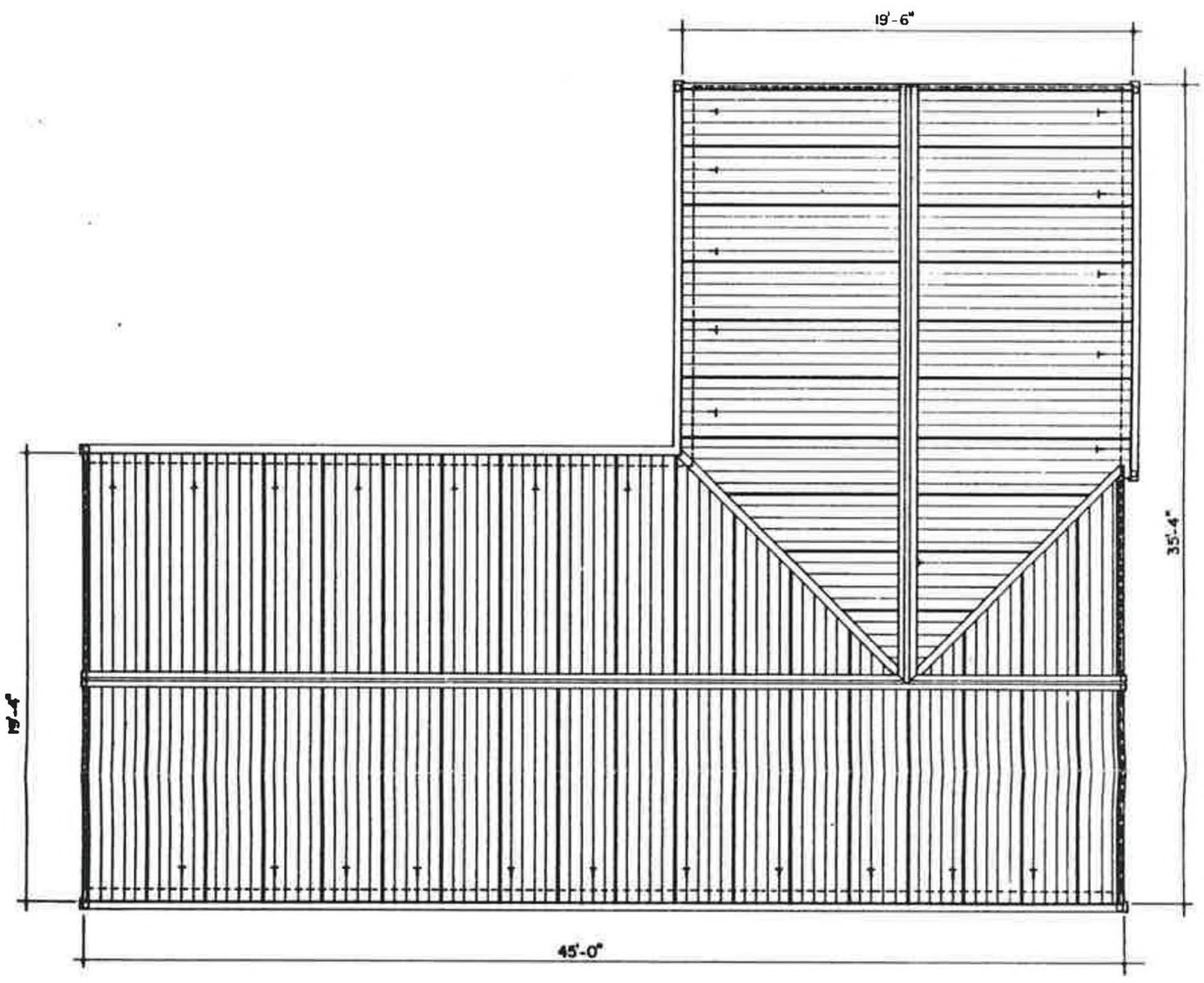
HISTORIC AMERICAN BUILDINGS SURVEY

SHEET 5 OF 6 SHEETS

IF REPRODUCED, PLEASE CREDIT HISTORIC AMERICAN BUILDINGS SURVEY, NATIONAL PARK SERVICE, NAME OF DELINEATOR, DATE OF THE DRAWING.



ATTIC PLAN



ROOF PLAN

SCALE OF FEET 1/4"=1'-0"
0 5 10 15
0 1 2 3 4
SCALE OF METERS 1:48

DRAWN BY: DAVID AMLINDSON, 1995

211

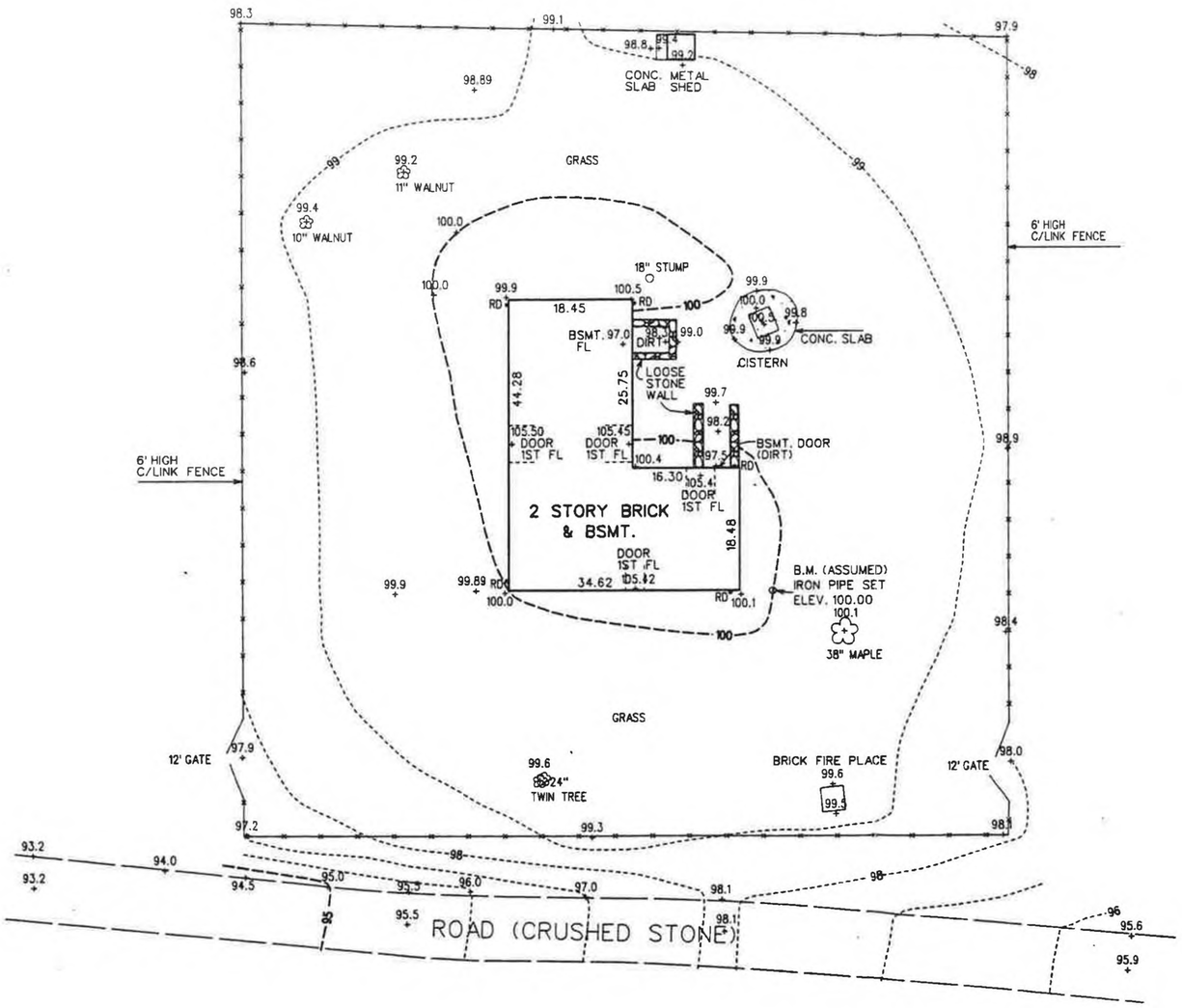
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

NAME AND LOCATION OF STRUCTURE
CLIFTON FARM HOUSE (WORTHINGTON HOUSE)
3/4 MI. NORTH OF BAKER VALLEY ROAD · FREDERICK VICINITY · FREDERICK COUNTY · MARYLAND

SURVEY NO.

HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 6 OF 6 SHEETS

IF REPRODUCED PLEASE CREDIT HISTORIC AMERICAN BUILDINGS SURVEY, NATIONAL PARK SERVICE, NAME OF DELINEATOR, DATE OF THE DRAWING



NOTES

1. TOPOGRAPHIC SURVEY WAS PERFORMED BY ASSOCIATED ENGINEERS. INC. DURING JUNE 1994.
2. SPOT GRADES AND CONTOURS ARE BASED ON AN ASSUMED DATUM.

10 0 10 20
SCALE: 1"=10'

ASSOCIATED ENGINEERS, INC.
8555 SIXTEENTH STREET
SILVER SPRING, MARYLAND 20910
TEL. 301-589-7311

DESIGNED:
DRAWN:
TECH. REVIEW:
DATE: /

SUB SHEET NO. C1

TITLE OF SHEET
WORTHINGTON HOUSE
SITE PLAN

MONOCACY NATIONAL BATTLEFIELD

DRAWING NO. —

PKG. NO. —

SHEET 213 OF —

APPENDIX F:
MAPS AND ILLUSTRATIONS

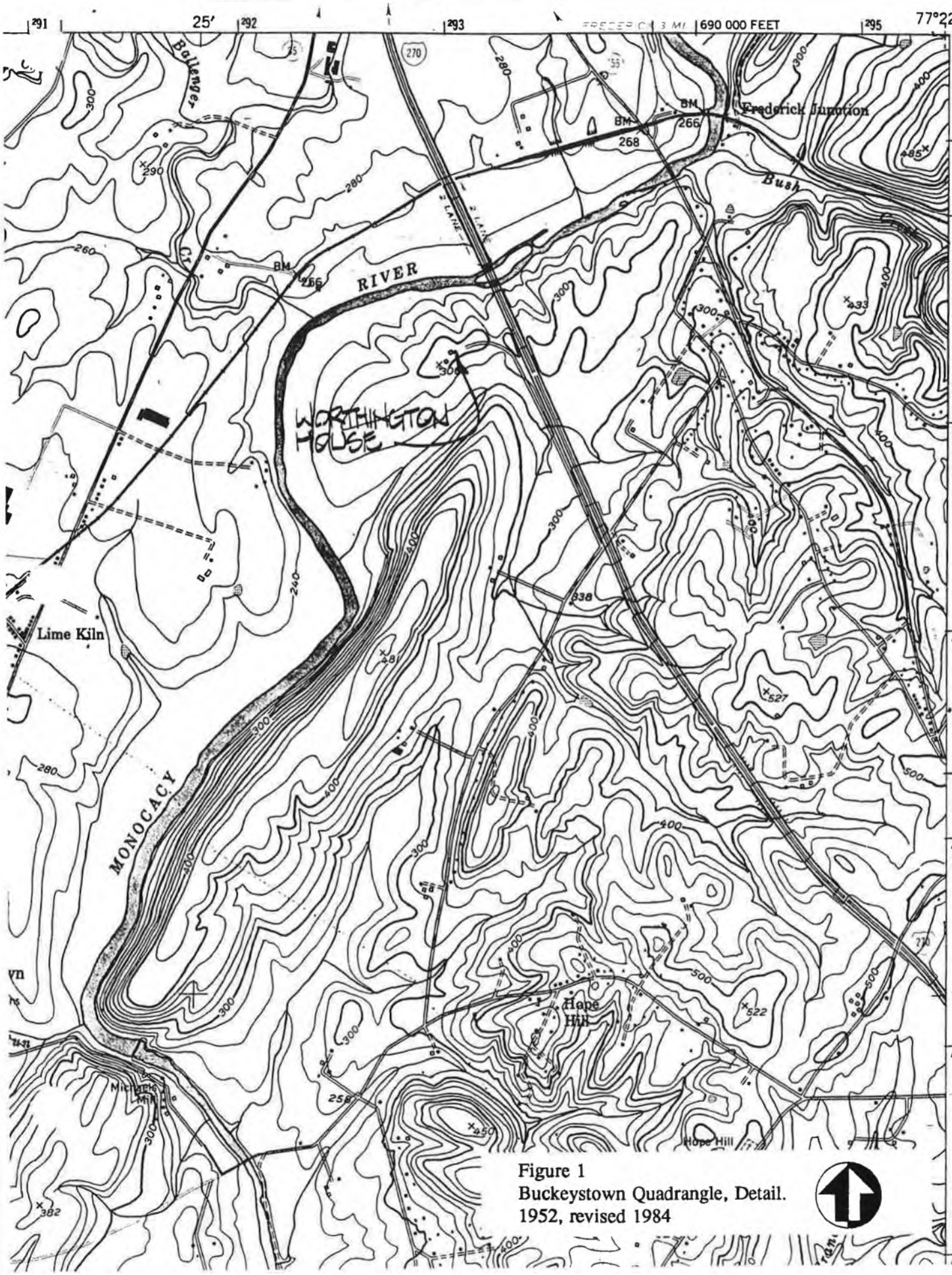


Figure 1
Buckeystown Quadrangle, Detail.
1952, revised 1984

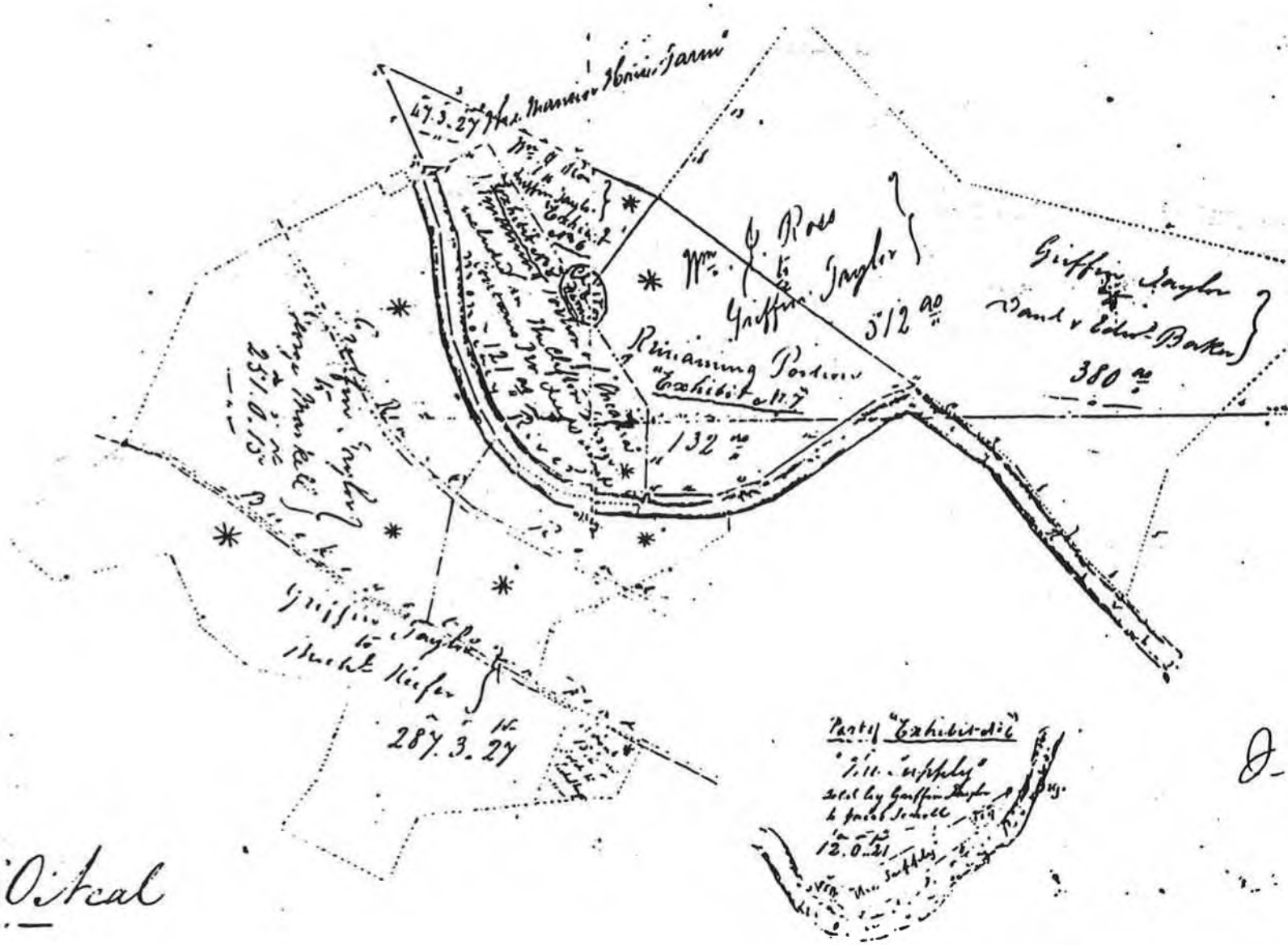


Figure 2
1856 Plat of Farm
From HABS No. MD-1052, page 43.

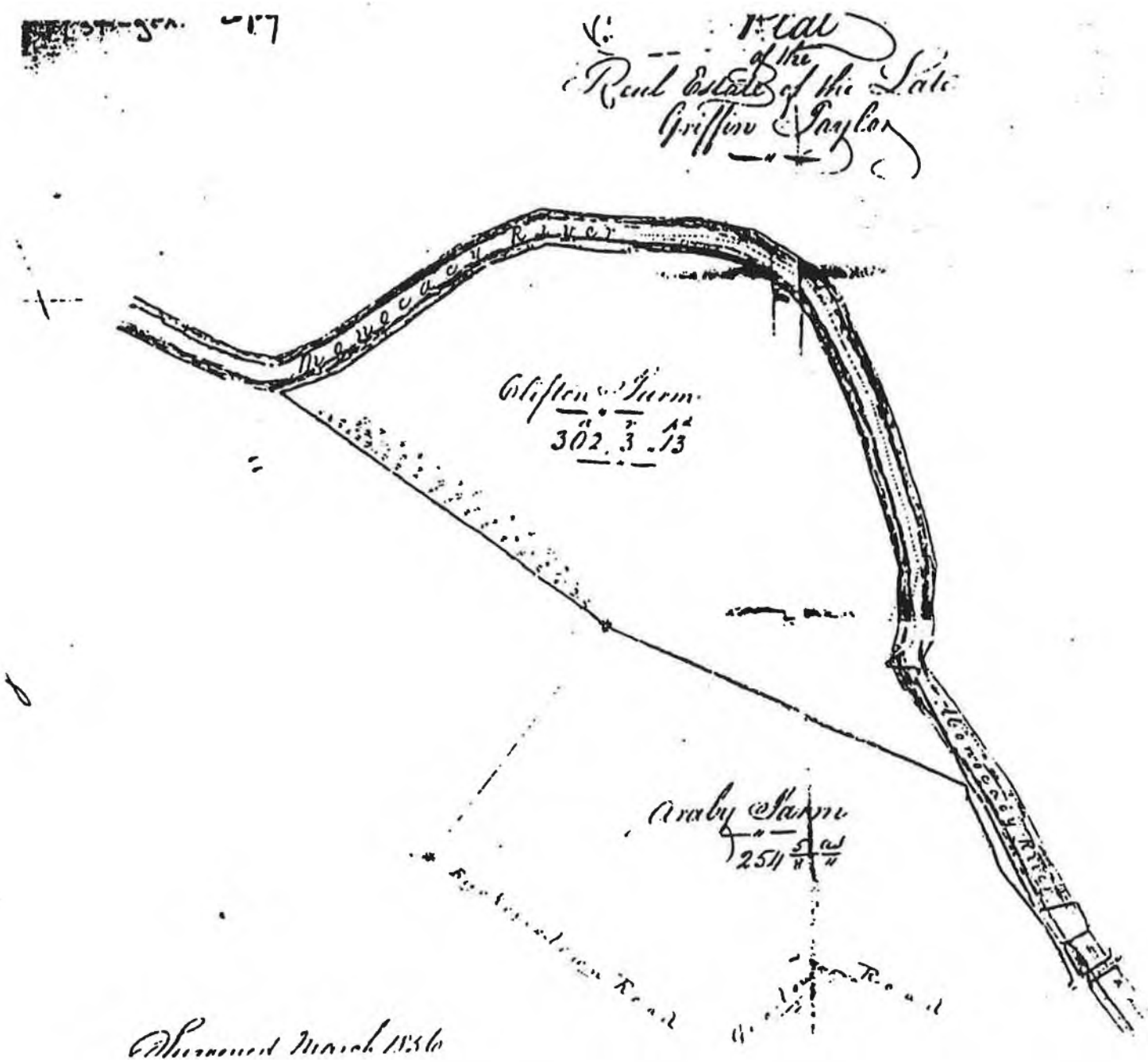


Figure 3
1856 Plat of Farm
From HABS No. MD-1052, page 44.

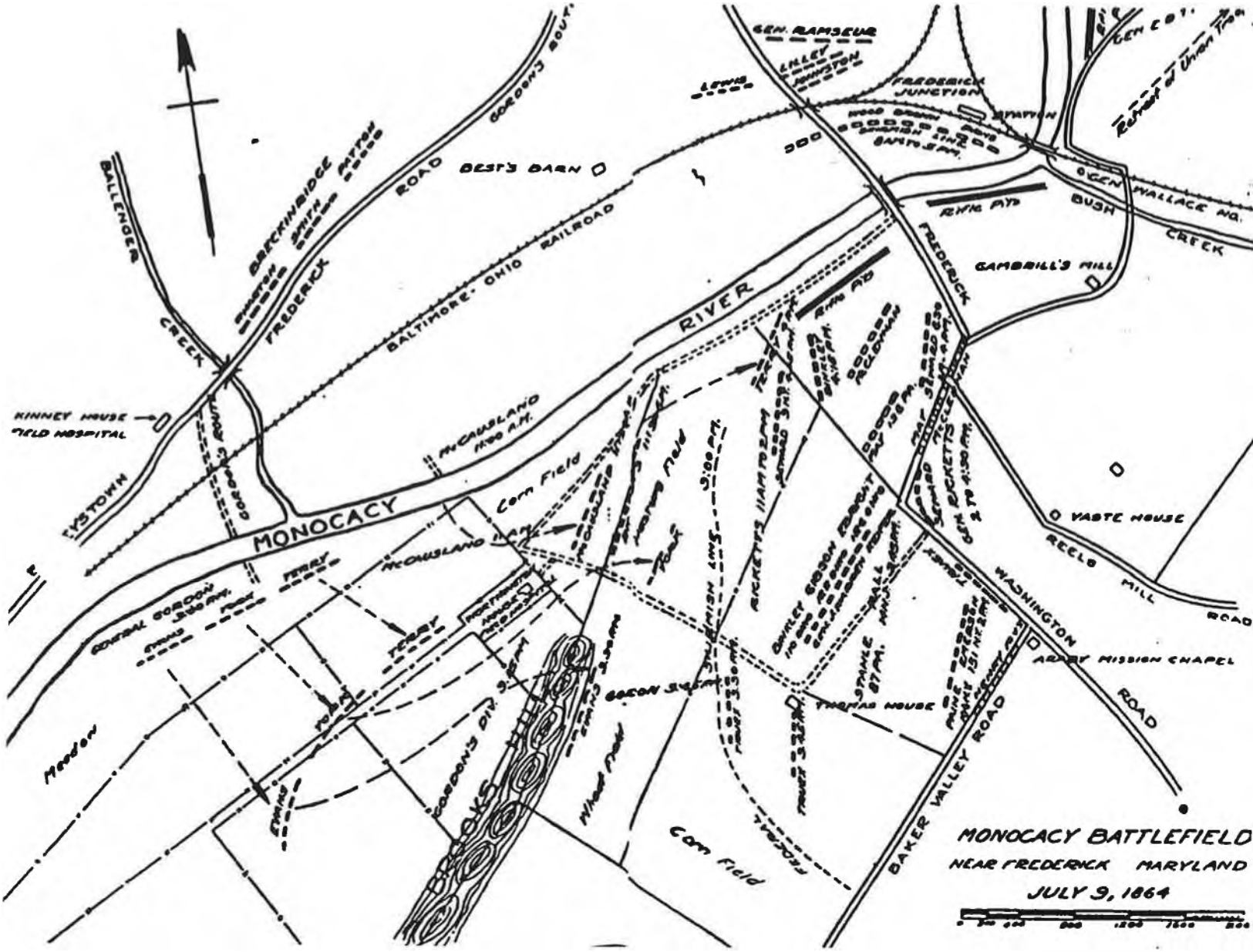


Figure 4
Map of Battle of Monocacy
From Glenn Worthington, Fighting for Time, endsheet.

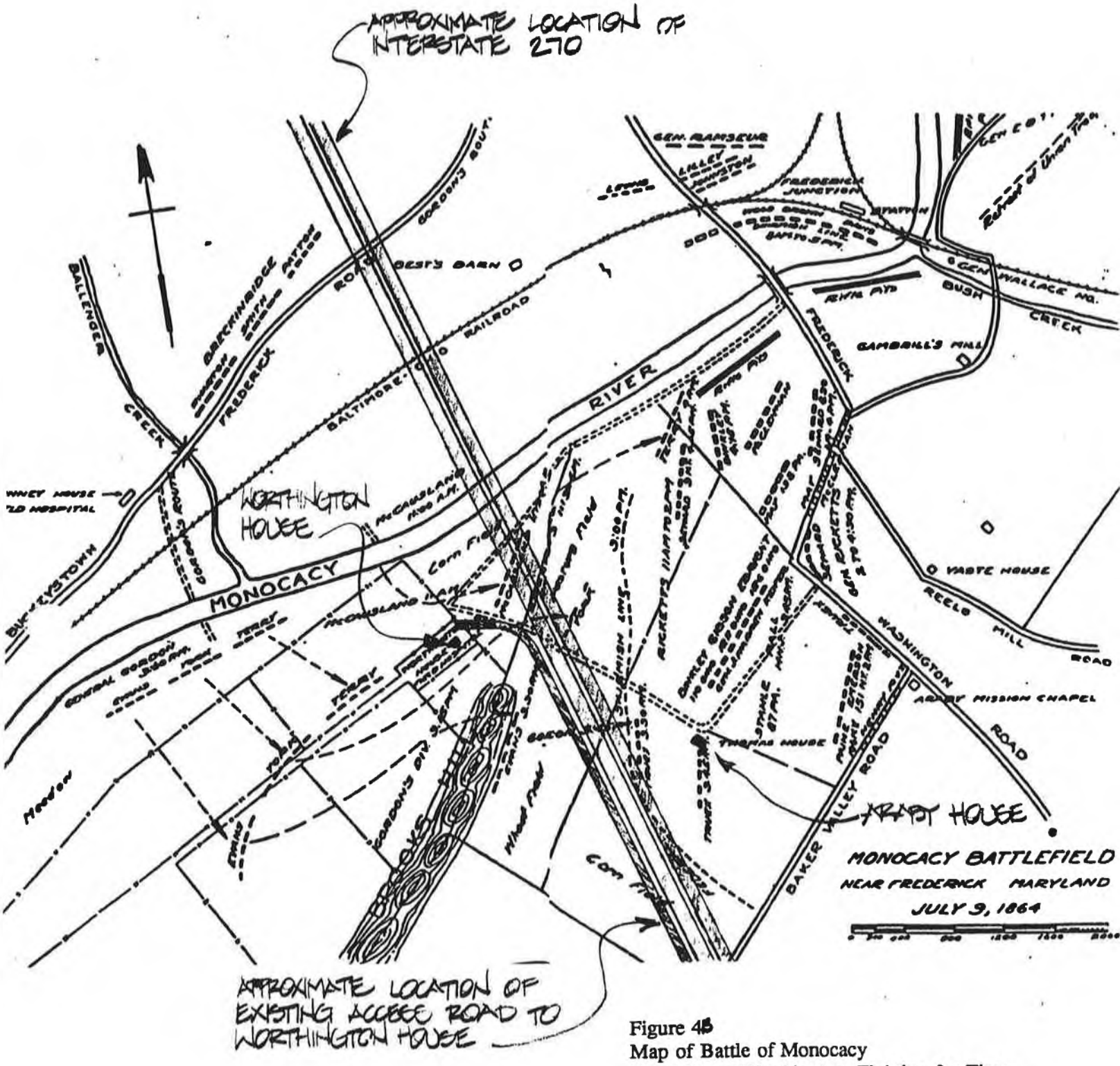


Figure 45
Map of Battle of Monocacy
From Glenn Worthington, Fighting for Time, endsheet, with modern context.

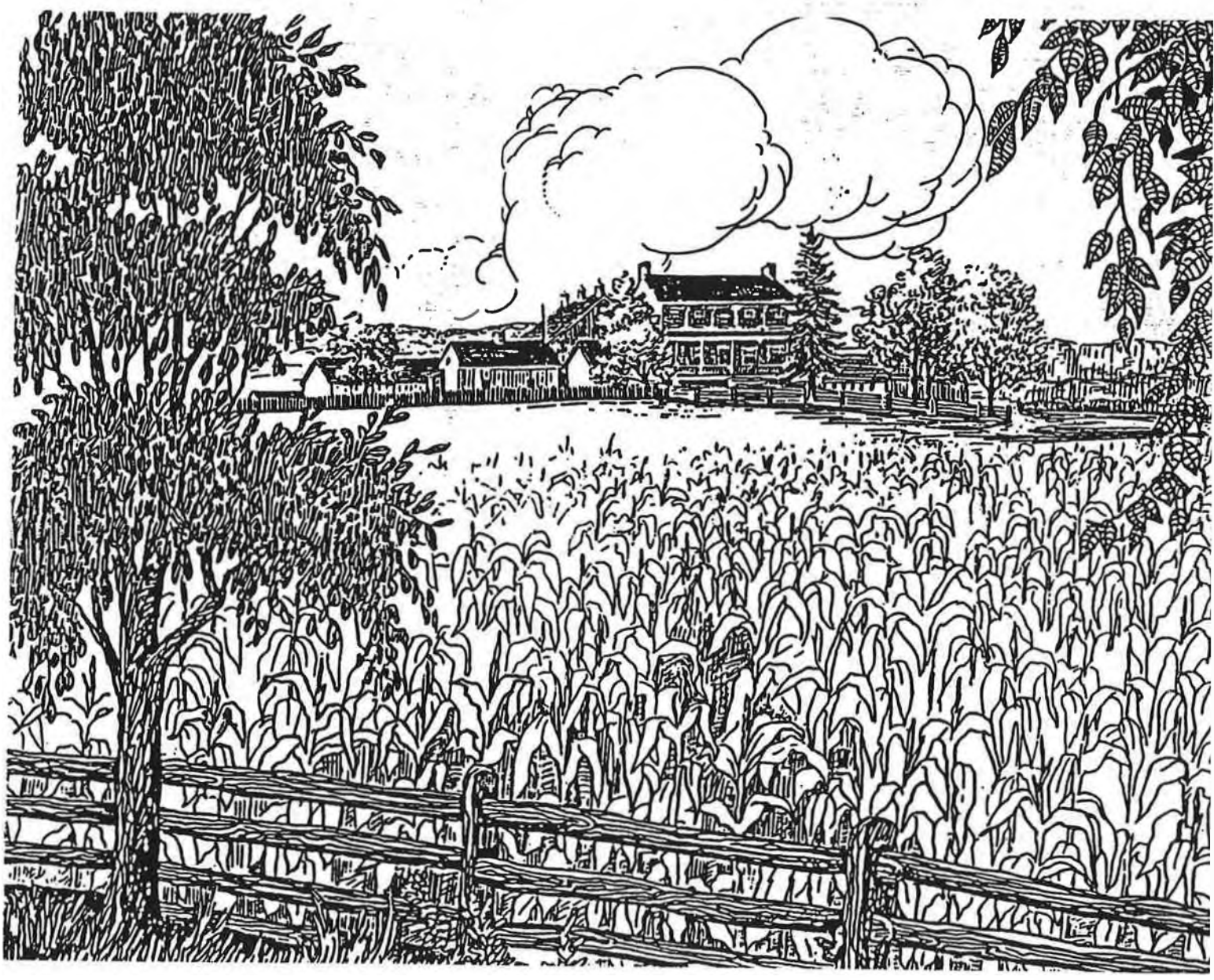


Figure 5
Drawing of Worthington Farm, circa 1930,
by Helen Smith
From HABS No. MD-1052, page 47.





Figures 6 and 7
Philip Pry House, Antietam Battlefield
Photograph at time of Civil War (top),
and 1959 (bottom), showing changes to porch.
Photos from Antietam Visitor Center Library.

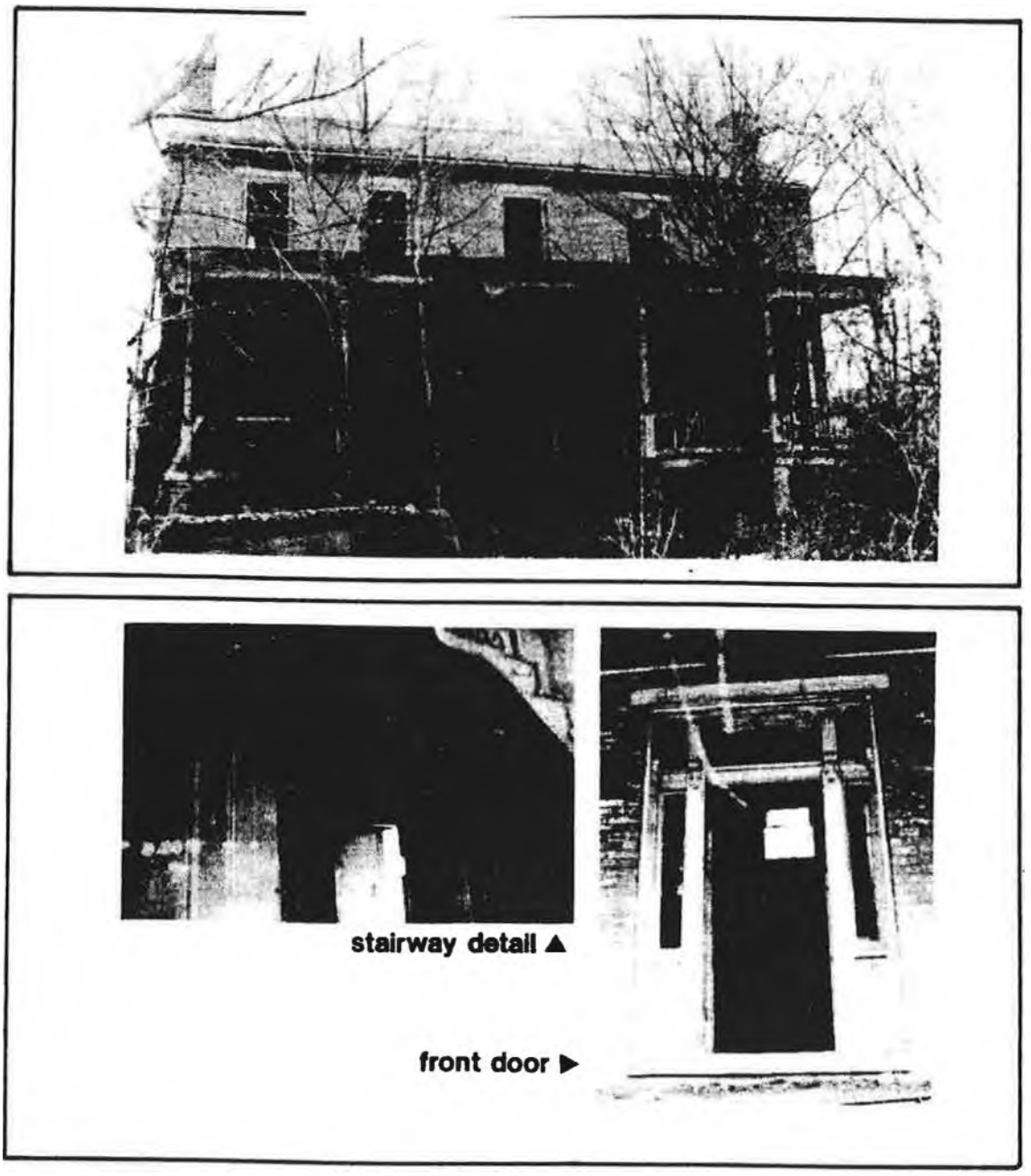
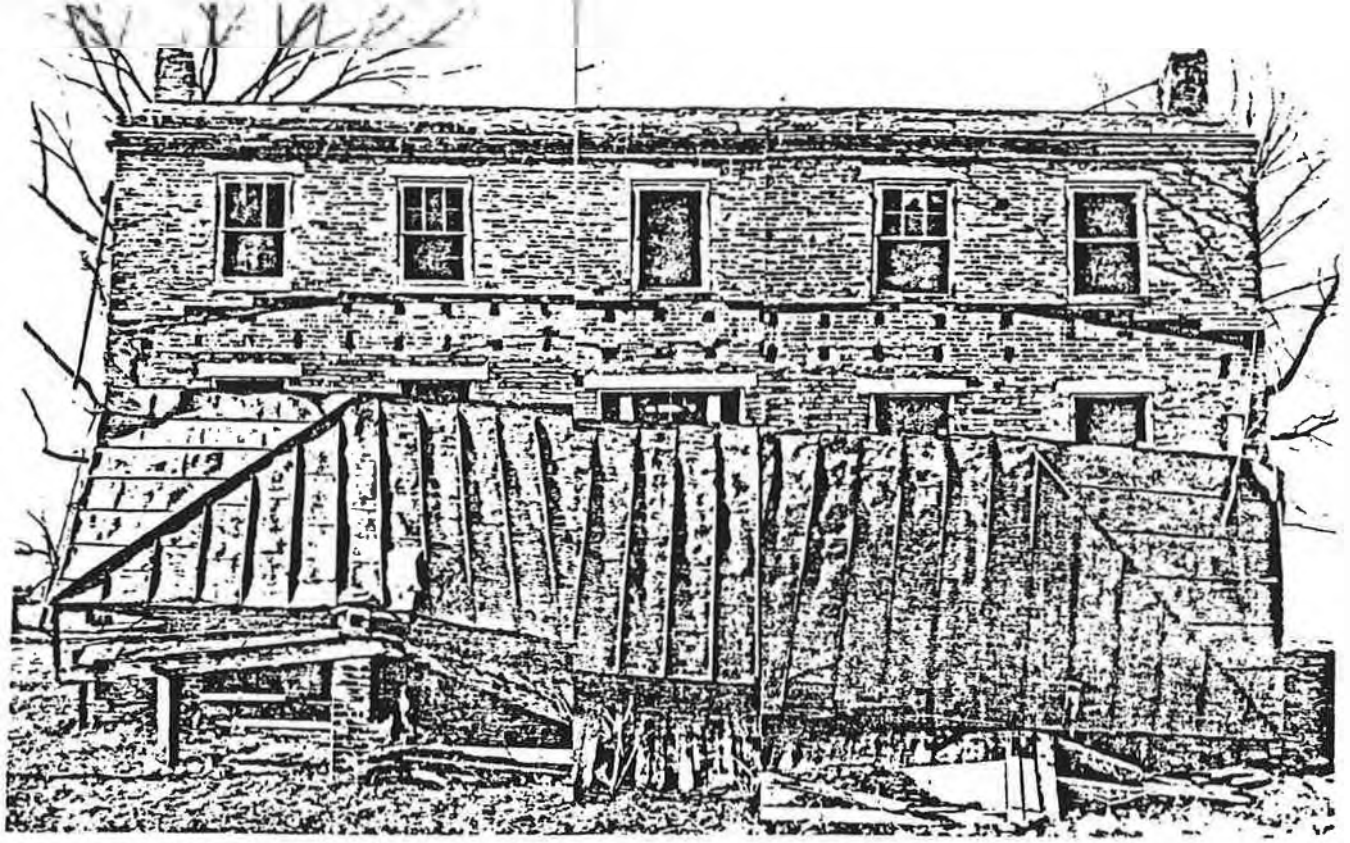
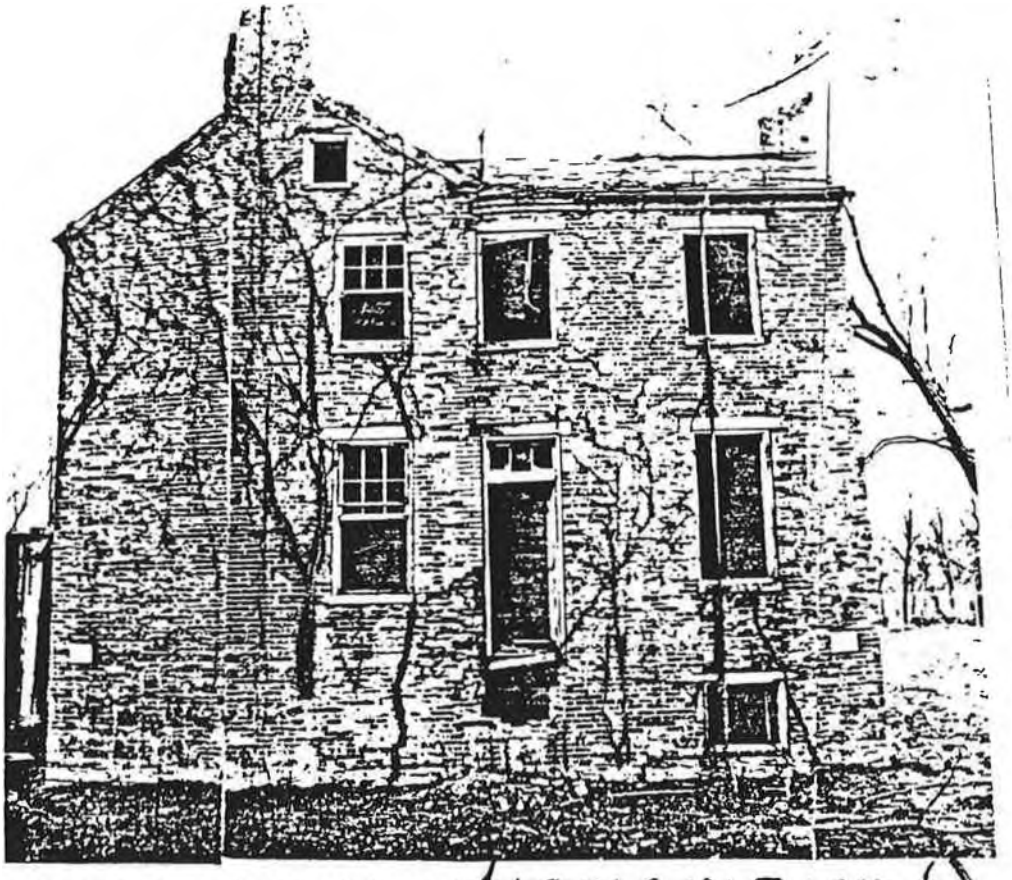


Figure 8
1979 Photos of Worthington House
From Miller, Wihry & Lee, Inc. Assessment of the Alternatives...



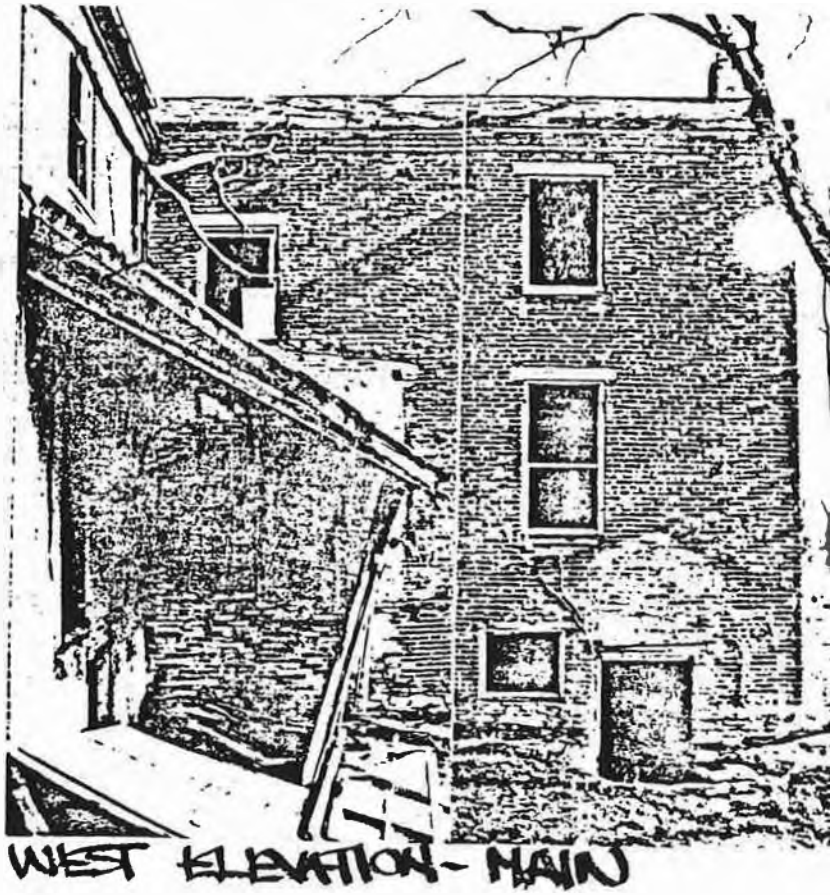
EAST ELEVATION



NORTH ELEVATION (NORTH GABLE END & NORTH ELEV. MAIN)

Figure 9
1983 Photos of Worthington House
From Thomas A. Vitanza, "Project File..."







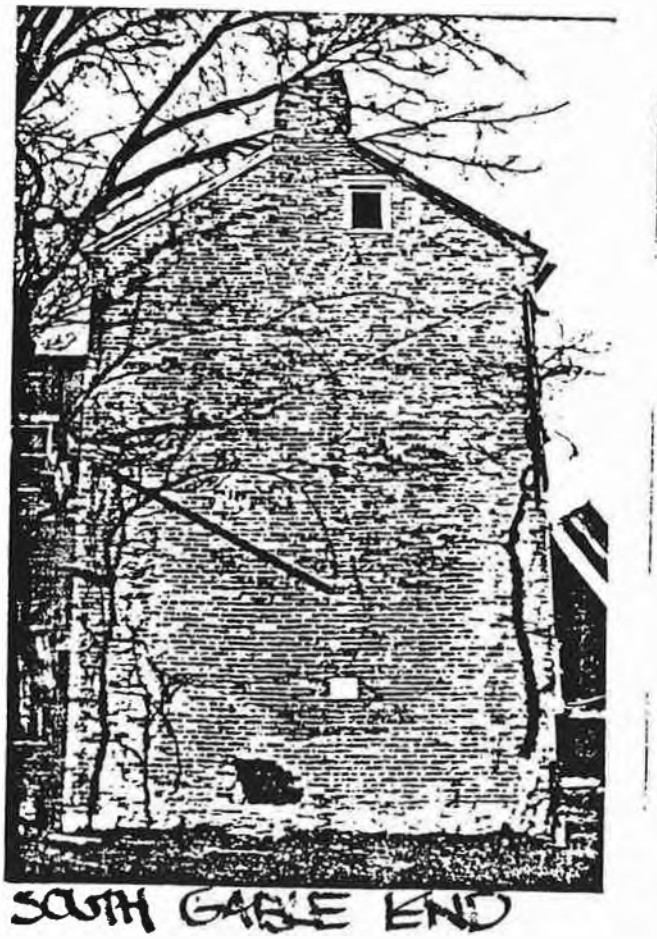


Figure 9 (continued)
1983 Photos of Worthington House
From Thomas A. Vitanza, "Project File..."

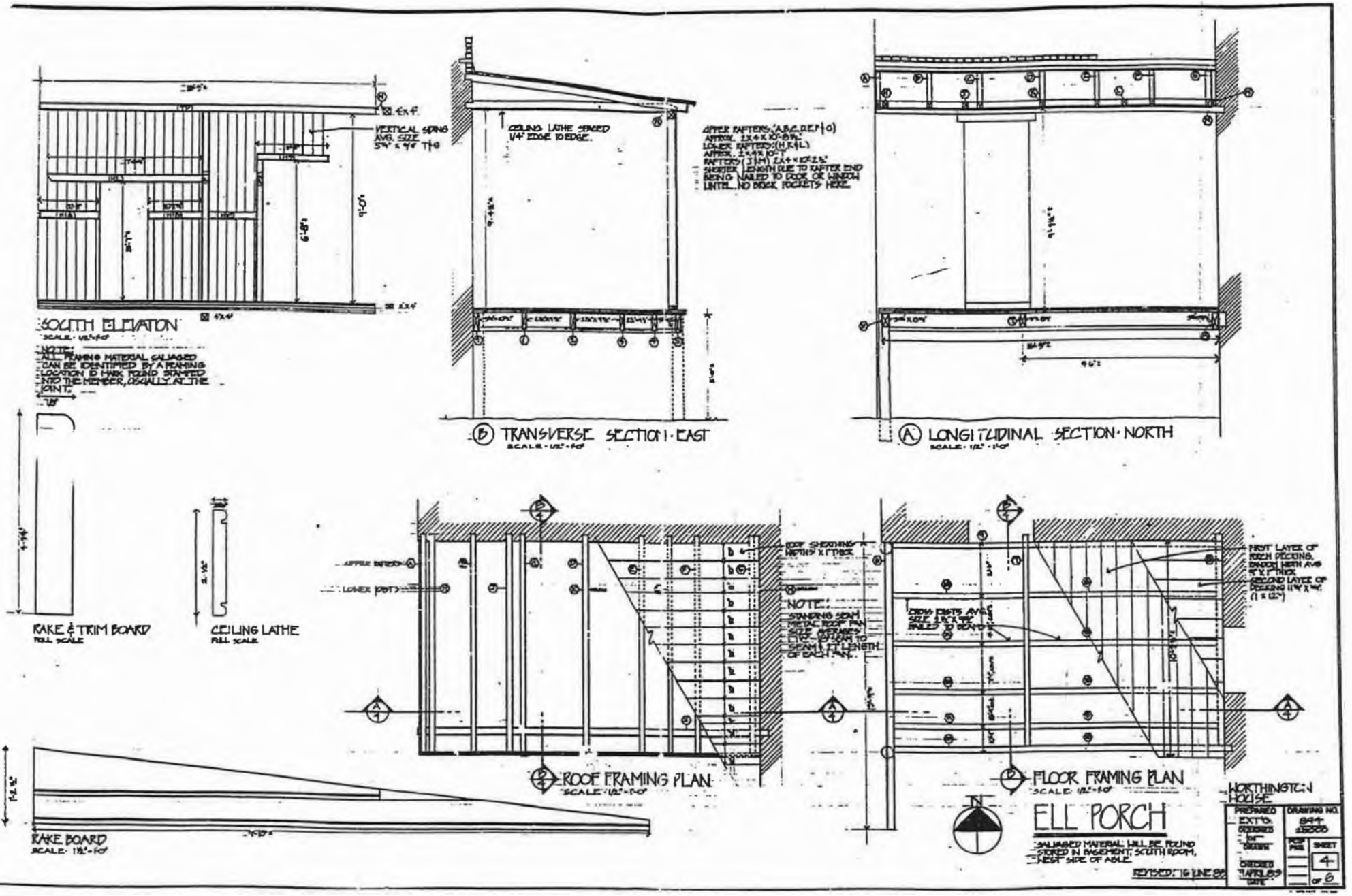


Figure 13
Dismantling drawings of porches, 1983
From Thomas A. Vitanza, "Project File..."

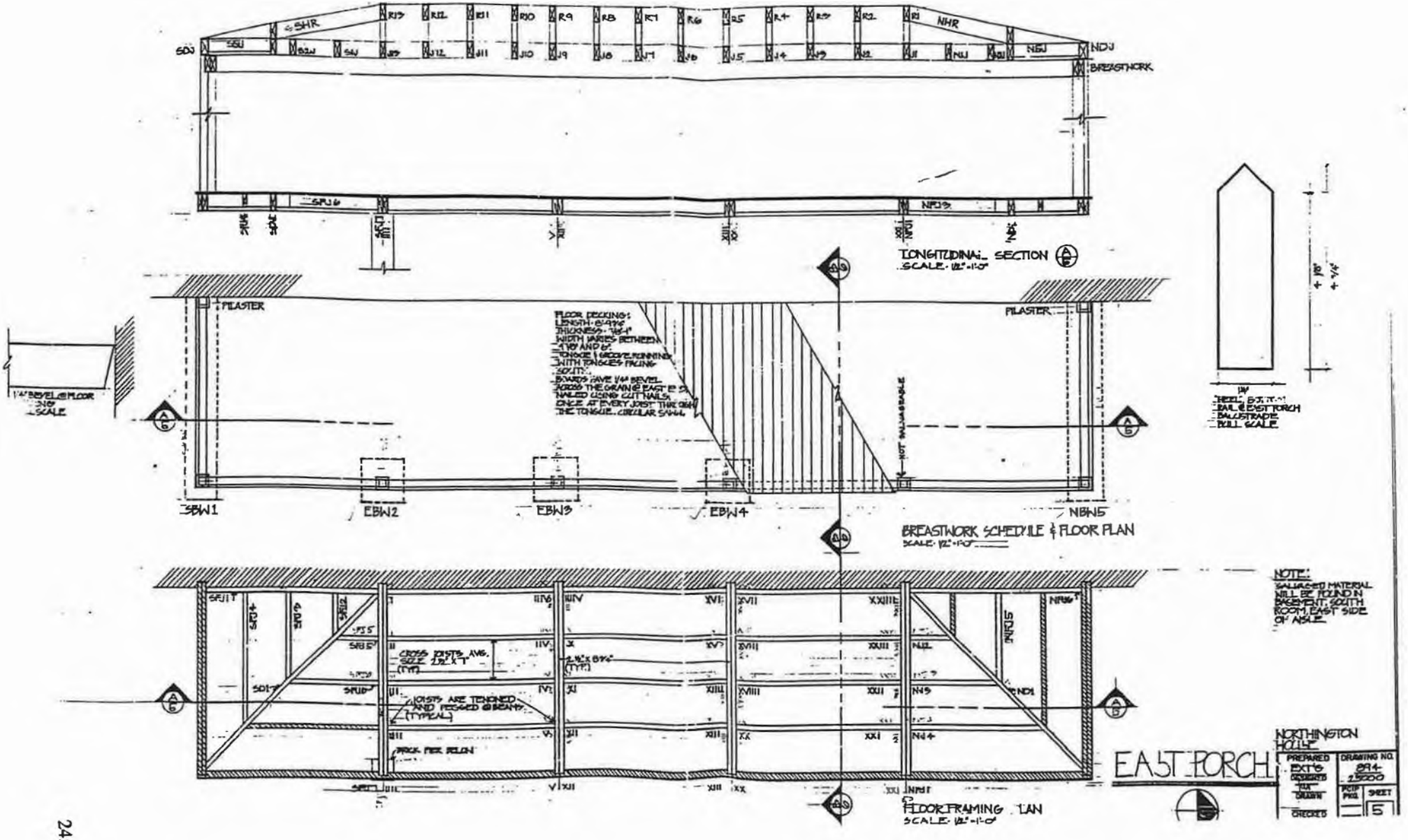
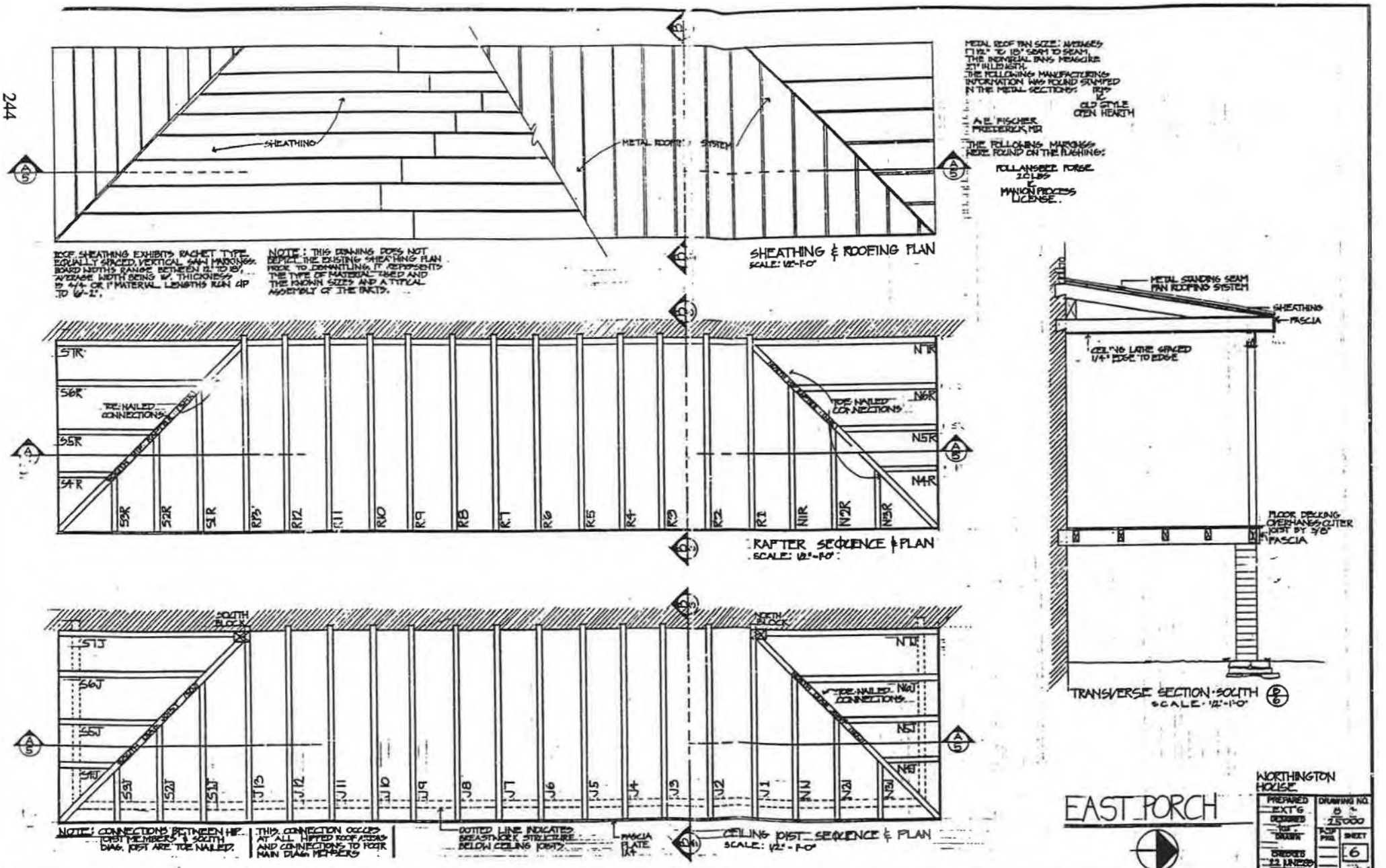


Figure 13 (continued)
Dismantling drawings of porches, 1983
From Thomas A. Vitanza, "Project File..."

Figure 13 (continued)
Dismantling drawings of porches, 1983
From Thomas A. Vitanza, "Project File..."



APPENDICES

APPENDIX A:
THE BATTLE OF MONOCACY

APPENDIX A: THE BATTLE OF MONOCACY

In early July, 1864, 18,000 Confederate troops under the command of Lieutenant General Jubal Early crossed into Maryland at Harper's Ferry and began marching towards Washington. Early and his troops had left Staunton, Virginia on June 28 on a campaign intended to capture the capital city and to divert Federal troops from Lee's army at Petersburg, Virginia. By July 6, General U.S. Grant dispatched troops to Washington to stop Early's assault on the capital.

Grant's diversion of troops was almost too late to effectively stop the Confederate assault on Washington. A mix of 2,300 untested recruits, trainees and local militia under Major General Lew Wallace, the commander of a Baltimore administrative district, were the only Federal forces between Early and the city of Washington. Wallace positioned his troops at the fords and bridges of the Monacacy River around Monocacy Junction Station to protect the roads and railroad lines to both Washington and Baltimore, since it was not clear which direction Early was headed. By July 8 the first Federal reinforcements, 3,500 troops under the command of Brigadier General James B. Ricketts, arrived by rail at Monocacy Junction Station. By that time, Wallace's troops were skirmishing with Early's advance guard in the countryside west of the Monocacy River, and Early's forces were camped south of Frederick, only a few miles north of the junction.

On July 9 Early's Confederate forces moved out from Frederick in different directions to try to ascertain the location and strength of the Federal armies (see battlefield maps, Appendix F). General Robert Rode's division went east on National Road and soon clashed with Federal troops. General Dodson Ramseur's division moved south down Georgetown Pike and met Wallace's troops defending the covered bridge and the railroad junction.

General Wallace's troops were able to hold out against the Confederate advance at the bridges and railroad junction where they had set up defenses. Reinforcements were arriving to bolster Wallace's small force, but the Confederate forces coming from the north still greatly outnumbered them.

Confederate General John McCausland's calvary brigade was sent south on Buckeystown Road to try to find another place to cross the river and to outflank the Union defenses. They succeeded in finding the Worthington-McKinney Ford which crossed the Monocacy River onto John Worthington's farm. McCausland's brigade crossed to the east side of the Monocacy River and began fighting veteran troops of General James B. Ricketts, who had just arrived on the battlefield by rail. McCausland fought Rickett's Skirmishers for three hours before reinforcements sent by Early found the ford and joined in the battle.

Between 3,500 and 4,000 Confederate troops crossed the Monocacy River at the Worthington-McKinney Ford and marched across the Clifton Farm past the Worthington House. To the east of the Worthington House, near the boundary of the farm owned by C.K. Thomas and in the area where Interstate 270 now passes, the Confederate troops met the full force of the 3,000 to 3,500 Union troops under General Rickett's command. They

battled from 11:00 am to 4:00 pm, with the battle lines moving back and forth between the Thomas farm and the Worthington farm. Eventually the Confederates prevailed, due to greater artillery forces and an outflanking maneuver which drove the Federal troops from a commanding position at the top of a hill on the Thomas farm.

Around 1,300 of Early's Confederate troops were killed or wounded in the battle, and Wallace's Federal army retreated back towards Baltimore, leaving over 1,600 dead, wounded or captured. With Wallace's army eliminated, Early set out the next day for Washington, and arrived there a day later. By then, however, it was too late for Early, as Federal troops had arrived in sufficient force to defend the capital city. Early fought briefly at Fort Stevens, but soon he abandoned his siege of Washington and returned to Confederate territory across the Potomac River.

In addition to the July 9, 1864 Battle of Monocacy fought on and near the Worthington House and Farm, the vicinity was also the site of other Civil War activity. In 1862, before the Battle of Antietam, both armies camped nearby within five days of each other, resulting in the discovery by the Union Army of Confederate campaign plans which had been left behind. "The Lost Order" gave the Union Army a tactical advantage at the Battle of Antietam which they couldn't have had otherwise. Union troops camped nearby again in late June, 1863, just prior to the Battle of Gettysburg. In August 1864 Union Generals Grant and Sheridan met at the adjacent Araby Farm Mansion to plan the Shenandoah Valley Campaign.

APPENDIX B:
PAINT ANALYSIS

APPENDIX B: PAINT ANALYSIS

Paint analysis at the Worthington House was limited to observation of the paint on the exterior of the house as an aid in determining if the front porch was original to the house, and analysis of the decorative paint on the interior of the house to determine its medium and condition. The analysis included on-site examination of the paint layers and removal of paint samples for off-site examination. Also consulted was the Paint Analysis, Appendix VI, from the 1983 "Project File, Exterior Preservation of the Worthington House."

A scalpel was used to expose paint layers for on-site observation, and a hand-held 7x lens was used to view the paint. Paint samples of the porch trim, front door frame and interior decorative paint were removed for observation off-site under stereoscopic magnification with 3200 degree Kelvin illumination. Observations of the coatings were limited to visual descriptions of the finishes, such as paint, graining or lime wash. The paint layers were described using common names, and were recorded chronologically on the attached charts. Testing of the interior decorative paint was performed to determine the type of paint used in the house.

EXTERIOR PAINT

The exterior of the Worthington House received extensive stabilization and repair in 1983. The 1983 work included dismantling the front porch and storing it in the basement of the house, repairing and rebuilding portions of the brick walls, and repair, replacement and painting of the wood windows, doors and frames. This work also included extensive analysis of the paint and mortar in the building. Even though the 1983 work removed and refinished a large amount of original material, evidence of original paint layers was still found.

Based on the quality of the brickwork, it appears that the original intention was for the brickwork not to be painted. The brickwork on the front (east) elevation is of higher quality than the masonry work of the other elevations (see Photos 1 through 7). On the east elevation, the coursing of the brick is uniform and the color of the brick is even. On the north, south and west elevations of the house discolored brick, glazed headers and less attention to coursing are visible. If the original intention had been to paint the brick, the higher quality of the masonry work at the east elevation would not have been necessary. Even though the original intention was probably not to paint the brick, evidence of paint exists on the surface of the masonry. Remnants of several layers of yellow ochre paint were found at the east, north and south elevations. The remnants of a layer of brick red paint was found over the yellow ochre paint and on the west elevation. The corbeled brick cornice of the building has numerous layers of white paint. The masonry walls adjacent to the dismantled ell porch were painted with several layers of various colors of paint. The masonry walls below this porch were painted with several layers of whitewash. The 1983 paint analysis identified these paint layers.

The wood door frame at the east entry and the trim of the front porch have almost the same sequence of paint layers (see the attached paint chart). The original paint color was cream, followed by dark red-brown and off-white. According to the 1983 paint analysis, other wood trim was painted the same sequence of colors.

CONCLUSIONS- EXTERIOR PAINT

The similarity of the paint sequences on the windows, doors, porch and other wood trim indicates that there was not a long period of time between the construction of the different parts of the house. The south section, which made up the initial 2/3 plan house, the north rooms, and the porch were all constructed within a short period of time. The paints used on all the different exterior wood elements of the house were closely matched as the different parts were completed.

The exterior of the house was originally unpainted brick, with the wood trim and porches painted a cream color, complementing the tan color of the mortar. The corbeled brick cornice also may have been painted cream. This scheme lasted until probably after the Civil War. The exterior brick on the east, north and south elevations was painted a yellow-ochre and the wood trim and porches painted dark red-brown. This was probably done at the same time to give the building a more up-to-date appearance during the last quarter of the 19th century. Later the brick was painted brick red and the trim was painted white and off-white.

INTERIOR DECORATIVE PAINT

The interior paint analysis was limited to the decorative paint in the stair hall and the south parlor. The paint finish in the stair hall and the south parlor represents one of the most significant features of the Worthington House (see Photos 14 through 18). This decorative painting is reputed to have been executed by Constantine Brumidi, muralist at the U.S. Capitol Building. Similar decorative paintings have been reported to be found in other Frederick County houses.[1] A comparison can be made between the painting at the Worthington House and known work by Brumidi, such as the Alsop House in Middletown, Connecticut and the U.S. Capitol building.[2] This comparison shows that the painting at the Worthington House is relatively crude and unrefined. It is doubtful that the artist responsible for the delicate and elaborate frescoes in these other projects would also have done the work at the Worthington House.

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[1]The attribution to Brumidi is from an anonymous, undated report for Frederick County Landmarks Commission, cited in Philip Edmund Pendleton, et al. "Clifton Farm (Worthington Farm, Riverside Farm) HABS No. MD-1052." Historic American Buildings Survey, Washington, DC, 1991.

[2]Photographs of the Alsop House frescoes are shown in Edward B. Allen, Early American Wall Paintings 1710-1850, 1926; rpt. Watkins Glen, New York: Century House, 1969.

In the stair hall the plaster walls are finished with hand painted murals imitating panel mouldings and raised panels. The painted panels are large and random size, dividing the walls into panels that extend from the floor to the ceiling. The panels do not relate to the interior elements of the space and are often interrupted by door and window openings. The field of the panels is grey-green with the wall outside the panel painted a slightly darker shade. The panel mouldings are painted with dark red-brown shadows and white highlights as if the light is coming from the east. The top of the wall has a border in a quatrefoil pattern.

The ceiling of the stair hall is painted with a dark grey-green border to match the wall, separated from a field of light green by two thin parallel blue-green lines. The center of the first floor stair hall ceiling has a small painted acanthus leaf ceiling medallion.

The stair hall door and window casings, stair trim, baseboard and doors are grained to simulate oak, matching the oak stair balusters. The raised panels of the doors are grained to simulate quarter sawn oak. The pine floor and stair treads are unfinished and the risers are painted to match the wall color.

The ceiling of the south parlor is more ornate than the stair hall ceiling. The top of the walls are painted with a version of the quatrefoil pattern, smaller than the quatrefoil pattern in the stair hall. The ceiling has a green border between the walls and a white panel moulding. A dark blue line runs parallel to the white panel moulding and defines the field of the ceiling. Painted in the center of the ceiling is a medallion consisting of four concentric rings of different colors around a stylized acanthus leaf pattern.

Paint analysis shows that there was only one tan paint layer under the decorative paint. This may have been the original paint color, a sizing coat or a color chosen to give the decorative paint depth and a warm hue. No dirt layer was found between the tan and the decorative paint, indicating that the decorative paint may have been installed soon after the completion of the building. The finish of the decorative paint is flat, and it appears to have been applied to the plaster after it had dried.

The paint was tested with several solutions to determine the type of paint used in the decorative paint. The paint had no reaction when tested with solvents and thinners, indicating that the paint is not oil-based. However, the paint bubbled and completely dissolved when tested with muriatic acid. The bubbling reaction observed when muriatic acid was applied to the paint was the reaction between the acid and calcium carbonate, which is the basic pigment (whiting) in water-based paints such as distemper or tempera. These paints were commonly used for decorative work on plaster. In addition to water, whiting and pigments, glue or egg white was often added to distemper paints to improve adhesion and to allow the paint to hold a darker pigment. Milk-based casein paint will also dissolve in muriatic acid, however casein paint is known to be tenacious and difficult to remove, which is not the case with the existing decorative paint.

The decorative paint is in poor but stable condition. The surface of the decorative paint is soiled and has areas of pencil graffiti. Minor cracks in the plaster walls are seen in the decorative paint. The major damage to the decorative paint is due to water damage, primarily at the stair landing where 2/3 of the plaster at the west wall has been removed

or severely damaged. Roof leaks in other areas have caused the paint to peel. The decorative paint has also been damaged by the removal of the interior trim and partitions, and by the installation of light fixtures in the ceiling. The loss of adhesion and flaking of the decorative paint occurs over its entire surface. Small flakes of paint (approximately 1/16 inch square) can be loosened and brushed by hand from the surface of the wall. Both the decorative paint and the tan base coat flake off, indicating loss of adhesion between the plaster and the first coat of paint.

INTERIOR DECORATIVE PAINT CONCLUSIONS

The decorative paint is an original or early addition to the interior decoration of the house. Although the decorative paint is severely damaged in various locations, the remaining sound decorative paint is stable. If the decorative paint is maintained in its existing environment and protected from abrasion, excess humidity, moisture and condensation, significant deterioration should not take place. Restoration and rehabilitation of the interior of the building should address the preservation of the decorative paint and the graining on the wood trim.

ADDITIONAL RESEARCH

Documentation of the decorative paint should be performed to determine the components of the paint, including investigation into the type of glue or protein binder used. Color analysis should be performed on clean paint samples to determine the original colors. The design of the painting should be documented, using photography and full-size patterns.

The attribution of the work to Constantine Brumidi should be clarified and documented. Review of existing documentation as well as original research on Brumidi, his known work and his career, and study of the other decorative paintings in other Frederick County houses would help to assess this assumption.

FRONT DOOR FRAME.		PORCH BRACKET.				MISC.			
WOOD		WOOD.				PLASTER WHITE			
~~OFF~~ WHITE/CREAM	=	~~OFF~~ WHITE/CREAM				TAN.	SIDING?		
							(NO DIRT)		
~~OFF~~ WHITE CREAM	=	~~OFF~~ WHITE CREAM				MURAL Colors.			
DARK RED/BROWN	=	DARK RED/BROWN.							
OFF WHITE	← DIRT	OFF WHITE	← DIRT						
OFF WHITE									
OFF WHITE/YELLOW	← DIRT	OFF WHITE/YELLOW	← DIRT.						
OFF WHITE	← DIRT	OFF WHITE							
OFF WHITE	← DIRT	OFF WHITE							
GREENISH WHITE	← DIRT								
			WHITE						
WHITE	PRIMER								
~~OFF~~ WHITE/CREAM.									

APPENDIX C:
HARDWARE ANALYSIS

APPENDIX C: HARDWARE ANALYSIS

Analysis of the hardware of the Worthington House was performed to verify the construction date of the building and to aid in discovering changes and alterations to the building. The hardware is consistent with the date of construction of the building circa 1850. Although much of the original hardware and the trim to which it was attached has been removed, most of the remaining hardware is original.

NAILS AND SCREWS

The nails found in original portions of the building are cut nails, consistent with the period of construction of the house. Most of the framing and trim was attached using large, 2 13/16 inch long common nails. The nails are sheared out of 1/8 inch thick steel and are 1/16 inch wide at the point and 7/32 inch wide at the top of the shank. The nail heads are crudely formed, roughly square, and slightly off center of the shank. This type of nail was found in the house in the framing, to attach door casings and wood mantels to the masonry walls, for framing and for blind nailing the tongue and groove wood flooring. These nails were also found in the face nailing of the tongue and groove horizontal siding in the back parlor and in the porch framing. Cut nails of this type were available as early as 1830's.[3]

Three different sizes of finish cut nails were found in the Worthington House. Large cut finish nails were used to attach the stair tread return moulding to the stair tread. These nails are 2 15/16 inches long with a 1/16 inch wide point and a 5/32 inch wide at the top of the shank. The head is a neatly formed 3/16 inches square. Die and shear marks on the shank of the nail are similar to the marks on the long common nails, indicating that they may have come from the same nail manufacturer. Smaller cut finish nails were used for attaching the wood door casings to the wood door jambs and for attaching the wood trim on the porch. These nails were cut from 3/32 inch thick plate and taper from 1/8 inch at the top of the shank to less than 1/16 at the bottom of the shank. The heads were uniform and slightly larger than the shank of the nail. Small cut finish nails were used to attach the thin wood moulding on the open stringer of the stair. This nail is 15/16 inches long and sheared out of 3/32 inch thick plate. The point of the nail is square and the nail tapers to slightly more than 1/16 inch at the top. The head of the nail is 1/8 inch by 1/16 inch. Finish nails used in exposed locations were set and the holes were puttied prior to finishing. These types of cut finish nails were available in the late 1830's.

1 1/4 inch long lath nails are used to attach the pine, circular sawn lath. The wood lath varies from 1 1/4 to 1 1/2 inches wide and 3/8 to 1/2 inches thick. The lath nails are cut from 1/16 inch plate and taper from 1/32 inch at the point to 3/32 inch at the midpoint

[3]Lee H. Nelson, "Nail Chronology as an Aid to Dating Old Buildings," Nashville, TN: American Association for State and Local History, History News, Technical Leaflet No. 48, No. 24, No. 11, November 1968.

of the shank. The top half of the shank is straight and the nail head is 3/16 inch by 7/32 inch. These nails were available from the early 1830's.

Large spikes were used to anchor the wood rafters to the attic floor joists and to anchor the wood stair stringers to the walls. Only the heads of the existing spikes could be seen. The head size varied from 3/8 inch to 1/2 inch square.

Wire nails were used to face nail the beaded wood siding in the servant stair. The use of wire nails indicates that this siding was a later addition.

Screws were used in the house to attach all of the hardware and to attach the stair treads to the risers. Screws used in the house were pointed. Screws attaching a single piece of hardware were uniform in size and with threads ending in a sharp point. Pointed wood screws were patented in 1846.[4]

HINGES

The hinges used in the house are primarily cast iron. Hinges on the front and back doors are 4 inch wide by 3-1/2 inch high cast iron "lift off" type butt hinges. Hinges on the door to the second floor south bedroom are also lift off hinges. The remaining room doors on the first and second floors and the beaded board door in the basement, main block of the building have cast iron, fixed pin, 5 knuckle butt hinges. Most of the hinges are 4 inches high; the width of the hinge depends on the width of the door. The hinges are attached with 4 pointed wood screws in each leaf. The built-in cabinets on the first and second floors also have cast iron fixed pin butt hinges. None of the hinges have any identifying marks or labels. All of the hinges are corroded and many of them are cracked or broken. Cast iron hinges were in common use after 1800, however, the pointed screws with which the hinges are attached date the hardware to after 1846.[5]

The beaded board basement door to the ell has 2 wrought iron tee hinges. The top hinge is 7 1/2 inches long and the bottom is 10 inches long.

The only other hinges found in the house are the shutter hinges. The shutters are gone and only a few of the hinge top leaves mounted on the frame remain. Only a portion of one original bottom hinge remains. This is located on the window to the south of the front door. The shutter hinges are cast iron "lift off" parliament hinges that resemble a "H" shape, 3-1/2 inches high and 5-3/4 inches wide, when open. The hinges are mortised into the frame and shutter. The bottom hinge was fitted on its back side with a latch bar that, when lowered into place, kept the hinge from closing, thus acting as a hold-open for the shutters. Notches on the back sides of all of the bottom shutter hinges mortises were made to accommodate this latch.

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[4]Dr. Henry C. Mercer. The Dating of Old Houses (Bucks County, PA: Bucks County Historical Society, reprinted 1976).

[5]Mercer.

LATCHES

All of the doors on the first and second floors had rim latches with knobs and key locks. Almost all of the door latches have been removed, leaving only the unpainted shadow of the original latches on the doors. The front and back doors had 4 inch by 6 inch rim latches. On the front door there is also a paint shadow and hole for a modern deadbolt. A smaller cast iron rim latch has been installed on the back door. The side door on the north elevation (which has been removed and is stored in the ell) has a 3 3/4 inch by 5 inch cast iron rim latch. The only latch identified as original because there was no paint on the door under the latch is on the door between the north bedroom on the 2nd floor and the ell. This cast iron rim latch is 4 3/4 inches by 4 1/2 inches overall, including the strike plate. The latch is fastened with 3 pointed screws and sides of the latch are beveled. The latch and strike are japanned black. This type of latch was used circa 1850.

APPENDIX D:
INVENTORY OF SIGNIFICANT MATERIALS

APPENDIX D: INVENTORY OF SIGNIFICANT MATERIALS

EXTERIOR

TYPICAL EXTERIOR ELEVATION

WALLS:	Rubble stone foundation to the bottom of the basement windows, 1' to 2' above grade. Brick walls from foundation to roof line, in common bond with bond course every sixth course. At eaves, brick corbels out for three courses. At gable ends rake boards with moulded drip edges and splash boards applied directly to the face of the brick. Wood lintels at windows and doors, wood sills at windows. Brick chimneys project above the roof at the three gable ends.
WINDOWS:	All windows wood frames and sash. Basement and attic windows six light fixed sash. First and second floor windows six-over-six double hung sash.
ROOF:	Slate shingles.
ALTERATIONS:	Slate roof replaced with galvanized sheet metal roof. Moulded rake boards replaced with flat boards. New galvanized gutters and downspouts installed. Brick masonry repaired, replaced and repointed. Brick chimneys removed to below the roof line. Window sash have been repaired or replaced, and twenty of the sash have been removed and temporarily replaced with fixed, screened wood louvers.

EAST ELEVATION

DOOR:	Four-panel 1 5/8" wood door, side panels, sidelights, transom window, scroll brackets and panelled jambs and head at 1st floor.
WINDOWS:	Four at basement, four at 1st floor, five at 2nd floor.
PORCH:	Wood porch with roof, guardrail and ornamental posts the full width of the elevation.
ALTERATIONS:	Transom windows and sidelights removed and replaced with plywood. Door hardware missing. Porch removed and parts stored in basement, joist pockets in masonry filled with mortar or polyurethane foam. Fixed wood louvers replace window sash: four at basement, two at 1st floor, two at 2nd floor.

NORTH ELEVATION

DOOR:	Wood door with transom window at 1st floor.
WINDOWS:	One at basement, two at 1st floor, three at 2nd floor, one at attic.
ALTERATIONS:	Door and transom window removed, covered with plywood. Porch to door removed, configuration unknown. Fixed wood louvers replace window sash: one at basement, two at 1st floor, two at 2nd floor, one at attic.

WEST ELEVATION

DOOR:	Door to basement at south of main block, dry rubble stone retaining walls form areaway. Four-panel 1 5/8" wood door to stair hall.
WINDOWS:	At ell: one at 1st floor, one at attic. At main block: one at basement, one at 1st floor, one at stair landing between 1st and 2nd floor, one at 2nd floor.
PORCH:	Roofed wood porch.
ALTERATIONS:	Wood porch removed from house and parts stored in basement. Fixed wood louvers replaced window sash: two at basement, two at 1st floor, one at 2nd floor, one at attic. Basement door and frame replaced with plywood door with hasp and wood frame.

SOUTH ELEVATION

DOOR:	Doorway to basement at ell, dry rubble stone retaining walls form areaway. Wood door with transom window at 1st floor ell.
WINDOWS:	At ell: one at 1st floor, two at 2nd floor. At main block: one at attic.
PORCH:	Wood porch with roof.
ALTERATIONS:	Wood porch removed from house. Fixed wood louvers replace window sash: one at basement, one at 2nd floor, one at attic. Door to basement removed and filled in with CMU and brick. Door to 1st floor ell removed and covered with plywood.

INTERIOR

Note: See HABS drawings for woodworking details of mouldings, windows, doors and stairs.

Basement

SOUTH BASEMENT

FLOOR:	Concrete slab on grade, dirt.
WALLS:	Stone masonry foundation walls (to approximately 4' above the floor), with brick walls above, plastered and/or whitewashed.
PARTITIONS:	Vertical beaded boards with whitewash finish.
CEILING:	Wood lath and plaster.
FIREPLACE:	Brick fireplace at south wall.
WINDOWS:	Single six light sash, one on west and two on east.
DOOR CASING:	Flat 3/4" wood.
MISCELLANEOUS:	Unmilled wood post supporting wood beam.
ALTERATIONS:	Original exterior door replaced with plywood door. Drywall installed on ceiling under stair hall. Wood beaded board partitions removed by cutting off just below the ceiling. Masonry at fireplace deteriorating. Plaster and limewash deteriorating. Window sash replaced with fixed wood louvers.

NORTH BASEMENT

FLOOR:	Dirt.
WALLS:	Rubble stone foundation walls with brick walls above on north, east and south; brick wall on west; whitewashed.
CEILING:	Exposed floor joists and bottom of wood floor above.
DOORS:	1" board doors.
WINDOWS:	Single six light sash, two on east.
DOOR CASING:	1" flat wood.

HARDWARE:	Iron tee hinges, top hinge 7 1/2" long, bottom hinge 10" long.
ALTERATIONS:	Window sash replaced with fixed wood louvers.

BASEMENT ELL

FLOOR:	Dirt.
WALLS:	Rubble stone foundation walls with brick above on north, west and south; brick wall on east; whitewashed.
CEILING:	Exposed wood floor joists and bottom of wood floor above.
FIREPLACE:	Brick fireplace at west wall.
DOOR:	1" beaded board door between ell and main block.
WINDOWS:	Single six light sash, one on north, one on south.
DOOR CASING:	1" flat wood.
HARDWARE:	Iron tee hinges, top hinge 7 1/2" long, bottom hinge 10" long.
STAIR:	Wood stair.
ALTERATIONS:	Window sash replaced with fixed wood louvers. Exterior door and frame removed and opening infilled with CMU. Stair to 1st floor deteriorated.

1st Floor

ENTRY HALL

FLOOR:	Tongue-and-groove pine.
WALLS:	Plaster on masonry (north, east and west); wood lath and plaster (south). Decorative paint on all walls.
BASE:	8 1/2" wood base.
CEILING:	Wood lath and plaster. Decorative paint on soffits below stairs and landings.
DOORS:	East entry to stair hall: four-panel 1 5/8" wood door with applied mouldings, sidelights and transom windows, wood grain finish on interior, painted on exterior. West entry to stair hall:

	four-panel 1 5/8" wood door with applied mouldings, wood grain finish on interior, painted on exterior.
WINDOWS:	Sidelights and transom window at east entry door.
DOOR CASING:	Wood mouldings.
WINDOW CASING:	Wood mouldings.
HARDWARE:	4" wide by 3-1/2" high cast iron "lift off" type butt hinges at doors.
STAIR:	Wood stair with wood balustrade and wood trim.
ALTERATIONS:	Stair balustrade and trim damaged or removed. Wood casing at perimeter of entry door windows removed. Plaster at walls and ceilings damaged by vandalism and water infiltration. Electric light fixture installed at ceiling, making hole through plaster and decorative painting. Wood blocking installed at east and west entries to secure doors. Window sash replaced with fixed wood louvers.

PARLOR

FLOOR:	Tongue-and-groove pine.
WALLS:	Plaster on brick (east, south and west walls), wood lath and plaster (north wall). Decorative paint on all four walls and on ceiling.
BASE:	8 1/2" wood base.
CEILING:	Wood lath and plaster. Decorative paint.
FIREPLACE:	Brick, with plastered firebox, brick hearth and wood mantel.
WINDOWS:	Six-over-six double-hung windows, one on west, two on east.
DOOR CASING:	Wood mouldings.
WINDOW CASING:	Wood mouldings.
ALTERATIONS:	Wood mantel removed. Entry foyer and north-south dividing wall constructed, dividing wall removed. Electric light fixture penetrates plaster and decorative painting at center of ceiling. Holes in plaster in walls and ceiling. Window sash replaced with fixed wood louvers.

DINING ROOM

FLOOR:	Pine tongue-and-groove.
WALLS:	Plaster on brick.
BASE:	1" by 7" flat wood with 3/4" quarter-round shoe mould.
CEILING:	Wood lath and plaster.
FIREPLACE:	Brick fireplace with plaster firebox.
WINDOWS:	Six-over-six double-hung windows, one on north, two on east.
DOOR CASING:	Wood mouldings.
WINDOW CASING:	Wood mouldings.
WOODWORK:	Built-in wood cabinet to east of fireplace with raised panel doors.
ALTERATIONS:	Fireplace mantel missing, firebox filled in with CMU. Original wood floor covered with tongue-and-groove wood floor. Window sash replaced with fixed wood louvers.

1ST FLOOR ELL

FLOOR:	Tongue-and-groove pine.
WALLS:	Plaster on brick (north, west, south); board wall (at east against stair).
BASE:	1" by 7" flat wood with 3/4" quarter-round shoe mould.
CEILING:	Wood lath and plaster.
FIREPLACE:	Brick fireplace with plastered firebox.
DOORS:	1 5/8" four-panel wood doors.
WINDOWS:	Six-over-six double-hung window, one on west.
DOOR CASING:	Wood mouldings.
WINDOW CASING:	Wood mouldings.
STAIR:	Wood stairs to basement and 2nd floor at east end of room.

HARDWARE:	Cast iron, fixed pin, 5 knuckle butt hinges
ALTERATIONS:	Wood floor covered with linoleum. Fireplace mantel missing. Holes into chimney for woodstove. Hole in west wall repaired with new brick. Plaster on walls and ceilings damaged and missing from water infiltration. Wiring for electric stove installed. Piping for water installed. Beaded boards installed on walls and ceiling of stairway. Window sash replaced with fixed wood louvers.

2nd Floor

SOUTH BEDROOM

FLOOR:	Pine tongue-and-groove.
WALLS:	Plaster on brick (south, east and west), lath and plaster (north).
BASE:	5 3/8" wood moulding.
CEILING:	Wood lath and plaster.
FIREPLACE:	Brick fireplace with plastered firebox.
DOOR:	1 5/8" four-panel wood door.
WINDOWS:	Six-over-six double-hung window, one on west.
DOOR CASING:	Wood mouldings.
WINDOW CASING:	Wood mouldings.
HARDWARE:	Cast iron, fixed pin, 5 knuckle butt hinges at door.
ALTERATIONS:	Wood mantel removed from fireplace. Holes in floor and chimney breast for woodstove pipe. Wood foyer and north-south dividing wall installed, wall removed. Window sash replaced with fixed wood louvers.

NORTH BEDROOM

FLOOR:	Pine tongue-and-groove.
WALLS:	Plaster on brick masonry.

BASE:	1" by 7" flat wood with 3/4" quarter-round shoe mould.
CEILING:	Wood lath and plaster.
FIREPLACE:	Brick fireplace with plaster firebox and wood mantel.
DOORS:	1 5/8" four-panel wood door, with grained finish.
WINDOWS:	Six-over-six double-hung window, one on north and two on east.
DOOR CASING:	Wood moulding.
WINDOW CASING:	Wood moulding.
HARDWARE:	Cast iron, fixed pin, 5 knuckle butt hinges on door.
WOODWORK:	Built-in wood cabinet with 4 raised-panel doors.
ALTERATIONS:	Window casings missing. Panels missing from door. Floor, ceiling and walls damaged by water infiltration. Wood foyer and north-south dividing wall installed, wall removed. Wood mantel loose from face of fireplace. Holes in floor and chimney for woodstove attachment. Window sash replaced with fixed wood louvers. Wood foyer and north-south dividing wall installed and removed.

SECOND FLOOR ELL

FLOOR:	Pine tongue-and-groove.
WALLS:	Plaster on brick masonry.
BASE:	1" by 7" flat wood with 3/4" quarter-round shoe mould.
CEILING:	Wood lath and plaster.
DOOR:	Beaded board door to attic.
WINDOWS:	Six-over-six double-hung window, two on north and two on south.
DOOR CASING:	Wood mouldings.
WINDOW CASING:	Wood mouldings.
HARDWARE:	Cast iron, fixed pin, 5 knuckle butt hinges.

STAIRS:	Wood stairs to 1st floor at west end of room; Wood stair with closet under in southwest comer.
ALTERATIONS:	Floor, ceilings and walls damaged by water infiltration. Beaded board added to stair wall and ceiling. Tread missing at stair to attic. Window sash replaced with fixed wood louvers.

ATTIC

FLOOR:	7/8" tongue-and-groove (above stair hall and south bedroom), 1" wood boards (above north bedroom and ell).
WALLS/CEILING:	Exposed rafters and sheathing sloping up from floor. Exposed brick at gable ends at south, north and west.
WINDOWS:	Six light fixed sash, one each at south, north and west.
ALTERATIONS:	Original roof sheathing replaced with new wood. Wood rafters replaced with new wood rafters. Window sash replaced with fixed wood louvers.

APPENDIX G:
STRUCTURAL CALCULATIONS

McMullan & Associates, Inc.
CONSULTING ENGINEERS
8245 Boone Boulevard, Suite 290
Vienna, Virginia 22182-3828
(703) 556-0651

JOB # 123 WORTHINGTON HOUSE
SHEET NO. 1 OF
CALCULATED BY D.L DATE 7.22.94
CHECKED BY DATE

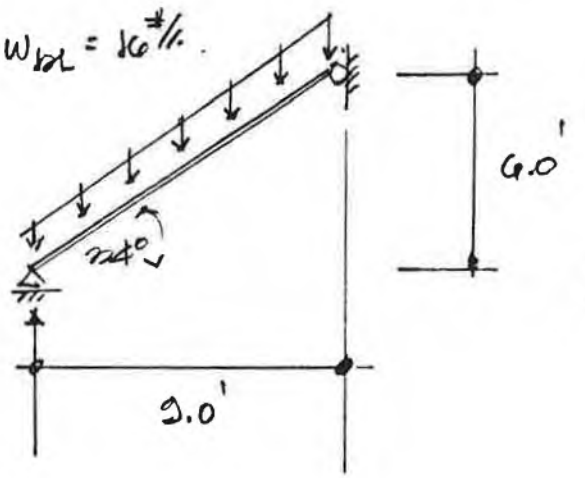
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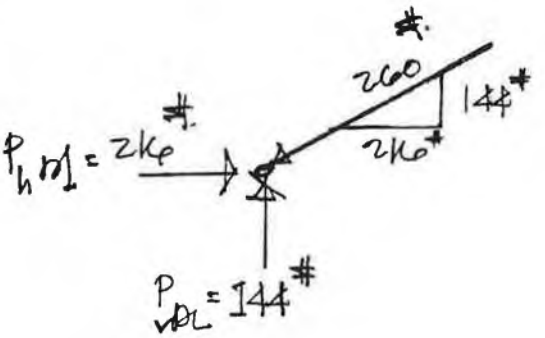
II. ROOF:

A. ROOF DEAD LOAD.

Metal roofing.	:	1 PSF
1" wood sheathing	:	3 PSF
Rafters 2¾" x 6" @ 24" oc	:	2 PSF
		6 PSF / cos. 34° = 8 PSF.

$$S_x = \frac{2.75(4.5)^2}{6} = 9.28 \text{ in}^3.$$





WOOD PROPERTIES: PER NDS 1991.

$$M = \frac{16(9)^2}{8} = 162.1 \text{ lbs}$$

SPECIES: MIXED OAK NO. 1

F_b = 825 psi
F_v = 85 psi
E = 1.0×10^6 psi
$F_{c\perp}$ = 800 psi
F_c = 825 psi

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TAPERED RAFTERS.

$$d = 3.5" + (5.5" - 3.5")\left[0.50 - 0.15\left(1 - \frac{3.5}{5.5}\right)\right] = 4.39"$$

$$\frac{l_e}{d} = \frac{10.817 \times 12}{4.39} = 29.56$$

$$F_{cE} = \frac{0.8(1.0 \times 10^6)}{(29.56)^2} = 915 \text{ psi} \qquad (F_{cE}/F_c^*) = 1.109$$

$$c_p = \frac{1 + 1.109}{2(0.8)} - \sqrt{\left[\frac{1 + (1.109)}{2(0.8)}\right]^2 - \frac{1.109}{0.8}} = .725$$

$$F_c = .725(825) = 598 \text{ psi}$$

$$f_{c_{DL}} = \frac{260}{2.75 \times 4.39} = 22 \text{ psi}$$

$$f_b = \frac{162 \times 12}{9.28} = 209 \text{ psi} \qquad F_b = 825(1.15) = 949 \text{ psi}$$

$$\left[\frac{22}{598}\right]^2 + \frac{209}{949\left[1 - (22/598)\right]} = .30$$

$\therefore$ MAX ALLOW LL = 8 PSF $\times \frac{1}{.3}$ = 26.8 PSF

LL = 30 PSF $\times$ 0.7 = 21 PSF < 26.8 PSF $\therefore$ (OK)

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ROOF SHEATHING: PINE.

1"x8" / FT. $S_x = \frac{8(1)^2}{6} = 1.33 \text{ in}^3$.

$w_{DL} = 5$ PLF

$M_{DL} = \frac{5(2)^2}{8} = 2.5$ ft.lbs.

$f_b = \frac{2.5 \times 12}{1.33} = 22.6$ psi

ATTIC

DEAD LOADS:

1" DECKING / 12 x 34 =	3 PSF
2"x 6" / 144 (2) x 34 =	2 PSF
WOOD LATH & PLASTER =	10 PSF
	15 PSF.

$S_x = \frac{2.5(6.75)^2}{6} = 18.98 \text{ in}^3$

$M_{LL} = \frac{15(2')(17')^2}{8} = 1084$ ft.lbs.

$f_b = \frac{1084 \times 12}{18.98} = 685$ psi

$F_b = 825 \times 1.15 = 949$ psi

LL allow = 15 PSF $\frac{(949-685)}{685} = 5.8$ psi

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JOB #12
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SECOND FLOOR: WORST CASE = 2 1/2" x 8 3/4" @ 27" O.C.

DEAD LOAD = 15 PSF
SUB-FLOORING = 3 PSF
18 PSF.

$S_X = \frac{2.5(8.75)^2}{6} = 31.90 \text{ in}^3$

$W_{DL} = 18 \text{ PSF } (27/12) = 40.5 \#/\text{ft}$

$M_{DL} = \frac{40.5(17)^2}{8} = 1463 \text{ ft.lbs.}$

$f_b = \frac{1463 \times 12}{31.90} = 550 \text{ psi}$

LL allow = $18 \text{ PSF} \cdot \frac{(949-550)}{550} = \underline{73 \text{ PSF}}$

- NEXT WORST CASE: 3" x 9" @ 27" O.C.

$S_X = \frac{3(9)^2}{6} = 40.5 \text{ in}^3$

$f_b = \frac{1463 \times 12}{40.5} = 433.5 \text{ psi}$

LL allow. = $18 \text{ PSF} \cdot \frac{(949-433.5)}{433.5} = \underline{21 \text{ PSF.}}$

- 3"x9" @ 24" O.C (span = 16'-6")

$W_{DL} = 36 \#/\text{ft}$ $M_{DL} = 36(16.5)^2/8 = 1225 \text{ lbs.}$

$f_b = \frac{1225 \times 12}{40.5} = 363 \text{ psi}$ LL allow = $18 \cdot \frac{(949-363)}{363} = \underline{29 \text{ PSF}}$

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FIRST FLOOR: WORST CASE 2"1/4" x 9" 4" @ 24" o.c. (span 16'-6")

$w_{DL} = 36\#/ft$ $M_{DL} = 36(16.5)^2/8 = 1225$ ft-lbs

$S_x = \frac{2.25(9.5)^2}{6} = 33.84$ in^3.

$f_b = \frac{1225 \times 12}{33.84} = 434$ psi

LLallow = $18\ \frac{(945-434)}{434} =$ **21.3 PSF**

CASE II: 2"1/2" x 9"1/2" @ 22" o.c. (span = 17'-0")

$w_{DL} = 33\#/ft$ $M_{DL} = \frac{33(17)^2}{8} = 1192$ ft-lbs.

$S_x = \frac{2.5(9.5)^2}{6} = 37.60$ in^3.

$f_b = \frac{1192 \times 12}{37.60} = 380$ psi

LLallow = $18\ /\ \frac{(949-380)}{380} =$ **26.9 PSF**

CASE III: 2"1/4" x 9"3/4" @ 21" o.c. (span = 17'-0")

$w_{DL} = 31.5\#/ft$ $M_{DL} = 1128$ ft-lbs $S_y = 35.65$ in^3.

$f_b = 383$ psi

LLallow = **26.6 PSF**

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CASE IV: $2\frac{1}{2}" \times 6\frac{3}{4}"$ @ 25" o.c. (SPAN = 9'-0")

$w_{DL} = 37.5$ #/'

$M_{DL} = 380$ ft. lbs

$S_x = 18.98$ in^3 $f_b = 240$ psi

$LL_{allow} = 18\left(\frac{949 - 240}{240}\right) = 53.1$ PSF

BEAM: $5\frac{3}{4}" \times 7\frac{1}{2}"$ (SPAN = 8'6").

- $w_{DL\ 1ST\ FLOOR} = 18\ PSF(9\frac{1}{2}') = 81$ #/'
- SELF WT: $5\frac{3}{4}" \times 7\frac{1}{2}" / 144 \times 35 = 11$ #/'

WALL (20PSF) $\times$ 16' = 320 #/'

STAIR.

81 #/'
493 #/' use: 500 #/'

$M_{DL} = 4516$ ft lbs. $S_x = 53.01$ in^3

$f_{b_{DL}} = 1005$ psi

LL CAPACITY = 0

SHEAR IN MORTISE & TENON.

$R_{LL} = 169$ #

$f_v = \frac{2(169)}{2(2.75 \times 2.5)} = 37$ psi

$LL_{allow} = 18\ PSF \times \frac{(85-37)}{37} = 23.4$ PSF

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POST: 6 1/2" ϕ hf = 8'4"

P = 500#/' (8.5') = 4,250#

$\frac{le}{d} = \frac{8.5 \times 12}{6.5} = 15.69$

F_{cE} (OK) $= \frac{0.3\,(E_{000,000})}{(15.69)^2} = 975$ psi

$f_c = \frac{4,250}{33.18} = 128$ psi (O.K.)

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PORCH FRAMING:

ASSUMED LUMBER STRESSES: F_b = 1050 psi, F_v = 90 psi

$C_{M_{FV}}$ = 0.97
$C_{M_{FB}}$ = 0.85
C_R = 1.15

FLOOR DL:

1" DECKING: 1"/12 × 35 PCF = 3 PSF.
2½"×7" JOISTS: 2.5×7/144 × 35 PCF / 2 = 2 PSF.
5 PSF.

- EXHIBIT LL = 100 PSF. w_1 = 105 (2) = 210 lbs/ft.

$R_{JOIST} = 210(8\frac{1}{2}) = 840^{\#}$ $\quad M = \frac{210(8)^2}{8} = 1680$ ft.lbs

$f_v = \frac{840(3)}{2(2.5\times7)} = 72$ psi < 100 psi (ok.)

$f_b = \frac{1680\times12}{\frac{2.5(7)^2}{6}} = 987$ psi < 1026 psi (ok)

HEADERS:

$w_1 = 105$ PSF $(16\frac{1}{2}) = 840^{\#}$/ft.

$R = 840(8\frac{5}{12}) = 3570^{\#}$ $\quad M = \frac{840(8.5)^2}{8} = 7586$ ft.lbs

$f_v = \frac{3(3570 - \frac{8.75}{12}(840))}{2(2\times2.5\times8.75)} = 101.4$ psi > 87.3 psi (NG).

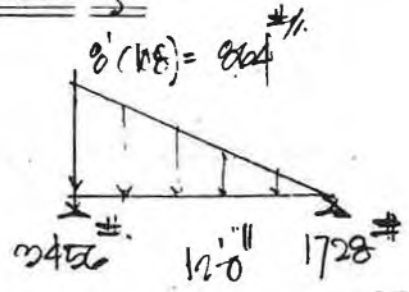
$f_b = \frac{7586\times12}{\frac{2(2.5)8.75^2}{6}} = 1427$ psi > 892 psi

$L_{Allow} = (\frac{892}{1427}) \times 105 - 5$ PSF = **60.6 PSF.**

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DIAGONALS:



$W = 5.18^{\#}$

$M = \frac{5184(12)}{6} = 10,368$ ft.lbs.

$f_b = \frac{10,368 \times 12}{\frac{1.5(6.75)^2}{6}} = 3900$ psi

H allow $= \left(\frac{892}{3900}\right) 105 - 5 =$ **19 PSF**

IF DOUBLE HIP JOIST USED LL $= \left(\frac{892(2)}{3900}\right) 105 - 5 =$ **43 PSF**

RAFTER FRAMING:

RAFTERS:

$w = (20\#) 2' = 70^{\#/ft.}$

$M = \frac{70(8.5)^2}{8} = 632$ ft.lbs.

$f_b = \frac{632 \times 12}{\frac{1.75 \times (4.5)^2}{6}} = 999$ psi

$F_b = 1050 \times 1.15 \times .85 \times 1.15 = 1180$ psi $>$ 999 psi (OK)

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EAVE BEAM:

$w = 35\ psf\ (8.5'/2 + 1) = 184\ \#/'$

$M = \frac{184(8)^2}{8} = 1470\ ft\text{-}lbs.$

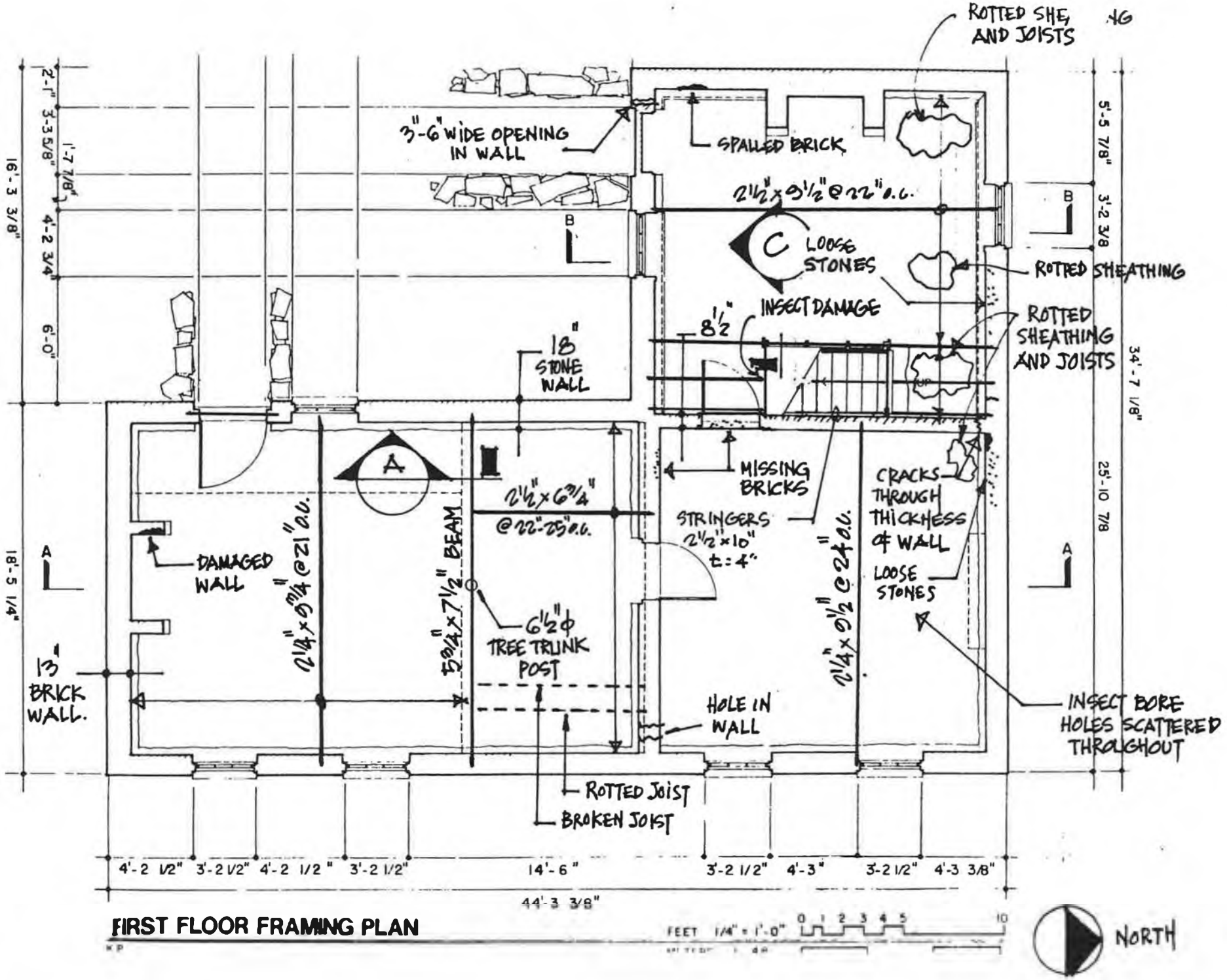
$f_b = \frac{1470 \times 12}{2\left(\frac{1.625 \times 9.688^2}{6}\right)} = 347\ psi \quad (OK)$

POST:

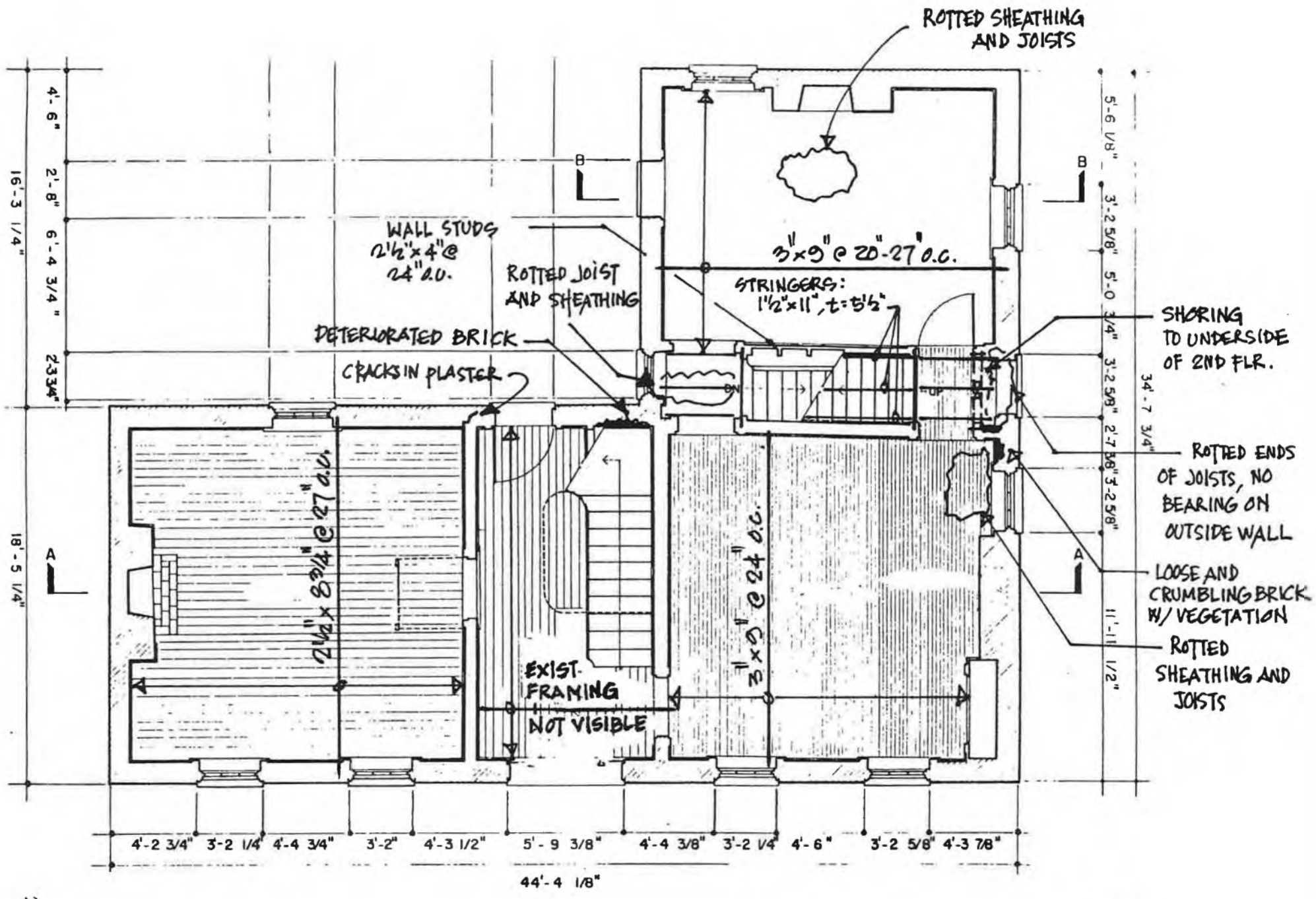
$R = 184(8') = 1472\ \#.$

$f_c = \frac{1472}{4.5 \times 4.5} = 73\ psi \quad (OK).$

APPENDIX H:
STRUCTURAL DRAWINGS



FIRST FLOOR FRAMING PLAN

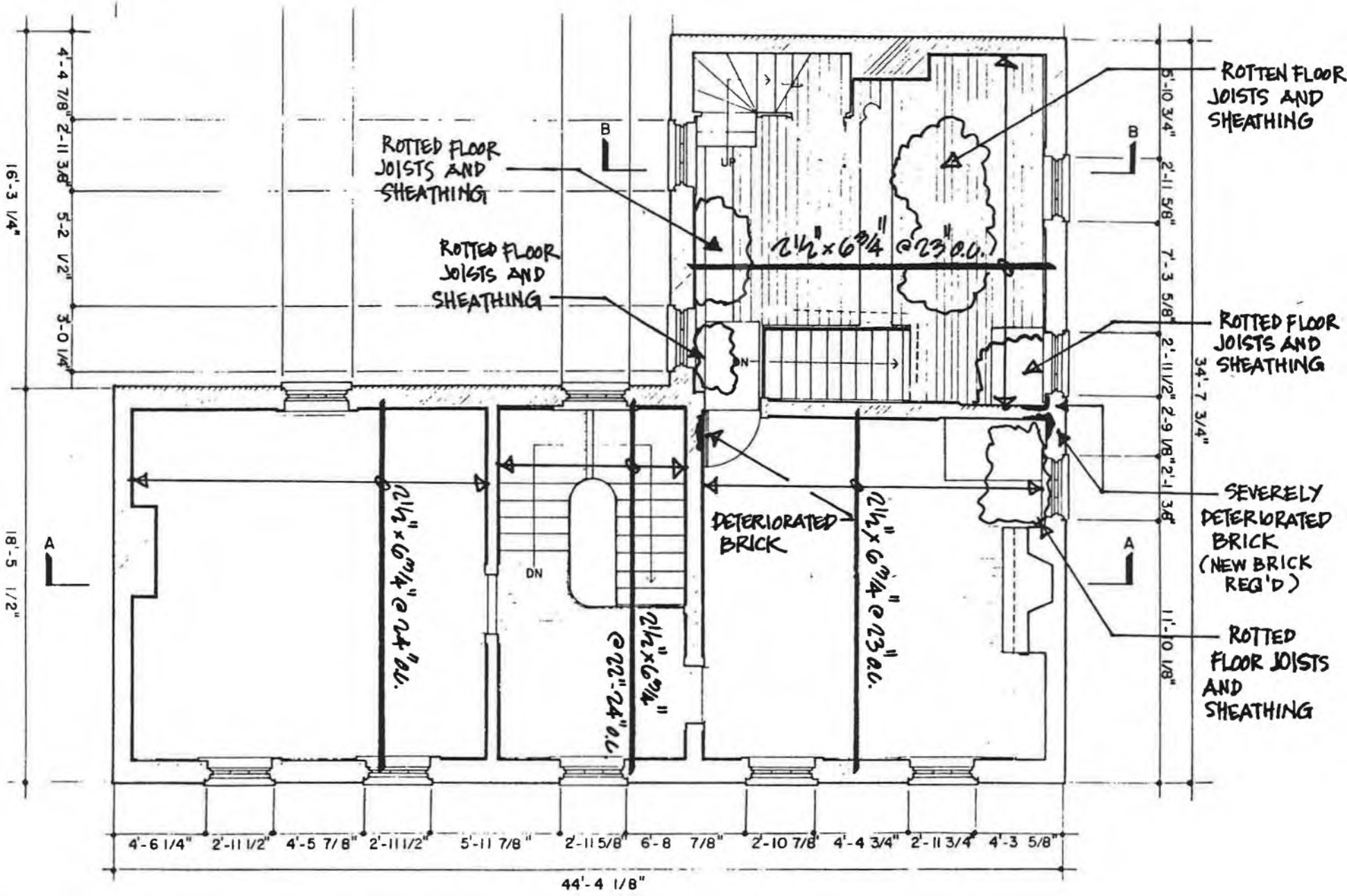


SECOND FLOOR FRAMING PLAN

FEET 1/4" = 1'-0" 0 1 2 3 4 5 10

METERS 1:48

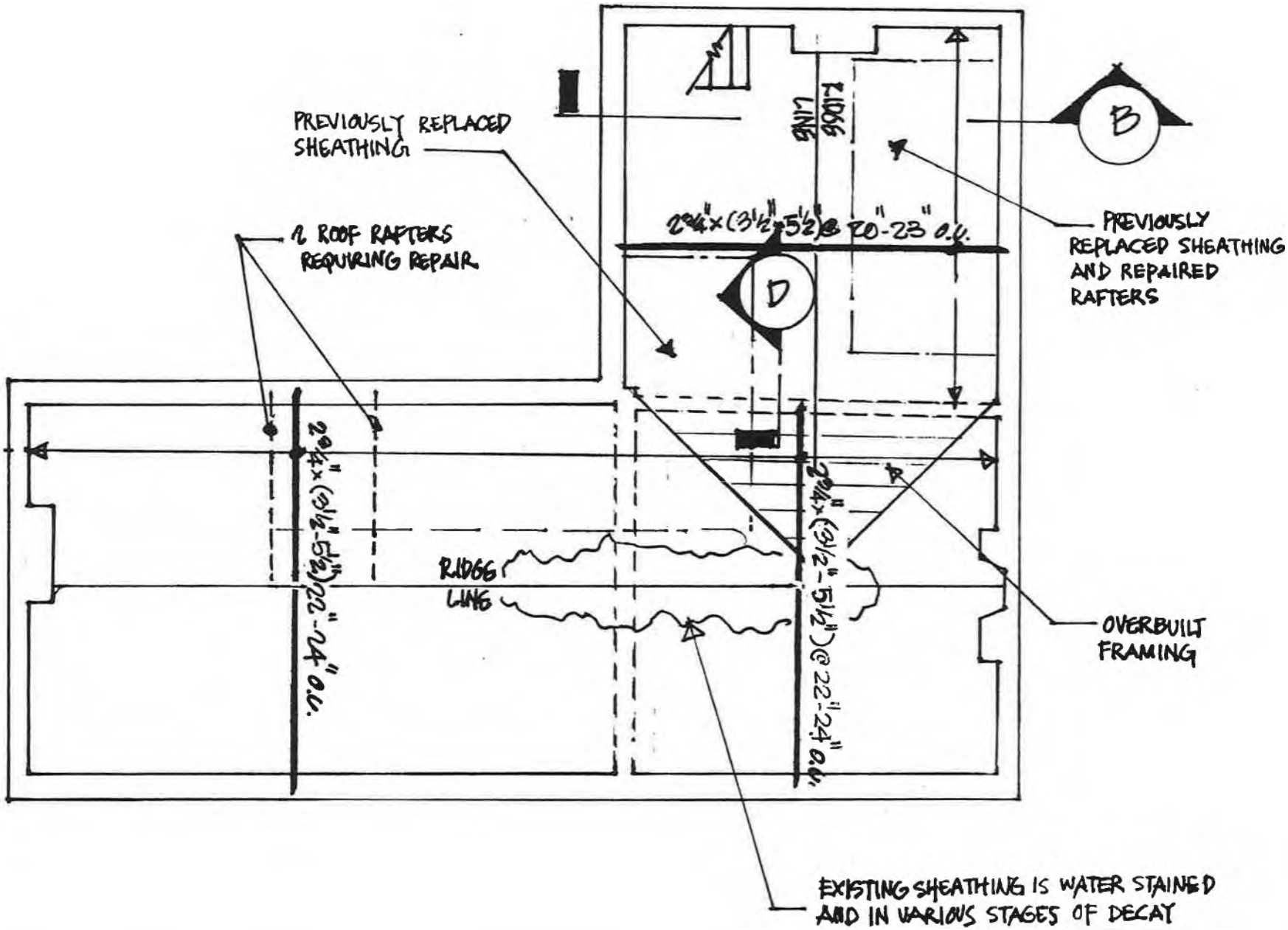
NORTH



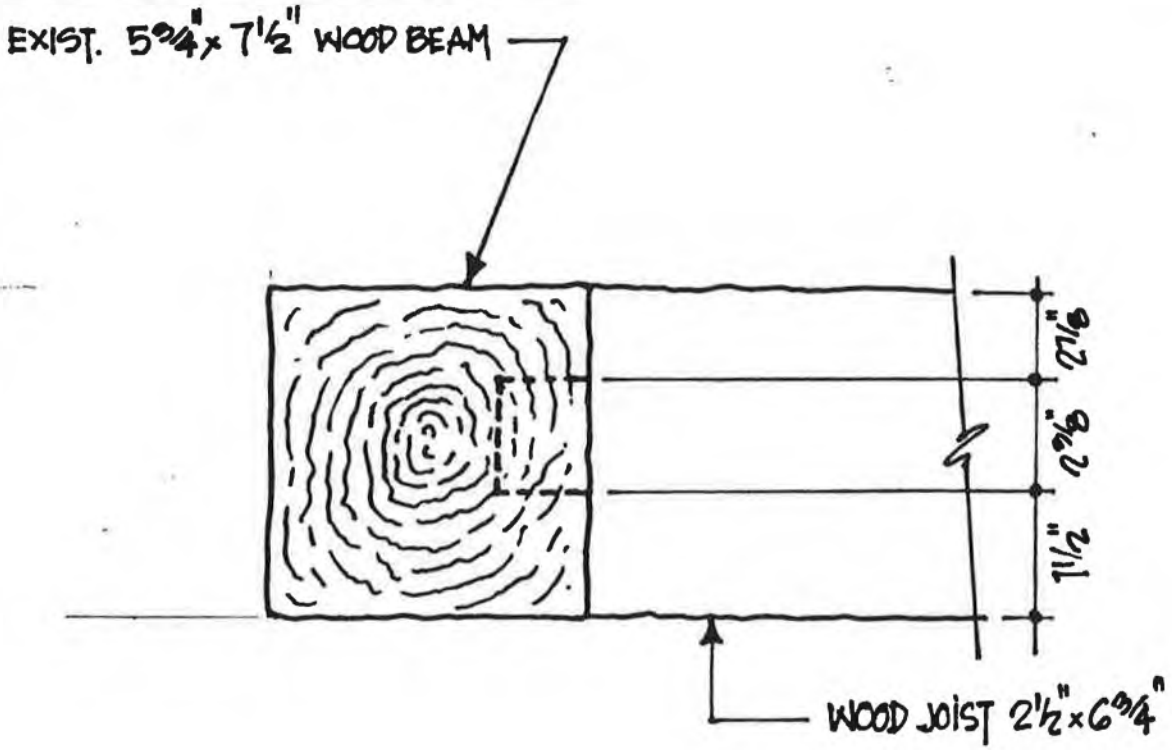
ATTIC FRAMING PLAN

FEET 1/4" = 1'-0" 0 1 2 3 4 5 10

NORTH

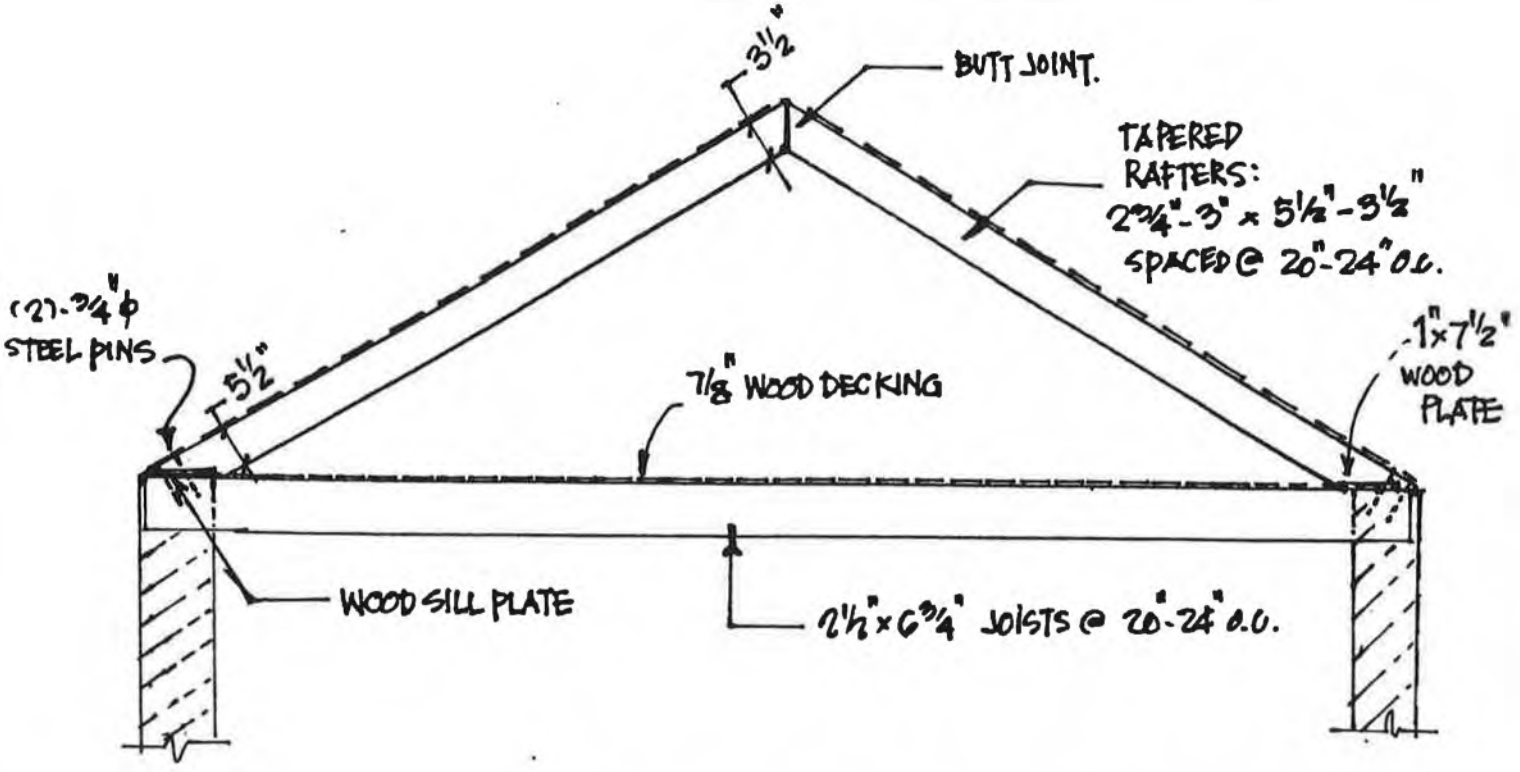


ROOF FRAMING PLAN



MORTISE & TENON DETAIL. (A)

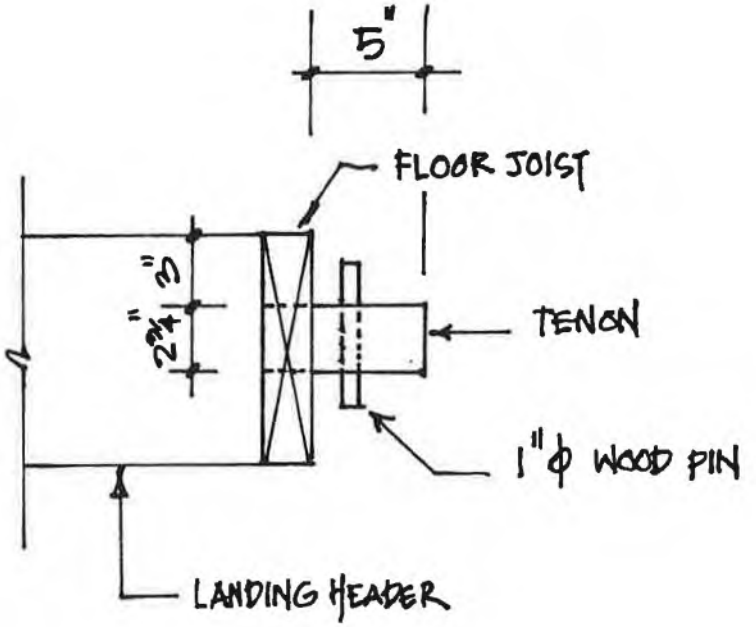
N.T.S.



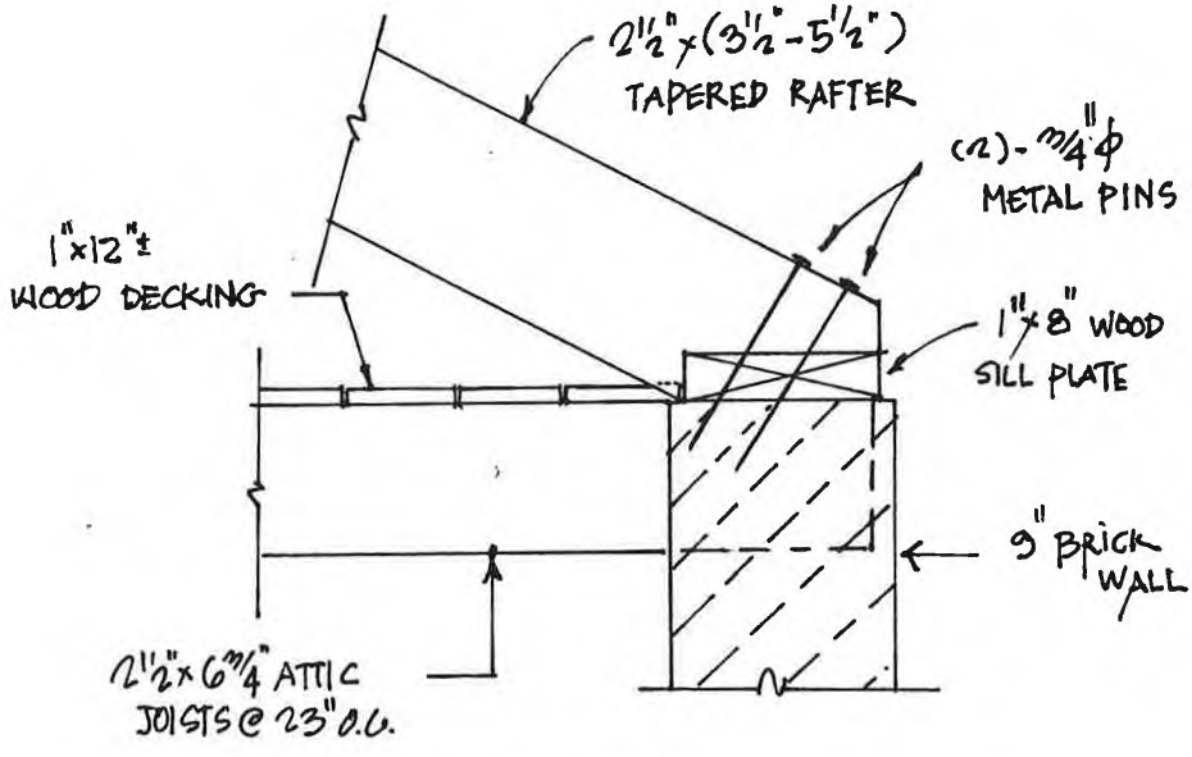
ATTIC CROSS SECTION

N.T.S.

B



STAIR LANDING HEADER DET. (C)



RAFTER BEARING DET. (D)

N.T.S.

APPENDIX J:
PRESERVATION TECH NOTES, "TEMPORARY WINDOW VENTS"

PRESERVATION
Tech Notes
NATIONAL PARK SERVICE
U.S. DEPARTMENT OF THE INTERIOR
WASHINGTON, D.C.



WORTHINGTON HOUSE
Monocacy National Battlefield
Frederick County, Maryland

Located on the grounds of the Monocacy National Battlefield, the Worthington House is a mid-19th century ell-shaped brick farmhouse. Judging from the modest exterior, it is rather surprising to find that the building contains noteworthy interior stenciling. The two front rooms on either side of the center stair hall and the stair hall itself all have remarkably intact examples of *trompe l'oeil* stenciled panelling combined with an egg and dart motif frieze border.

The National Park Service acquired the 282 acre Worthington property in 1982, principally to protect this detached portion of the battlefield from intensive development. At the time of acquisition, the farmhouse was vacant and severely deteriorated with extensive water damage occurring as a result of major roof leaks and a predominance of broken and missing windows. Vines and saplings were growing up through the building and roof, destroying the mortar and displacing the bricks. The one-story porch across the front had collapsed, causing noticeable dislocation of the front masonry wall. In several areas large numbers of the handmade brick had been scavenged from the exterior, leaving gaping holes in the bearing walls.

With no immediate use planned for the building, it was necessary to repair and stabilize the structure or lose it to deterioration. Work was undertaken using limited funds to make the building structurally sound, weathertight, and less vulnerable to vandalism. Rather than using traditional mothballing techniques, which rely heavily on temporary measures and the introduction of non-historic elements, the project team utilized high quality but cost-effective stabilization measures whenever possible to ensure the long-term preservation of the historic building. Temporary features, such as window vents, were designed and installed in such a manner as to be reversible and to cause little additional loss of historic fabric.

Preservation Problem

Situated on a very windy knoll, the Worthington House had several immediate preservation problems. The interior was waterlogged. Rain entered through broken and missing windows and through the deteriorated slate roof. At the time of acquisition, the structure had been occupied sporadically for approximately 10 years by vagrants and had received no upkeep at all. Rodent and insect infestation was also contributing to the deterioration of the structure.

Early work focused on the need to make the building as weathertight as possible, yet allow for adequate ventilation. Consideration was given to devising a solution that would incorporate the window work with a passive ventilation system. It was recognized that if the house was tightly sealed with insufficient ventilation, the building would be particularly susceptible to condensation and moisture damage. Another factor to consider was that the building would remain unheated and unoccupied for an undetermined length of time.

Neither boarding over the openings nor installing full sash throughout would provide optimum ventilation on the interior. This would be required to deter fungal decay of the wood and to avoid condensation damage to plaster walls and to their decorative

WINDOWS
NUMBER 10

Temporary Window Vents in Unoccupied Historic Buildings

Charles E. Fisher
Preservation Assistance Division
National Park Service
and
Thomas A. Vitanza
Williamsport Preservation Training Center
National Park Service

Special care should be taken to provide sufficient ventilation in unoccupied historic buildings to deter fungal decay and condensation damage.

stencil work. Hot daytime temperatures followed by cold nights in the spring and early fall could result in significant condensation damage to the plaster and stencil work. Damage would be particularly acute when nighttime temperatures fell below freezing. Furthermore, the hot moist air of the long Maryland summer would create problems, since high humidity can present a favorable condition for fungal growth. This is particularly true when the drying effect of air movement, normally induced in an occupied building, is not present. The potential for damage in these circumstances was great. Once wood absorbs enough moisture from the hot humid air and if fungal attack begins, the process of wood decay would enable the fungi to maintain the wood in a wet condition since fungi reduces wood to water and carbon dioxide. While such moisture problems could arise throughout the house, the basement was particularly susceptible to such damage due to moisture infiltration through the dirt floor, the below grade location, and seepage through the walls and basement doors.

Preservation Solution

Since the stabilization plan did not call for the installation of either a heating or a mechanical ventilation system, the solution to the air circulation needs was to install window vents. The basic "rule-of-thumb" used by the project staff for determining the amount of open air needed for good air circulation in this building is to use 50 percent of the sash units for ventilation. This approach has been successfully used by the Williamsport Preservation Training Center in previous projects. Depending upon individual conditions, some adjustment needs to be made based on the layout of rooms, interior walls, door locations, and number and location of stair shafts and windows.

Because cross-room ventilation was desirable, the location of the ventilating louvers was critical. With proper planning, natural ventilation could be induced through the "chimney" or "updraft effect" within the building by which warm air raises and escapes through higher level vents, to be replaced with cooler air entering at lower levels.

Good air movement would also tend to equalize interior and exterior temperatures, thus lessening condensation problems within the brick walls and on interior painted plaster surfaces.

The window louvers had to be located so as to promote cross-room ventilation and avoid stagnant air pockets in the rooms. Furthermore, improvements to the appearance of the exterior of this long neglected building were desired. Efforts were taken, therefore, to locate as many of the louvers as possible on side and rear elevations, thereby minimizing the visual impact on the front elevation. Full double-sash vents could be placed in some side and rear windows to permit more glass on the front elevation. Even the glazing in the reconditioned or replacement windows would help to facilitate air movement within the building, since the sunlight passing through the glass would heat inside air and cause it to rise out through upper floor level vents. Cooler air entering through the basement windows would replace the warmer air.

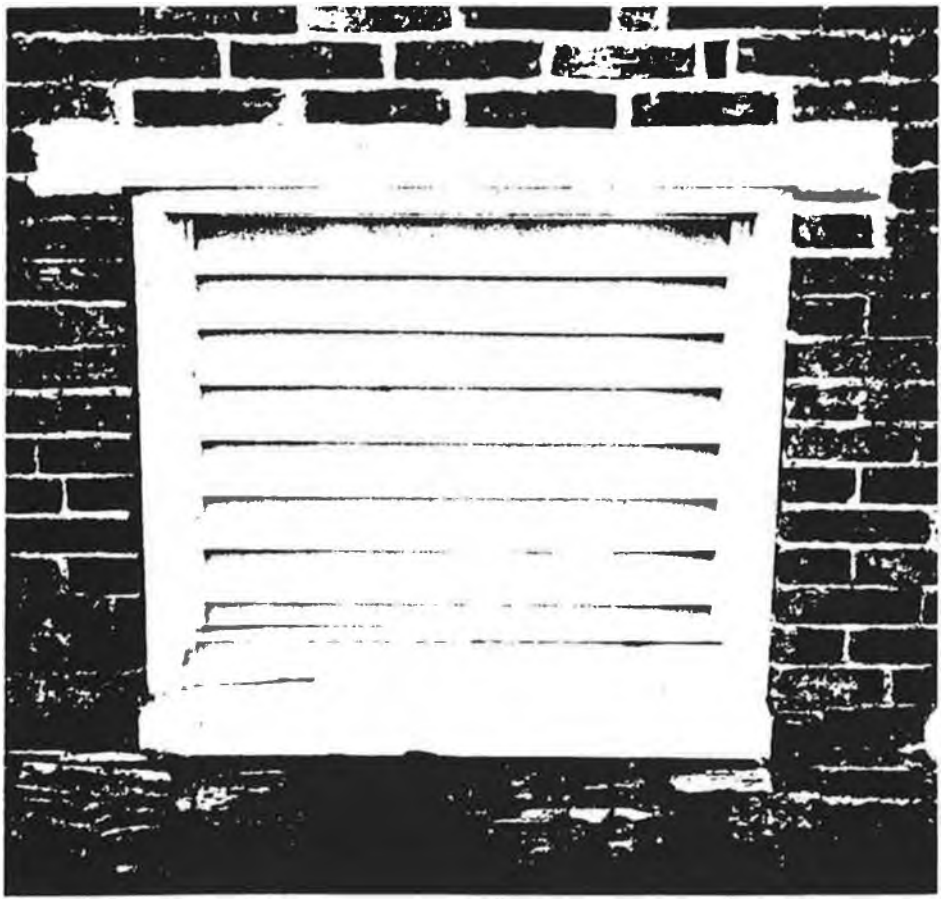
A survey of the building's 31 window openings established that on the first floor all but one sash were either missing or beyond repair. Altogether, only about one-third of the individual sash units were repairable. Most of those that were reconditioned required muntin replacement. In order to save on the final production costs involved in repairing or constructing the 52 individual sash units, all sash work was completed in one shop operation. The louvered vents were temporarily installed in lieu of the glazed sash on the bottom half of most window openings as part of the "mothballing" and stabilization efforts.

Louvered Window Vents

Wooden fixed louver vents were custom-made and installed. The easily fabricated louvers were sized to fit the lower sash opening — 34½" wide by 34¼" high on the first floor, while those for the smaller second floor windows were only 25¼" high. Full units were installed in all single-sash basement windows, since the window area was much less and the moisture problems more severe (see figure 1). At the same time, the three attic windows were also replaced with full louvers to encourage thorough multi-level ventilation.

Custom-built wooden louvers were selected over stock, pre-fabricated metal vents for the following reasons: most pre-fabricated vent systems would require modifications of the historic jamb in order to get a secure fit; a single style metal unit could not be found to fit the variety of opening sizes and the depth of the jamb; costs would be greater than making the custom units; and most important, it was felt that the thin gauge metal units offered little or no deterrent to unlawful entry. The wooden units presented a more secure system.

Figure 1. Full louvered vents were installed in all single-sash openings in the basement because of the more severe moisture problems present in that location. Photo: Charles Fisher



The louver frame was designed to fit snugly into the existing sash tracks and simultaneously to secure the glazed upper sash. An added benefit of the 6" stock width is that it provided a fairly rigid — and thus secure — louver frame. The louver frame was constructed of 1" × 6" shelf grade northeastern white pine; the louver slats were made from 1" × 8" pine (see figure 2). The spacing of the louver slats did not exceed 4" in order to provide additional lateral strength (and security) to the frame. The relative closeness of the slats also would make it more difficult to kick out the grade level units. The slats were set into the frame at a 45 degree angle by routing a ¼" deep dado cut into the jamb of the louver. The exposed edges of the slats were plumb cut in order t create a water drip on the exterior.

Prior to assembly, the louver members were primed using an alcohol base paint in order to get at least one protective coat on all surfaces. After assembly, they were given one shop coat of oil base exterior house paint. A final coat was appplied after installation. For aesthetic reasons, the paint color used on the sash and trim was selected for the final coat on the louvers (see figure 3).

In order to secure the vents in place, common 6d galvanized box nails were driven through the louver jambs into the sash tracks of the historic window jambs. To keep the jamb and stops from being damaged by the louver installation, temporary blocking was set between the parting bead and the inner and outer stops (see figure 4). By attaching the vents in this location, little damage was done as the nails were driven into the sash track rather than an exposed portion of the jamb. Once the building is returned to use, the lower sash will be installed and the nail holes will be filled with wood putty. Since the nails were driven in on the interior of the building, nearly 3" from the exterior wall, adequate security was achieved without driving the nails all the way in. Thus it will be relatively easy to grab onto the nail heads and back them out when the vents are eventually removed.

Figure 2. Section of the wooden louvers shows the simple manner in which they were made and assembled. Drawing: Thomas Vitanza

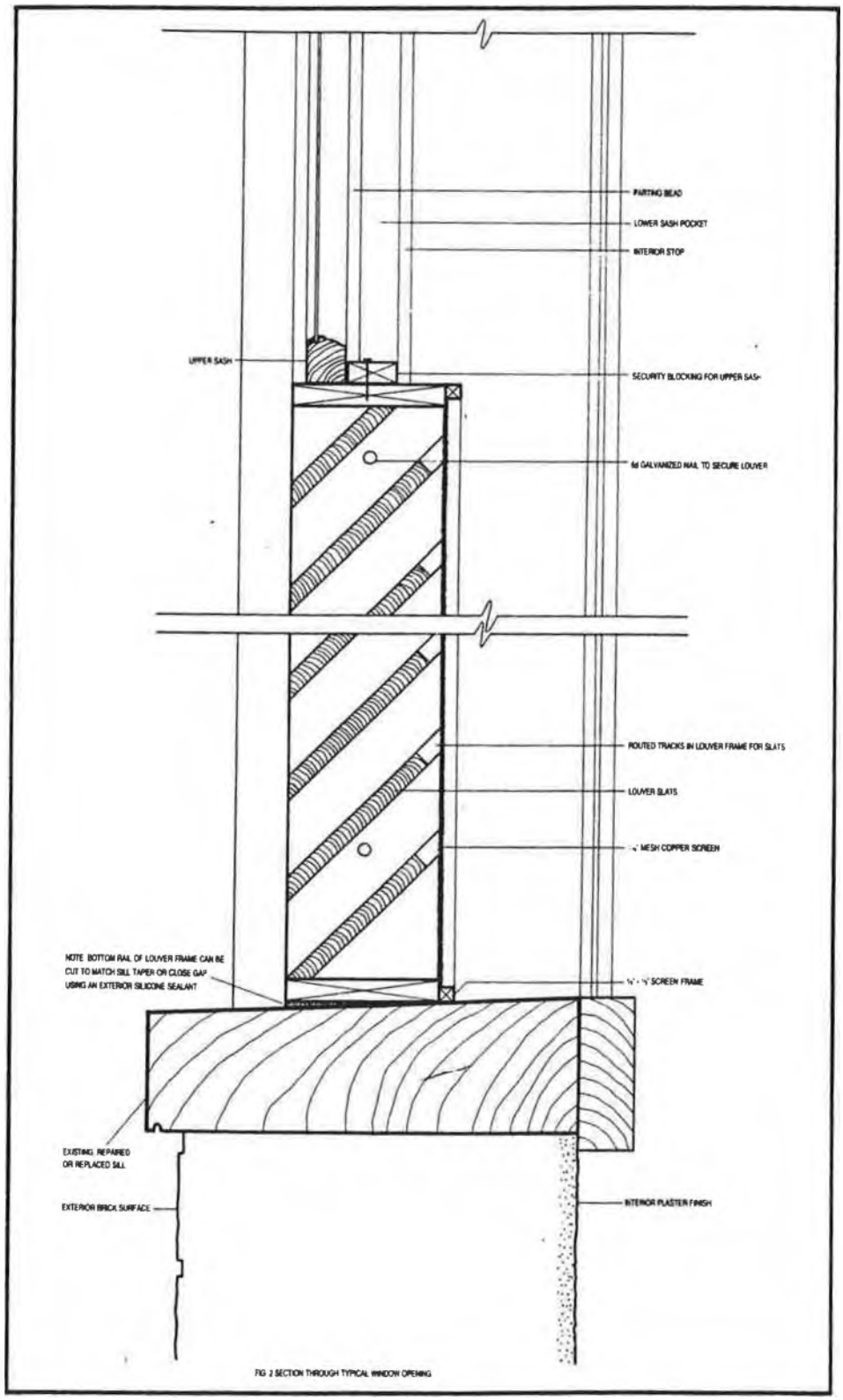
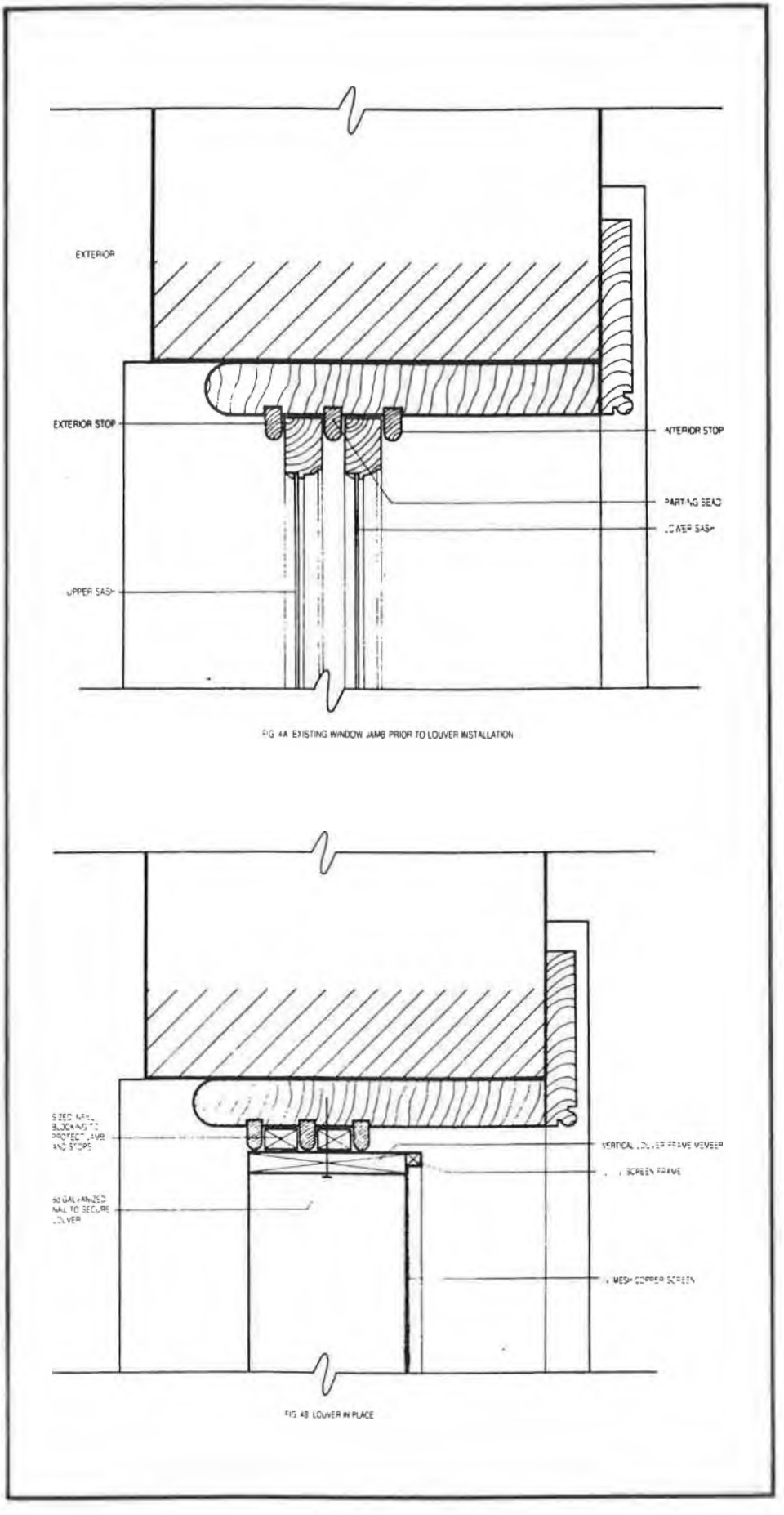


Figure 3. The exposed edges of the louver slats were plumb cut in order to create a water drip on the exterior. For aesthetic reasons, the louvers were painted the same color as the sash and trim. Photo: Charles Fisher



Figure 4. The lower sash (Figure 4a) were removed to permit installation of the louvers. To minimize damage to historic fabric in installing the louvers, temporary blocking was set between the parting bead and stops prior to nailing the units in place (Figure 4b). Drawings: Thomas Vitanza and Christina Henry.



After the louvers were secured in place, ⅛" mesh copper wire screening was installed on the interior of the louver frame using a ½" square wood frame. The screening is an integral part of the louver design. This seemingly minor detail was necessary to prevent the recurrence of insect, bird, and rodent infestation (see figure 5). The ⅛" mesh was specified to keep out the ever-present mud-dauber wasp, whose hive-building instincts have no regard for historic plaster or paint.

The cost of constructing and installing the louvers in 27 window openings was around $1,800, including 17 full size louvers, 7 basement and 3 attic units. This work was undertaken concurrently with the construction and installation of the reconstructed window sash and repairs to the frames, sills, jambs, and surrounding brickwork. The total cost of the window work was less than $9,000, involving 31 window openings.

Figure 5. Screening was attached to the back side of the louvers to prevent the recurrence of insect, bird, and rodent infestation. Photo: Charles Fisher



Project Evaluation

The window louvers installed in the Worthington House have proven effective over the past two years in providing the necessary ventilation for the building (see figure 6). Neither fungal attack nor condensation damage has recurred, and the interior air lacks even the typically humid, musty odor typically found in many older buildings. The louvers provide for good air movement within the building and a greater equilibrium between interior and exterior humidity levels and air temperatures, thus helping to protect the historic plaster and the significant interior finishes. The installation of the louver system in conjunction with the other sash work, and the overall exterior stabilization work has stimulated an interest in finding a use for the structure. As a temporary solution to a complex set of problems, the louver vents in the Worthington House have resolved a variety of issues. When used together with additional weatherproofing measures, this venting solution can be adopted for use in other buildings being mothballed.

Figure 6. The window louvers installed in the Worthington House have proven effective over the past two years in providing the necessary ventilation for the building. Photo: Tom Vitanza.



PROJECT DATA

Building:
Worthington House
Monocacy National Battlefield
Frederick County, Maryland

Owner:
National Park Service
Antietam National Battlefield
Sharpsburg, Maryland

Project Date: January-June 1983

Project Staff:
Williamsport Preservation Training Center
National Park Service
Williamsport, Maryland

Douglas C. Hicks
Project Supervisor
Supervisory Exhibit Specialist

Thomas A. Vitanza
Project Leader
Historical Architect Trainee

William Hose
Exhibit Specialist Trainee

Bruce Martin
Woodworking Specialist

Project Cost: Material and labor for construction of the 17 full size, 7 basement and 3 attic louvers was approximately $1,800. The material and labor cost for reconstruction of the sash, including glazing, painting, sizing and installation was around $5,200 (roughly $100 per sash unit), involving 21 pairs of double-hung sash and 7 basement and 3 attic windows. All other related work for the 31 openings, including sizing and installation of the louvers, repair to window openings (repair/replacement of sills and jambs and related masonry work), painting, and installation of screening and blocking cost between $1,000 and $2,000. Total window costs for complete sash and the louvers as well as installation and finish work was between $8,000 and $9,000.

This PRESERVATION TECH NOTE was prepared by the National Park Service. Charles E. Fisher, Preservation Assistance Division, National Park Service serves as Technical Coordinator for the PRESERVATION TECH NOTES. Special thanks go to James S. Askins, Branch Chief, Williamsport Preservation Training Center, for his time and generous assistance in providing information concerning the ventilation problems of mothballed historic buildings. Thanks also go to Doug Hicks, Project Supervisor, Williamsport Preservation Training Center, for his contributions to this Tech Note. The following Preservation Assistance Division staff contributed to the production of this Tech Note: Michael J. Auer, Brenda Johnson, Christina Henry, Janet L. Thomas, Theresa Robinson, and Alicia Hardison.
Cover Photo: Tom Vitanza.

This and many of the PRESERVATION TECH NOTES on windows are included in "The Window Handbook: Successful Strategies for Rehabilitating Windows in Historic Buildings," a joint publication of the Preservation Assistance Division, National Park Service, and the Center for Architectural Conservation, Georgia Institute of Technology. For information write to The Center for Architectural Conservation, P.O. Box 93402, Atlanta, Georgia 30377.

PRESERVATION TECH NOTES are designed to provide practical information on practices and innovative techniques for successfully maintaining and preserving cultural resources. All techniques and practices described herein conform to established National Park Service policies, procedures, and standards. This Tech Note was prepared pursuant to the National Historic Preservation Act Amendments of 1980 which directs the Secretary of the Interior to develop and make available to government agencies and individuals information concerning professional methods and techniques for the preservation of historic properties.

Comments on the usefulness of this information are welcomed and should be addressed to PRESERVATION TECH NOTES, Preservation Assistance Division-424, National Park Service, P.O. Box 37127, Washington, D.C. 20013-7127.

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BIBLIOGRAPHY

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-Building Material Stored at Site;
-Schedule of Replacement Members at Framed Openings;
-Schedule of Miscellaneous Building Hardware Stored at Site (inc. photos);
-Mortar Analysis Information and Testing Results;
-Field Notes;
-Accounting ledger.

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MAPS

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PRESERVERS
DATE:
ASSIGNMENT:
KODAK 5053 TMY


Roll #2
KODAK 5053 TMY


PrintFile
ARCHIVAL PROTECTIVES
KODAK 5053 TMY
Roll #3


#4
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19A 20 20A 21 21A 22 22A 23 23A 24 24A

Photo #	Use?	Description
Roll #1		
1.1	√	Stair detail.
1.2	-	Stair detail.
1.3	√	Entry door interior.
1.4	√	Stair detail and entry door.
1.5	-	Parlor window detail.
1.6	-	Dining room window detail
1.7	√	Dining room window detail
1.8	-	Parlor window detail
1.9	√	North bedroom window detail
1.10	-	North bedroom window detail
1.11	-	Stair to attic.
1.12	√	Stair to attic.
1.13	√	North bedroom, mantel and closet.
1.14	-	North bedroom, mantel and window detail.
1.15	√	North bedroom, mantel and window detail.
1.16	-	1st floor ell.
1.17	√	1st floor ell interior, looking northwest.
1.18	√	Exterior elevation, from SW.
1.19	-	Exterior elevation, from south.
1.20	-	Exterior detail, SW corner of ell.
1.21	√	Exterior detail, SW corner of ell.
1.22	√	South elevation.

1.23	√	Ell, south elevation.
1.24	√	West elevation.

Roll #2

2.1	-	XXX
2.2	-	Porch parts stored in south room of basement.
2.3	√	Porch parts stored in south room of basement.
2.4	-	Porch parts stored in south room of basement.
2.5	-	Porch parts stored in south room of basement.
2.6	-	East elevation.
2.7	√	East elevation.
2.8	-	Exterior, from NE.
2.9	-	Exterior, from NE.
2.10	√	North elevation.
2.11	-	Exterior, from NW.
2.12	√	Detail of cornice, gable, roof and windows, north elevation.
2.13	-	West elevation.
2.14	√	East entry, detail of brackets and transom.
2.15	√	East entry and window, oblique view from NE.
2.16	-	East entry door, elevation.
2.17	√	West entry door, elevation.
2.18	-	Exterior detail, SW corner of ell.
2.19	-	Exterior detail, SW corner of ell.
2.20	-	Window detail at top of servant stair.

2.21	-	Window detail at top of servant stair.
2.22	√	Door to ell and bottom of servant stair.
2.23	√	Parlor window detail.
2.24	-	North window, east wall of south bedroom.
2.24A	-	Window and corner of mantel, NW corner of north bedroom.

Roll # 3

3.0A	-	North bedroom window.
3.1A	-	North bedroom, NW corner walls and ceilings.
3.2A	-	North bedroom window detail.
3.3A	-	Parlor window detail.
3.4A	-	Attic.
3.5A	√	Rafter feet.
3.6A	-	Attic, main block looking south.
3.7A	√	Attic, main block looking north.
3.8A	-	Attic, xxx
3.9A	√	Attic, rafters, floor, floor framing at inside corner.
3.11 A	-	Landscape looking from house west towards Worthington-McKinney ford.
3.12A	-	Landscape looking from house west towards Worthington-McKinney ford.
3.13A	-	Landscape looking from house west towards Worthington-McKinney ford.
3.14A	-	House exterior from west.
3.15A	-	House exterior from west.

Roll #4

4.1	-	1st floor ell , interior looking NW.
4.2	-	1st floor ell , interior looking NW.
4.3	-	1st floor ell , interior looking SW.
4.4	-	1st floor ell, window at top of stair to basement.
4.5	√	Dining room, northeast corner.
4.6	-	Main entry, detail of paneled jamb and scroll.
4.7	√	Attic, view from west end of ell looking east.
4.8	-	Attic, view of main block towards south.
4.9	-	Attic, view of main block towards south.
4.10	-	Attic, view of main block towards south.
4.11	-	Attic, view of rafter foot.
4.12	-	Attic, view of stair down at west end of ell.
4.13	-	2nd floor?
4.14	-	North bedroom.
4.15	-	North bedroom, looking towards door to stair hall.
4.16	-	North bedroom, looking towards door to stair hall, and hand.
4.17	√	North bedroom, looking towards door to stair hall.
4.18	√	2nd floor ell, interior looking east towards servant stair and door to north bedroom.
4.19	√	Stair hall from 2nd floor, looking west.
4.20	-	Window detail, north bedroom.
4.21	√	Door and base detail, south bedroom.
4.22	√	Basement, south room looking north.

4.23	-	Basement, north room looking north.
4.24	√	Basement, ell looking southwest towards blocked door way and fireplace.

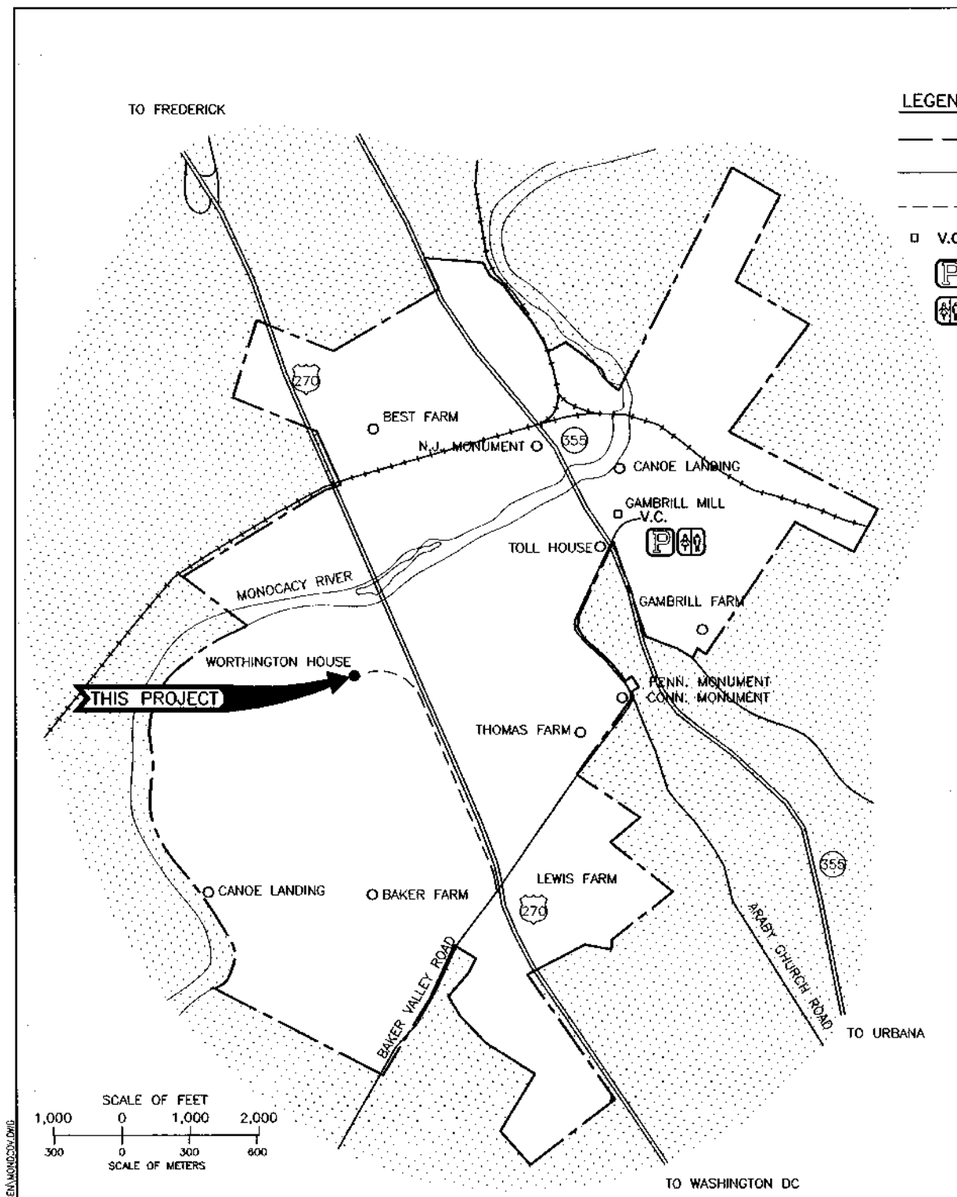
Roll #5

5.0	-	East elevation.
5.1	-	East elevation.
5.2	√	East entry door, elevation.
5.3	-	East entry door, detail.
5.4	√	Window, 1st floor east elevation, exterior detail.
5.5	-	North elevation.
5.6	-	West elevation.
5.7	-	Exterior from SW.
5.8	-	South elevation.
5.9	-	South elevation.
5.10	√	Exterior from the NE.
5.11	√	Basement, south room looking south.
5.12	√	Stair to basement, looking up.
5.13	-	East entry door, interior.
5.14	√	Main stair.
5.15	-	Main stair, detail.
5.16	√	Parlor, looking SE.
5.17	√	Stair hall, looking west.
5.18	-	Stair hall looking west from 2nd floor.
5.19	-	North bedroom.
5.20	-	2nd floor ell, stair to attic and closet.

5.21	-	North bedroom, looking northwest.
5.22	√	North bedroom, detail of mantel and cabinet.
5.23	-	Parlor window, interior corner detail.
5.24	√	South bedroom, doorway with vestibule.
5.24A	-	Stair hall, looking east from 2nd floor.

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Appendix A. Exterior Rehabilitation Drawings, NPS, 2004



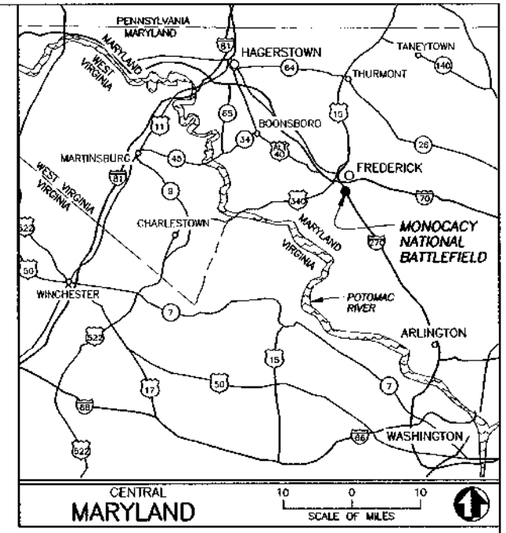
LEGEND

- PARK BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- V.C. VISITOR CENTER
- PARKING
- RESTROOMS

ARCHITECTURAL SYMBOLS

NOTE: STRUCTURAL DRAWINGS USE THE 3 PART SECTION SYMBOL IN ADDITION TO THESE. SEE SHEET S1.0 FOR EXPLANATION.

- SECTION LETTER/NUMBER
- SHEET SHOWN ON
- DETAIL LETTER/NUMBER
- SHEET SHOWN ON
- (A) DOOR LABEL
- (A) WINDOW LABEL



INDEX

SHEET	SUB SHEET	TITLE OF SHEET
GENERAL PROJECT INFORMATION		
1		COVER SHEET
2	GP.1	WORTHINGTON HOUSE HISTORIC PHOTOGRAPH
EXISTING CONDITIONS DRAWINGS & PHOTOGRAPHS		
3	EC.1A	EAST ELEVATION EXISTING CONDITIONS PHOTOGRAPH
4	EC.1B	NORTH ELEVATION EXISTING CONDITIONS PHOTOGRAPH
5	EC.1C	SOUTHWEST ELEVATION EXISTING CONDITIONS PHOTOGRAPH
6	EC.1D	SOUTH ELEVATION EXISTING CONDITIONS PHOTOGRAPH
7	EC.2A	EXISTING FLOOR PLANS
8	EC.2B	DB01 & DB02 EXISTING CONDITIONS PHOTOGRAPHS
9	EC.2C	EAST DOOR (D101) EXISTING CONDITIONS PHOTOGRAPHS
10	EC.2D	D102, D103, D104 EXISTING CONDITIONS PHOTOGRAPHS
11	EC.3A	SOUTH FIREPLACE EXISTING CONDITIONS PHOTOGRAPHS
12	EC.3B	WEST FIREPLACE EXISTING CONDITIONS PHOTOGRAPHS
SITEWORK		
13	C.01	SITE PLAN
BUILDING PLANS AND ELEVATIONS		
14	A1.0	BASEMENT & EAST PORCH FLOOR/ROOF PLANS
15	A1.1	2ND FLOOR PLAN AND ROOF PLANS
16	A1.2	SOUTH & EAST BUILDING ELEVATIONS
17	A1.3	NORTH & WEST BUILDING ELEVATIONS
EAST PORCH DRAWINGS		
18	A2.0	EAST PORCH PLANS SECTIONS & ELEVATIONS
19	A2.1	EAST PORCH ELEVATIONS, SECTIONS & DETAILS
20	A2.2	EAST PORCH COLUMN DETAILS
21	A2.3	EAST PORCH MOLDING PATTERNS
WEST DECK DRAWINGS		
22	A3.0	WEST DECK ELEVATION & PLAN
23	A3.1	WEST DECK ELEVATION & SECTION
ROOFING DRAWINGS		
24	A4.0	ROOFING DETAILS
SHUTTERS, SCREEN PANELS & DOORS		
25	A5.0	WINDOW SHUTTERS
26	A5.1	WINDOW LOUVERS & SCREEN PANELS
27	A5.2	WINDOW SCHEDULE
28	A5.3	DOOR DETAILS
29	A5.4	DOOR SCHEDULE
MASONRY, FIREPLACE & CHIMNEY REPAIRS		
30	A6.0	FIREPLACE REPAIR DETAILS
31	A6.1	CHIMNEY REPAIR DETAILS
STRUCTURAL DRAWINGS		
32	S1.0	GENERAL NOTES
33	S2.1	EAST PORCH FOUNDATION & FLOOR FRAMING PLANS
34	S2.2	EAST PORCH ROOF FRAMING PLAN
35	S2.3	EAST PORCH FLOOR FRAMING DETAILS
36	S2.4	EAST PORCH ROOF FRAMING DETAILS
37	S3.1	WEST DECK PLANS & DETAILS
37A	S3.2	ELL PORCH FRAMING DETAILS (N.I.C.)
ELECTRICAL DRAWINGS		
38	E1	ELECTRICAL SITE PLAN
39	E2	ELECTRICAL FLOOR PLAN
40	E3	FIRE AND SECURITY ALARM PLANS
41	E4	LIGHTNING PROTECTION

CONTRACTOR:
SOUTHEASTERN ROOFING CO. of PINEVILLE, INC.
RT. 10 NORTH (PO BOX 1322)
PINEVILLE, WEST VIRGINIA 24874

CONSTRUCTION MANAGEMENT:
RICHARD H. BROWN – MONOCACY NATIONAL BATTLEFIELD

PROJECT MANAGEMENT:
PATRICK MACDONALD – DENVER SERVICE CENTER

MONOCACY NATIONAL BATTLEFIELD

CONTRACT NO. 1443C3059020905
MONO 403

Mark	Sheet	REVISION	Date	Initial
A	ALL	AS-BUILT DRAWINGS	10/05	MCT

QUALITY DESIGN CERTIFICATION
☐ Prepared in Accordance with Design Development (Title I) Drawing No.
OR
☐ Variance from Design Development (Title I) Approved by Superintendent on Date
OR
☐ Construction Drawing Not Procedent by Design Development (Title I)
Project Manager Date

AS-BUILT DRAWINGS

UNITED STATES
DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE
DENVER SERVICE CENTER

TITLE OF DRAWING
EXTERIOR RESTORATION
LOCATION WITHIN PARK
WORTHINGTON HOUSE
NAME OF PARK
MONOCACY NATIONAL BATTLEFIELD
REGION: NAT. CAPITAL | COUNTY: FREDERICK | STATE: MARYLAND

DRAWING NO. 894 25003A
PKG. NO. MONO 403
SHEET 1 OF 41

BASIC DATA: PARK INFO MAP

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WORTHINGTON HOUSE
(CIRCA 1930)

DESIGNED: NOT APPLICABLE CADD: NOT APPLICABLE TECH. REVIEW: NOT APPLICABLE DATE: 07/02	SUB SHEET NO. GP.1	TITLE OF SHEET WORTHINGTON HOUSE HISTORIC PHOTOGRAPH AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 / 25003A PKG. NO. MONO 403 SHEET 2 OF 41

10/5/05 09:54 MTRACY R15 P:\MONO\403\DRAWINGS\DEA\GP.1_1930PHOTO.DWG HAGES: \$HAGES\WORTHINGTON_13JUL_B.JPG

GENERAL NOTE:
THE EXISTING CONDITIONS SHEETS (EC.1A, EC.1B, ETC.) CONTAIN PHOTOS OF THE WORTHINGTON HOUSE. THEY ARE INTENDED TO PROVIDE A GENERAL, GRAPHIC REFERENCE TO THE CURRENT CONDITION OF THE HOUSE. THESE SHEETS ALSO INCLUDE NUMEROUS NOTATIONS IN THE FIELD AND MARGINS. THESE NOTATIONS ARE INTENDED TO BE USED AS GENERAL REFERENCE TO THE SCOPE OF THE WORK TO BE PERFORMED. THE ARCHITECTURAL, SITEWORK, STRUCTURAL, AND ELECTRICAL DRAWINGS, AND SPECIFICATIONS, DESCRIBE IN DETAIL THE WORK TO BE PERFORMED.

REMOVE EXISTING CORRUGATED METAL ROOFING AND REPLACE WITH SLATE ROOFING

W203 – ADD NEW OPEN SHUTTERS AND HARDWARE

ORIGINAL PORCH ROOF RAFTER AND JOIST POCKETS AND ORIGINAL FLASHING LINE

W202 – REMOVE EXISTING LOWER SASH LOUVER, ADD NEW SCREEN PANEL, NEW SHUTTERS IN CLOSED POSITION AND NEW HARDWARE

W201 – ADD NEW OPEN SHUTTERS AND HARDWARE

PROVIDE & INSTALL NEW GUTTER AND DOWNSPOUT SYSTEM FOR UPPER ROOF. WRAP DOWNSPOUT AT NE CORNER OF MAIN BLOCK TO SOUTH FACE (SEE EC.1D FOR NEW ROUTING.

W101 – REMOVE EXISTING LOWER SASH LOUVER, ADD NEW SCREEN PANEL, NEW SHUTTERS IN CLOSED POSITION AND NEW HARDWARE

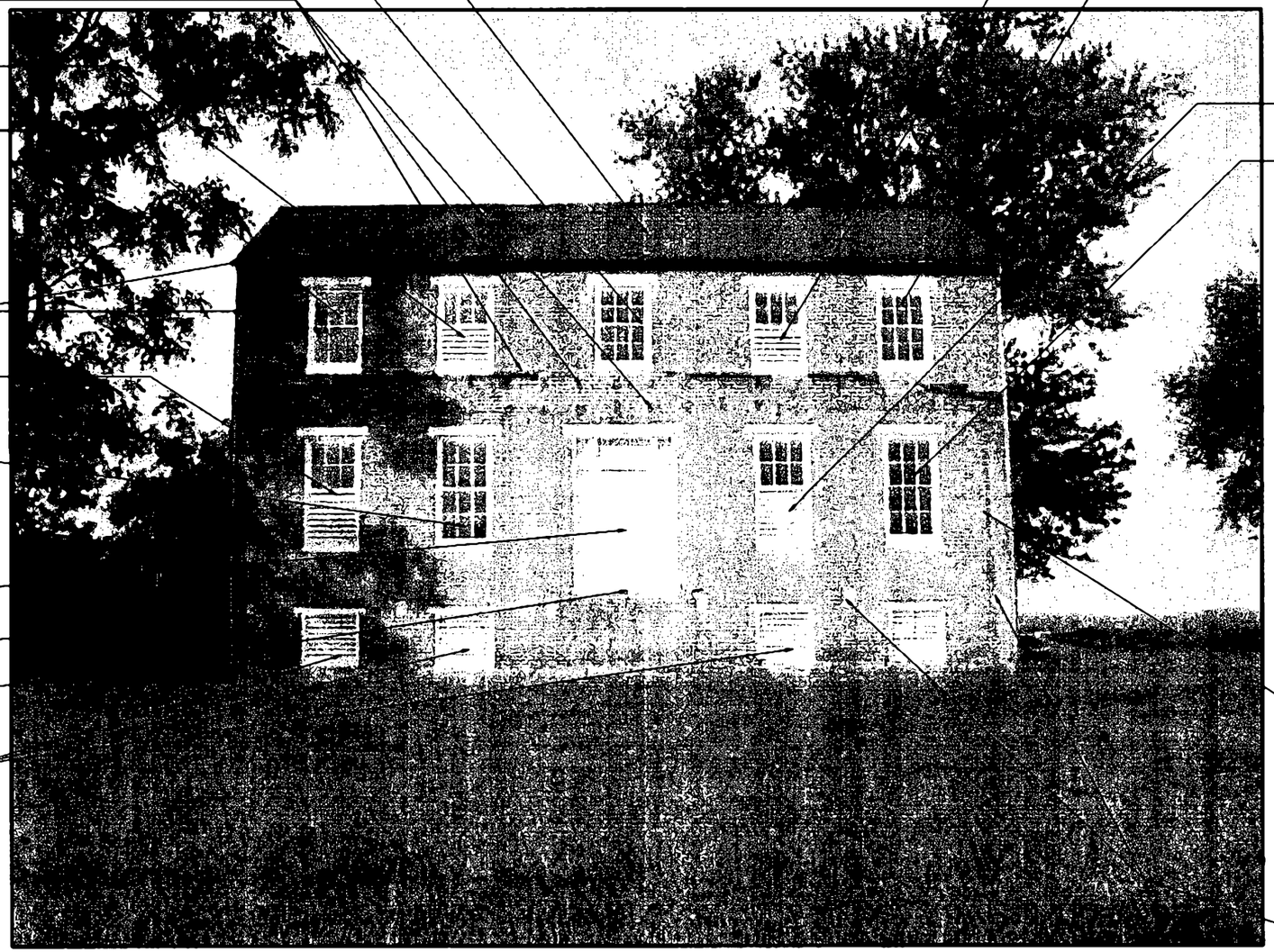
W102 – ADD NEW OPEN SHUTTERS AND HARDWARE

D101 – DOOR, CASING, SIDELIGHTS AND TRANSOM TO BE REPAIRED, CONSERVED, REFINISHED AND REHUNG WITH NEW HARDWARE AS SPECIFIED. SEE SUBSHEETS EC.2C, A5.3 & A5.4 FOR ADDITIONAL NOTATION.

EXISTING BEAM POCKETS (TYP)

D101 – REPLACE WOOD SILL. MATCH ORIGINAL CONFIGURATION, WOOD SPECIES, AND INSTALLATION CONDITIONS & DETAILS

BASEMENT LOUVERS TO BE STRIPPED, REMOVED AND REPLACED IF NECESSARY, REPAIRED, REPLACED AND REFINISHED AS SPECIFIED (TYP. @ ALL BSMT VENTS)



W204 – REMOVE EXISTING LOWER SASH LOUVER, ADD NEW SCREEN PANEL, NEW SHUTTERS IN CLOSED POSITION, AND NEW HARDWARE

W205 – ADD NEW OPEN SHUTTERS AND HARDWARE

W103 – REMOVE EXISTING LOWER SASH LOUVER, ADD NEW SCREEN PANEL, NEW SHUTTERS IN CLOSED POSITION AND NEW HARDWARE

W104 – ADD NEW OPEN SHUTTERS AND HARDWARE

GENERAL NOTE:

THE APPROXIMATE AMOUNT OF BRICK REPOINTING REQUIRED FOR EXTERIOR FACES OF THE WORTHINGTON HOUSE IS AS FOLLOWS:

15 S.F. – EAST FACE
10 S.F. – NORTH FACE
04 S.F. – WEST FACE OF ELL
04 S.F. – SOUTH FACE OF ELL
04 S.F. – WEST FACE OF MAIN
06 S.F. – SOUTH FACE OF MAIN
43 S.F. + 15% CONTINGENCY =
50 S.F. BRICK REPOINTING (APPROX.)

BRICKWORK FOR REPLACEMENT OF DISMANTLED CHIMNEYS IS NOT INCLUDED IN THIS LIST. SEE SHEET A8.1 FOR CHIMNEY REPAIR DETAILS.

THE APPROXIMATE AMOUNT OF STONE FOUNDATION REPAIR AND REPOINTING IS AS FOLLOWS:

135 S.F. – EAST FACE OF BLDG
105 S.F. – NORTH FACE OF BLDG
58 S.F. – WEST FACE OF ELL
30 S.F. – SOUTH FACE OF ELL
50 S.F. – WEST FACE OF BLDG
56 S.F. – SOUTH FACE OF BLDG
432 S.F. – APPROX. FOUNDATION REPOINTING FROM BOTTOM OF BRICK TO 2 FEET BELOW EXISTING GRADE. THIS IS BASE BID ONLY (SEE THE CONTRACT BID SCHEDULE AND DEFINITION OF BID ITEMS FOR BID OPTIONS PERTAINING TO ADDITIONAL STONE WORK.

PAINT ENTIRE BRICK EXTERIOR OF BLDG AS SPECIFIED, UNLESS NOTED OTHERWISE

CONSTRUCT NEW EAST PORCH, PORCH ROOF, RAILING, PORCH STAIRS. SEE DETAILS ON EAST PORCH DRAWINGS

EXCAVATE EARTH ALONG ENTIRE EAST FACE OF BUILDING FROM BOTTOM OF BRICK TO A DEPTH OF 5 FT. BELOW EXISTING GRADE. FROM BOTTOM OF BRICK TO FULL DEPTH OF EXCAVATION: RAKE AND CLEAN STONE JOINTS, REPLACE ANY MISSING STONEWORK, AND REPOINT FOUNDATION. (APPROXIMATELY 135 S.F.)

EXISTING BEAM POCKETS (TYP)

EAST ELEVATION

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DESIGNED: NOT APPLICABLE DRAWN: J.COOK TECH. REVIEW: D.SNOW DATE: 07/02	SUB SHEET NO. EC.1A	TITLE OF SHEET EAST ELEVATION EXISTING CONDITIONS PHOTOGRAPHS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 103 SHEET 3 OF 41

W301 LOUVER TO BE STRIPPED, (REMOVE & REPLACE IF NECESSARY) REPAIRED & REFINISHED AS SPECIFIED (TYP. @ ALL ATTIC LOUVERS)

REMOVE EXISTING CORRUGATED METAL ROOFING AND REPLACE WITH SLATE ROOFING.

PROVIDE AND INSTALL NEW GUTTER AND DOWNSPOUT SYSTEM FOR UPPER ROOF

W206 – REMOVE EXISTING LOWER SASH LOUVER, ADD EXISTING GLAZING SASH STORED ON SITE, ADD NEW SHUTTERS IN OPEN POSITION WITH HARDWARE AS SPECIFIED

W105 – REMOVE EXISTING LOWER SASH LOUVER, ADD EXISTING GLAZING SASH STORED ON SITE, ADD NEW SHUTTERS IN OPEN POSITION WITH HARDWARE AS SPECIFIED.

GENERAL NOTE:
ALL EXTERIOR WINDOW SASHES, CASINGS, SILLS AND LOUVERED OPENINGS AT ALL BUILDING ELEVATIONS SHALL BE STRIPPED, CLEANED AND REPAIRED AS NEEDED, REPAINTED AND REMOUNTED AS INDICATED AND AS SPECIFIED.



W207 – ADD NEW OPEN SHUTTERS AND HARDWARE AS SPECIFIED

W208 – REMOVE EXISTING LOWER SASH LOUVER, ADD NEW SCREEN PANEL, NEW SHUTTERS IN CLOSED POSITION AND NEW HARDWARE AS SPECIFIED

W106 – REMOVE EXISTING LOWER SASH LOUVER, ADD NEW SCREEN PANEL, NEW SHUTTERS IN CLOSED POSITION AND NEW HARDWARE AS SPECIFIED

NEW DOWNSPOUT TO BE LOCATED IN HISTORIC ALIGNMENT (SHADOW VISIBLE ON BRICK SURFACE) AT WEST FACE OF "ELL" AT NW CORNER. NOTE & RECORD LOCATION OF SHADOW PRIOR TO PAINTING TO ENSURE PROPER ALIGNMENT.

W3B05 LOUVER TO BE STRIPPED, (REMOVE & REPLACE IF NECESSARY) REPAIRED & REFINISHED AS SPECIFIED (TYP. @ ALL BASEMENT LOUVERS)

PAINT ENTIRE BRICK EXTERIOR OF BLDG. AS SPECIFIED, UNLESS NOTED OTHERWISE

D102 – FABRICATE NEW DOOR. DOOR, CASING, TRANSOM & TRIM TO BE REPAIRED, CONSERVED, REFINISHED AND REINSTALLED WITH NEW HARDWARE AS SPECIFIED (SEE EC.2D, A5.3 & A5.4).

EXCAVATE EARTH ALONG ENTIRE NORTH FACE OF BUILDING FROM BOTTOM OF BRICK TO A DEPTH OF 5 FT. BELOW EXISTING GRADE. FROM BOTTOM OF BRICK TO FULL DEPTH OF EXCAVATION: RAKE AND CLEAN STONE JOINTS, REPLACE ANY MISSING STONEWORK, AND REPOINT FOUNDATION. (APPROXIMATELY 105 S.F.)

NORTH ELEVATION

DESIGNED: NOT APPLICABLE CADD: J.COOK TECH. REVIEW: D.SNOW DATE: 07/02	SUB SHEET NO. EC.1B	TITLE OF SHEET NORTH ELEVATION EXISTING CONDITIONS PHOTOGRAPHS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 4 OF 41

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REMOVE EXISTING CORRUGATED METAL ROOFING AND REPLACE WITH SLATE ROOFING TO MATCH ORIGINAL MATERIAL.

PROVIDE AND INSTALL NEW GUTTER AND DOWNSPOUT SYSTEM FOR UPPER ROOF

W302 – LOUVER TO BE STRIPPED (REMOVE & REPLACE IF NECESSARY), REPAIRED & REFINISHED AS SPECIFIED (TYPICAL @ 3 ATTIC LOUVERS)

PAINT ENTIRE BRICK EXTERIOR OF BLDG. AS SPECIFIED, UNLESS NOTED OTHERWISE

NEW DOWNSPOUTS FOR GUTTERS AT NORTH AND SOUTH FACES OF "ELL" TO BE LOCATED ON WEST FACE OF "ELL" AT THE NW & SW CORNERS. NW CORNER IS HISTORIC ALIGNMENT (SHADOW VISIBLE ON BRICKWORK. DOWNSPOUT AT SW CORNER TO BE MIRROR IMAGE OF THE DOWNSPOUT AT NW CORNER. NOTE AND RECORD THE NW SHADOW LOCATION PRIOR TO PAINTING TO ENSURE ACCURATE ALIGNMENT OF NEW DOWNSPOUT.

DO NOT PAINT "SHADOW" AREA OF THE FORMER PORCH AND PORCH ROOF. COORDINATE WITH CONTRACTING OFFICER PRIOR TO PAINTING.

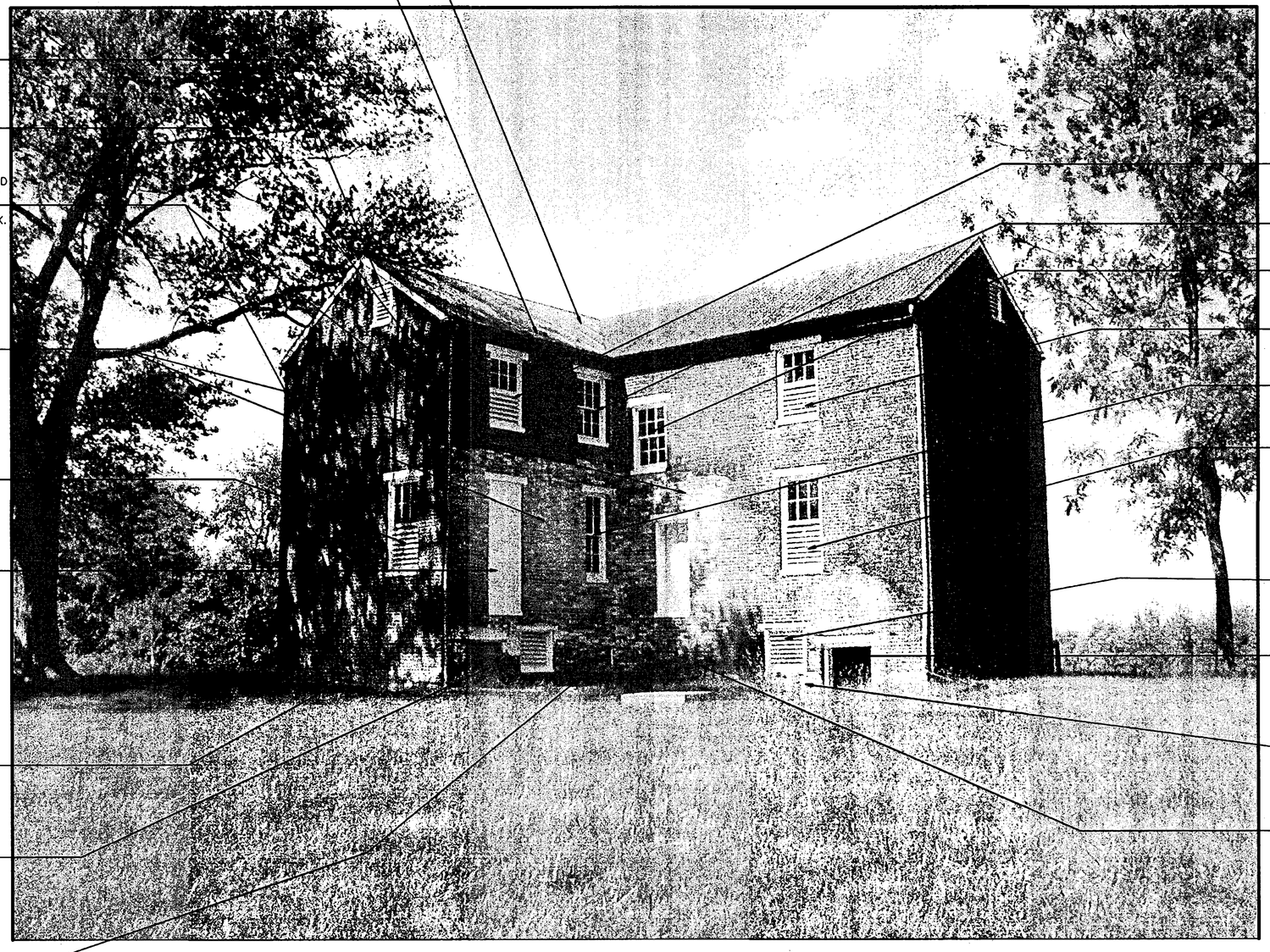
W107 – REMOVE EXISTING LOWER SASH LOUVER, ADD EXISTING GLAZING SASH STORED ON SITE, ADD NEW SHUTTERS IN OPEN POSITION WITH NEW HARDWARE AS SPECIFIED.

D103 – DOOR, CASING, & TRANSOM TO BE REPAIRED, CONSERVED, REFINISHED AND REINSTALLED WITH NEW HARDWARE AS SPECIFIED. SEE EC.2D, A5.3 & A5.4 FOR ADDITIONAL INFORMATION.

EXCAVATE EARTH ALONG ENTIRE WEST FACE OF "ELL" FROM BOTTOM OF BRICK TO A DEPTH OF 2 FT. BELOW EXISTING GRADE. FROM BOTTOM OF BRICK TO FULL DEPTH OF EXCAVATION: RAKE AND CLEAN STONE JOINTS, REPLACE ANY MISSING STONEWORK, AND REPOINT FOUNDATION. (APPROXIMATELY 56 S.F.)

EXISTING CONCRETE MASONRY UNIT INFILL AT DOOR DB01 TO REMAIN IN PLACE.

EXCAVATE EARTH ALONG SOUTH FACE OF "ELL" FROM BOTTOM OF BRICK TO A DEPTH OF 2 FT. BELOW EXISTING GRADE. FROM BOTTOM OF BRICK TO FULL DEPTH OF EXCAVATION: RAKE AND CLEAN STONE JOINTS, REPLACE ANY MISSING STONEWORK, AND REPOINT FOUNDATION. (APPROXIMATELY 30 S.F.)



W209 – REMOVE EXISTING LOWER SASH LOUVER, ADD NEW SCREEN PANEL, NEW SHUTTERS IN CLOSED POSITION AND NEW HARDWARE AS SPECIFIED.

W210 – ADD NEW SHUTTERS IN OPEN POSITION & NEW HARDWARE AS SPECIFIED.

W211 – ADD NEW SHUTTERS IN OPEN POSITION & NEW HARDWARE AS SPECIFIED.

W212 – REMOVE EXISTING LOWER SASH LOUVER, ADD NEW SCREEN PANEL, NEW SHUTTERS IN CLOSED POSITION AND NEW HARDWARE AS SPECIFIED.

W108 – ADD NEW SHUTTERS IN OPEN POSITION AND NEW HARDWARE AS SPECIFIED.

W109 – REMOVE EXISTING LOWER SASH LOUVER, ADD NEW SCREEN PANEL, NEW SHUTTERS IN CLOSED POSITION, AND NEW HARDWARE AS SPECIFIED.

NEW DOWNSPOUT TO BE LOCATED IN HISTORIC ALIGNMENT ON SW FACE OF MAIN BLOCK AT SW CORNER (SEE EC.1D).

WB07 – LOUVER TO BE STRIPPED (REMOVE & REPLACE IF NECESSARY), REPAIRED & REFINISHED AS SPECIFIED (TYPICAL @ ALL BASEMENT LOUVERS)

DOOR DB02 (SEE A5.3 & A5.4 FOR DETAILS)

REPAIR NORTH AND SOUTH RETAINING WALLS ADJACENT TO DB02. REMOVE ALL LOOSE STONEWORK, CLEAN, RESET, AND REPOINT ALL IN AS NEAR TO ORIGINAL CONFIGURATION AS POSSIBLE.

EXCAVATE EARTH ALONG WEST FACE OF BUILDING FROM BOTTOM OF BRICK TO A DEPTH OF 5 FT. BELOW EXISTING GRADE. FROM BOTTOM OF BRICK TO FULL DEPTH OF EXCAVATION: RAKE AND CLEAN STONE JOINTS, REPLACE ANY MISSING STONEWORK, AND REPOINT FOUNDATION. (APPROXIMATELY 50 S.F.)

NOTE: 2 FOOT FOOTING EXCAVATION IS THE MINIMUM DEPTH OF EXCAVATION IN THE BASE BID. BID OPTIONS FOR ADDITIONAL EXCAVATION DEPTH ARE ITEMIZED AND EXPLAINED IN THE SPECIFICATIONS (SEE CONTRACT BID SCHEDULE AND SECTION 01270)

SOUTHWEST ELEVATION

DESIGNED: NOT APPLICABLE CADD: J.COOK TECH. REVIEW: D.SNOW DATE: 07/02	SUB SHEET NO. EC.1C	TITLE OF SHEET SOUTHWEST ELEVATION EXISTING CONDITIONS PHOTOGRAPHS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 / 25003A PKG. NO. MONO 403 SHEET 5 OF 41

10/5/05 09:15 MTRACY R15 P:\MONO\403\DRAWINGS\ARCH\EC1C_SWELEVEXCPHOTO.DWG IMAGES: ..\IMAGES\SW ELEV 01_B&W.JPG;

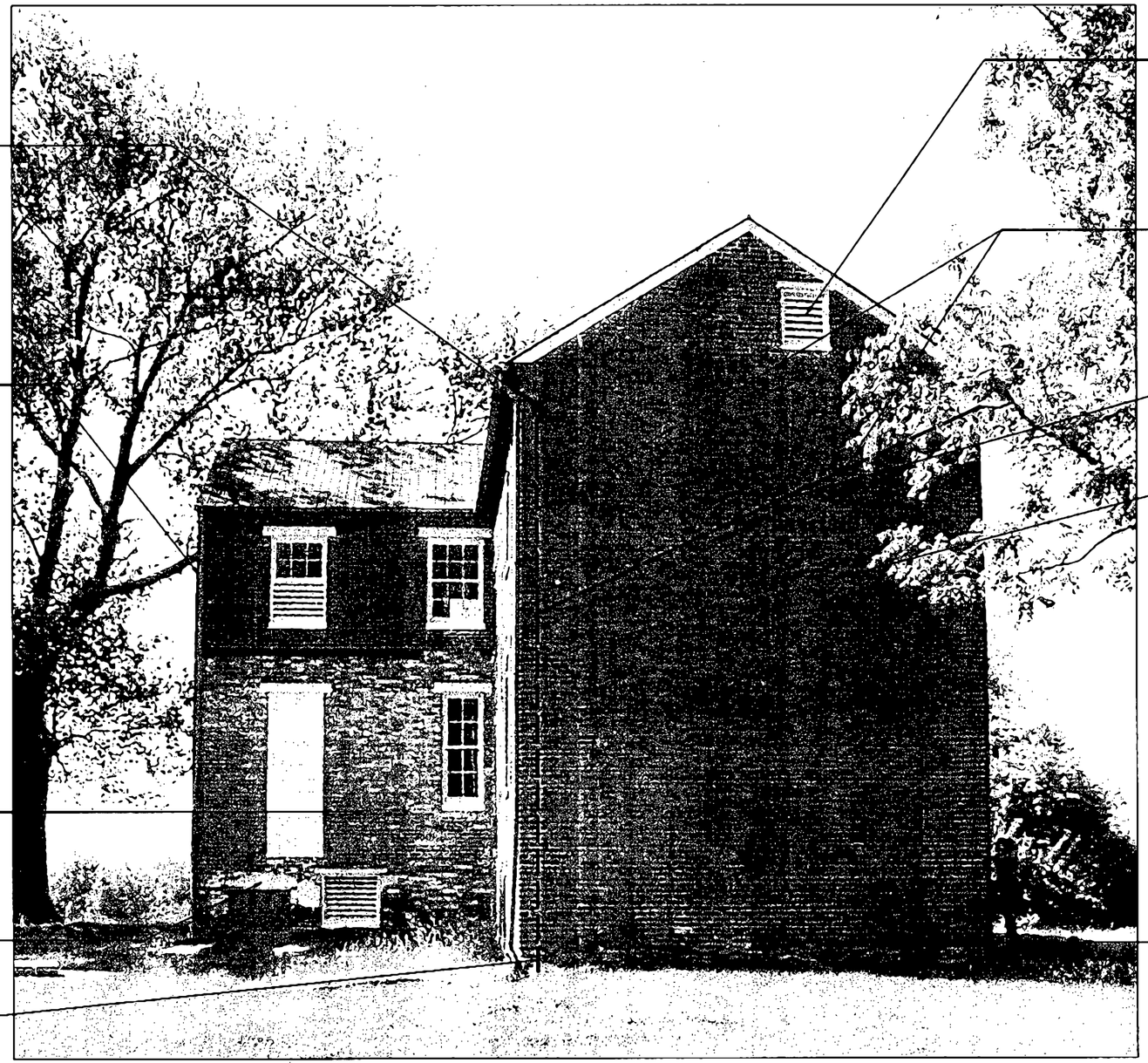
PROVIDE & INSTALL NEW GUTTER & DOWNSPOUT SYSTEM FOR UPPER ROOF. DOWNSPOUT FOR THE NEW GUTTER FOR WEST FACE OF MAIN BLOCK TO BE LOCATED IN HISTORIC ALIGNMENT (MARKS ARE VISIBLE ON BUILDING) ON SOUTH FACE OF THE MAIN BLOCK AT SW CORNER. NOTE & RECORD LOCATION OF SHADOW PRIOR TO PAINTING TO ENSURE PROPER ALIGNMENT OF DOWNSPOUTS.

NEW DOWNSPOUT FOR NEW GUTTER AT SOUTH FACE OF "ELL" TO BE LOCATED ON WEST FACE OF "ELL" (SEE SIMILAR NOTE ON EC.1C.)

CONSTRUCT NEW DECK, RAILING AND STAIRS FOR ACCESS TO DOORS D103 AND D104. (SEE A3.0 & A3.1 FOR DETAILS).

REMOVE PARGING AROUND DB01. REPLACE MISSING BRICK AND REPOINT ENTIRE AREA. MASONRY INFILL FOR DOOR TO REMAIN IN PLACE. REMOVE DAMAGED WOOD LINTEL AND REPLACE WITH NEW LINTEL OF SAME WOOD SPECIES, SAME LINTEL CONFIGURATION, AND SAME INSTALLATION CONDITIONS & DETAILS AS ORIGINAL.

DOWNSPOUT (LEADER) WILL CONNECT TO BURIED DRAINAGE PIPE. SEE SITE DRAWING FOR ROUTING AND DAYLIGHTING OF PIPE.



W303 - LOUVER TO BE STRIPPED (REMOVE AND REPLACE IF NECESSARY), REPAIRED & REFINISHED AS SPECIFIED

PROVIDE NEW GUTTER AND DOWNSPOUT SYSTEM FOR UPPER ROOF. DOWNSPOUTS AT SOUTH FACE OF MAIN BUILDING BLOCK SHALL BE ROUTED ALONG HISTORICAL PATH AS INDICATED HERE BY DASHED LINE. THE HISTORICAL OUTLINE IS CLEARLY VISIBLE ON THE FACE OF THE BUILDING. REUSE THE HISTORICAL LEADER CLAMPS THT ARE MOUNTED ON THIS FACE OF THE BUILDING.

ORIGINAL LEADER "SLEEVE" TO BE REUSED.

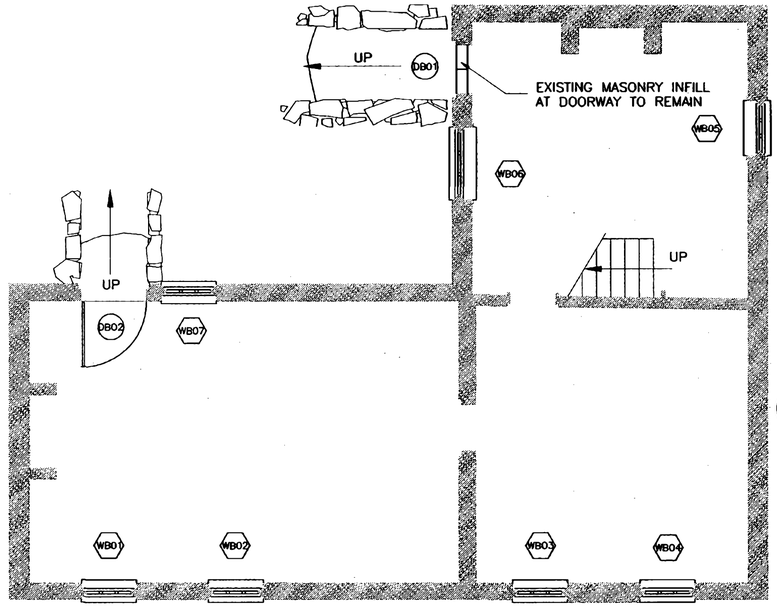
ORIGINAL LEADER CLAMP TO BE REUSED.

EXCAVATE EARTH ALONG ENTIRE SOUTH FACE OF BUILDING FROM BOTTOM OF BRICK TO A DEPTH OF 5 FT. BELOW EXISTING GRADE. FROM BOTTOM OF BRICK TO FULL DEPTH OF EXCAVATION: RAKE AND CLEAN STONE JOINTS, REPLACE ANY MISSING STONEWORK, AND REPOINT FOUNDATION. (APPROXIMATELY 56 S.F.)

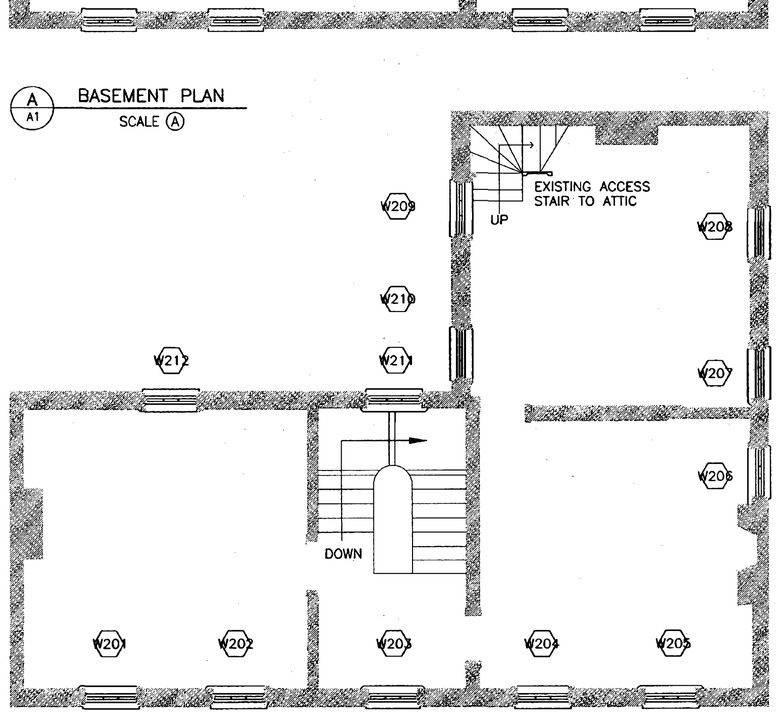
SOUTH ELEVATION

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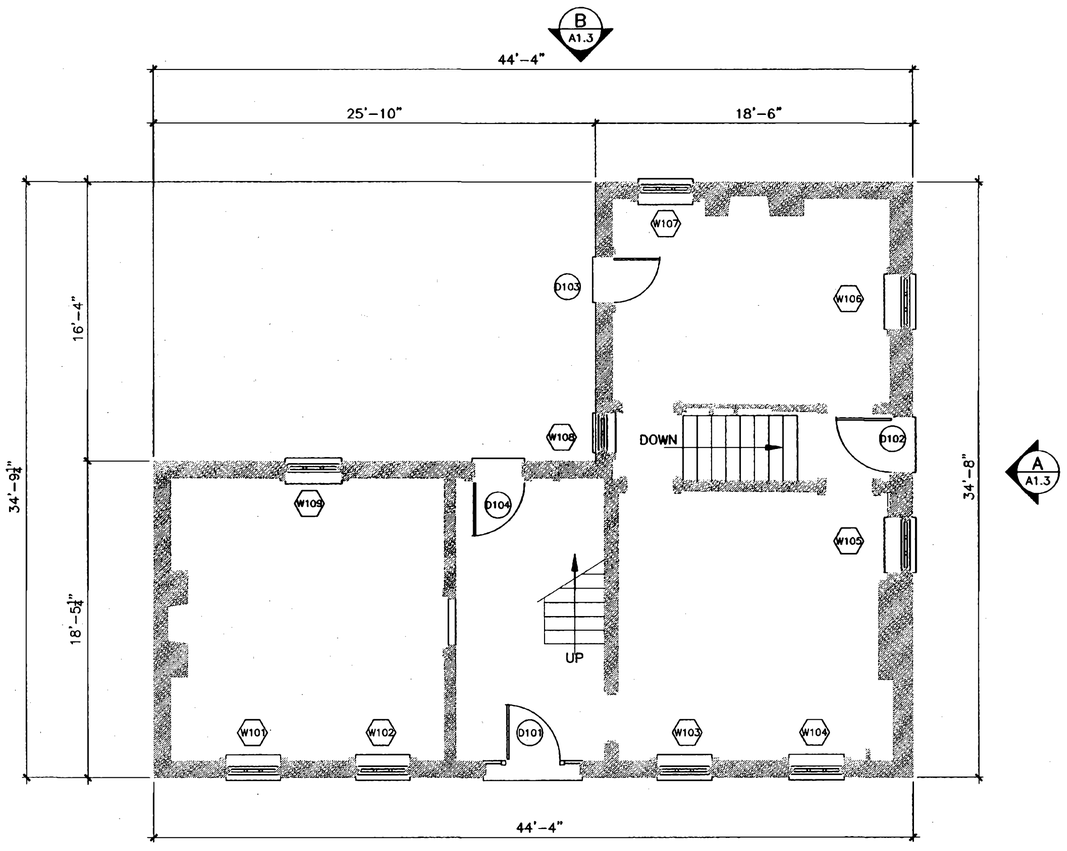
DESIGNED: NOT APPLICABLE CADD: J.COOK TECH. REVIEW: D.SNOW DATE: 07/02	SUB SHEET NO. EC.1D	TITLE OF SHEET SOUTH ELEVATION EXISTING CONDITIONS PHOTOGRAPHS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 6 OF 41



A / A1 BASEMENT PLAN
SCALE A



A / A3 SECOND FLOOR
SCALE A



A / A2 FIRST FLOOR PLAN
SCALE A

B / A1.2

GENERAL NOTE:

INTERIOR STAIRS ARE SHOWN FOR VERTICAL CIRCULATION INSIDE HOUSE. OTHER INTERIOR FEATURES HAVE BEEN REMOVED FOR CLARITY. INTERIOR RESTORATION IS NOT INCLUDED IN THIS CONTRACT. THESE FLOOR PLANS ARE INCLUDED TO SHOW LOCATIONS OF EXTERIOR DOORS, WINDOWS, AND OTHER EXTERNAL FEATURES, AND TO REFERENCE THEM TO DOOR AND WINDOW SCHEDULES. INTERIOR RESTORATION, EXCEPT FOR REPAIR AND RESTORATION OF DOORS AND WINDOWS, IS NOT PART OF THIS CONTRACT.

WHEN REQUIRED TO WORK INSIDE BUILDING TO REPAIR WINDOWS AND DOORS, TAKE CARE TO PROTECT ALL EXISTING INTERIOR FEATURES FROM DAMAGE DUE TO CONSTRUCTION.

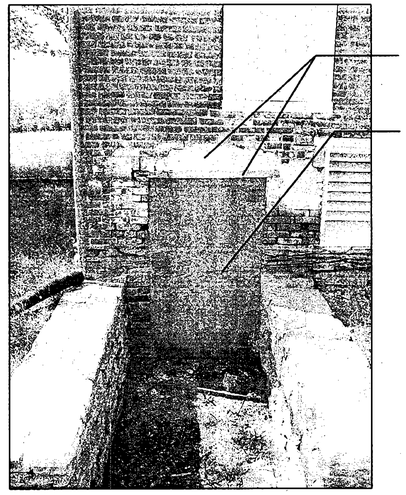
NO CONSTRUCTION MATERIALS SHALL BE STORED INSIDE THE HOUSE DURING CONSTRUCTION.

LOCATION FOR STORAGE OF CONSTRUCTION MATERIALS SHALL BE AS DIRECTED BY CONTRACTING OFFICER

SCALE A 4 0 4 8
SCALE OF FEET

DESIGNED: N/A (SADD) J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. EC.2A	TITLE OF SHEET EXISTING FLOOR PLANS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 7 OF 41

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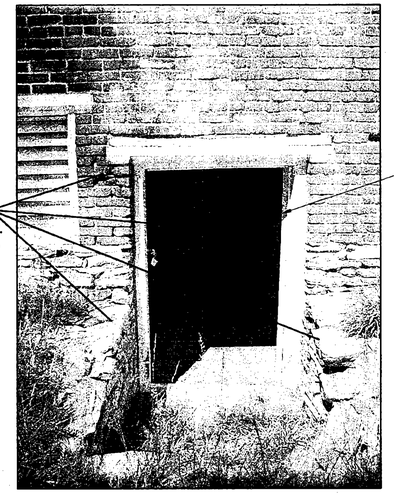


REMOVE PARGING, CLEAN BRICK, REPLACE MISSING OR BROKEN BRICKS AND REPOINT WHERE NEEDED. REMOVE EXISTING WOOD LINTEL AND REPLACE WITH NEW LINTEL TO MATCH EXISTING IN WOOD SPECIES, AND CONFIGURATION & INSTALLATION DETAIL.

CMU INFILL TO REMAIN IN PLACE.

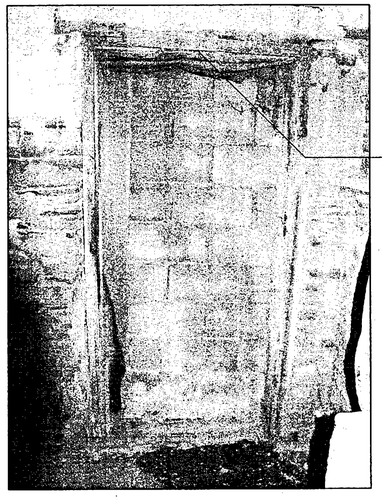
REPLACE MISSING OR BROKEN BRICK AND REPOINT WHERE NEEDED. REPAIR STONE RETAINING WALLS. REPAIR DOOR CASING. FABRICATE NEW DOOR (SEE DETAILS A5.3) TO REPLACE EXISTING PLYWOOD PANEL DOOR. STRIP CASING & LINTEL AND REFINISH DOOR, CASING, AND LINTEL AS SPECIFIED.

DB01 EXTERIOR



REPALCED DOOR CASING WITH MAHOGANY 3"X8"X8'

DB02 EXTERIOR



REPLACE DETERIORATED WOOD LINTEL (SEE NOTE ABOVE)

DB01 INTERIOR

GENERAL NOTES:

1. FABRICATE A NEW DOOR TO REPLACE EXISTING PLYWOOD PANEL DOOR AT DB02 (SEE DETAILS D, E & F/A5.3). STRIP & REPAIR DOOR CASING. NEW DOOR & REPAIRED CASING TO BE REFINISHED AS SPECIFIED. REPLACE MISSING AND/OR BROKEN BRICK AND REPOINT AS NEEDED IN THIS AREA. REPAIR RETAINING WALLS AT NORTH, SOUTH AND WEST OF DOOR. REPOINT RETAINING WALL STONEWORK.

2. REMOVE EXISTING WOOD LINTEL AT DOOR DB01. REPLACE WITH NEW LINTEL OF SAME WOOD SPECIES, SAME LINTEL CONFIGURATION, AND SAME INSTALLATION DETAILS AS ORIGINAL. EXISTING CONCRETE MASONRY INFILL TO REMAIN. REPLACE MISSING AND BROKEN BRICK AND REPOINT AS NEEDED IN THIS AREA.

DESIGNED: NOT APPLICABLE DRAWN: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. EC.2B	TITLE OF SHEET DB01 AND DB02 EXISTING CONDITIONS PHOTOGRAPHS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 / 25003A PKG. NO. MONO 403 SHEET 8 OF 41

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EAST DOOR (D101)



INTERIOR W/TRANSOM

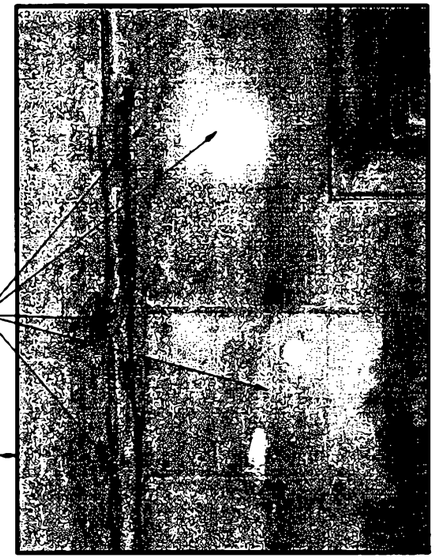
INTERIOR:

REPLACE MISSING GLAZING AND TRIM AT TRANSOM AND SIDELIGHTS. REFINISH AS SPECIFIED.

CLEAN & REPAIR INTERIOR SURFACE OF D101. CLEAN & REPAIR ALL INTERIOR SURFACES OF CASING, TRANSOM & TRIM. REPLACE MISSING GLAZING FOR SIDELIGHTS & TRANSOM. REPLACE MISSING WOOD TRIM FOR DOOR, SIDELIGHTS AND TRANSOM TO MATCH EXISTING TRIM.

REMOVE OLD STRIKE. REPAIR HOLE FOR MISSING SURFACE MOUNT DEADBOLT WITH DUTCHMAN. FILL OLD SCREW HOLES. REPLACE MISSING RIMLOCK & KEEPER. ORIGINAL DIMENSION OF THE ORIGINAL RIMLOCK APPROXIMATELY 5 7/8" WIDE X 4" HIGH. FILL AND REPAIR LARGE HOLES IN CASING TO BRING BACK TO ORIGINAL SHAPE & CONFIGURATION.

SEE DETAIL



INTERIOR ELEVATION



EXTERIOR DETAIL

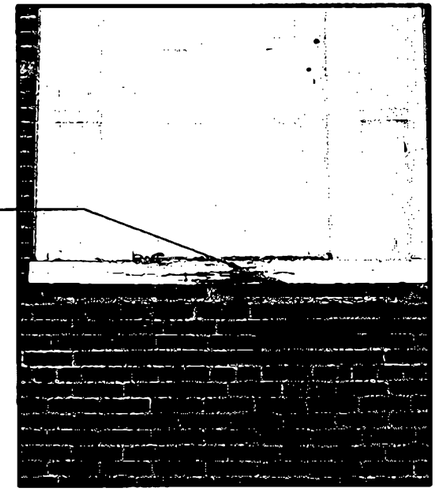


EXTERIOR DETAIL

EXTERIOR:

STRIP ALL FINISH FROM EXTERIOR OF THIS DOORWAY. REPAIR AS NEEDED AND REFINISH AS SPECIFIED.

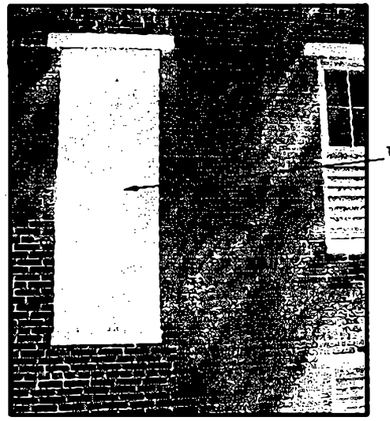
REMOVE EXISTING DETERIORATED SILL AND REPLACE WITH NEW SILL MATCHING THE ORIGINAL IN WOOD SPECIES, CONFIGURATION, AND INSTALLATION DETAILS.



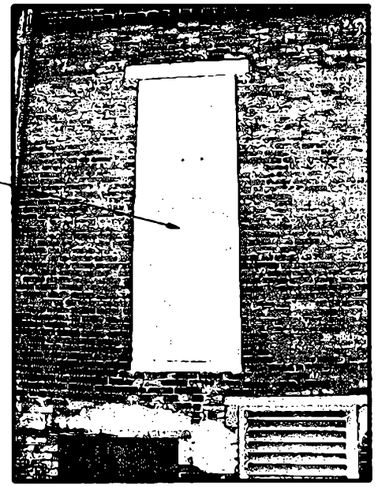
SILL DETAIL (D101)

DESIGNED: NOT APPLICABLE (CADD) J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. EC.2C	TITLE OF SHEET: EAST DOOR (D101) EXISTING CONDITIONS PHOTOGRAPHS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 — SHEET 9 OF 41

10/5/05 08:40 MTRACY RES P:\MONO\403\DRAWINGS\HABSX\EC2C_D101_DOORSEPHOTOS.DWG IMAGES: ..\BASES\2515027.JPG; ..\BASES\D101FRSTVIEW.JPG; ..\BASES\D101C_SILLDETAIL.JPG; ..\BASES\D101.JPG; ..\BASES\D101ELEV.JPG; ..\BASES\D101B.JPG;



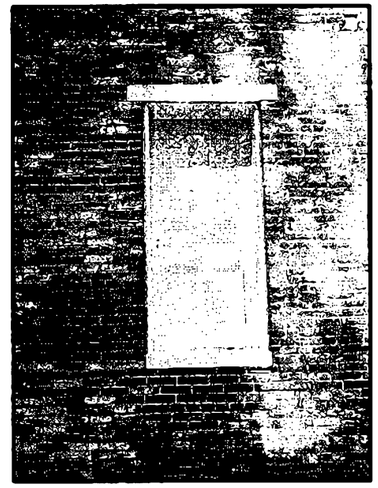
NORTH DOOR (D102) EXTERIOR



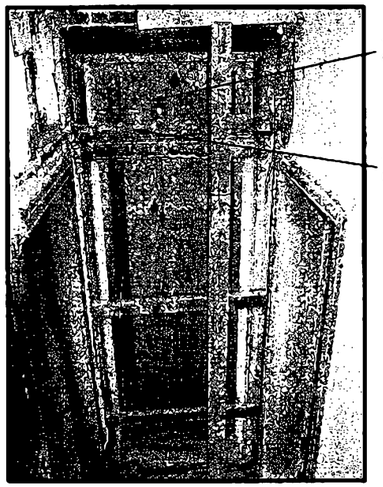
SOUTH DOOR (D103) EXTERIOR



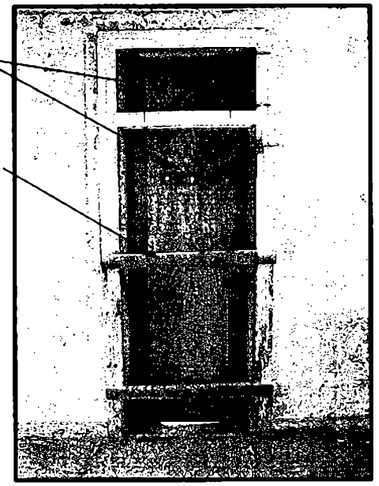
DOOR D102 OR DOOR D103



WEST DOOR (D104) EXTERIOR



NORTH DOOR (D102) INTERIOR



SOUTH DOOR (D103) INTERIOR

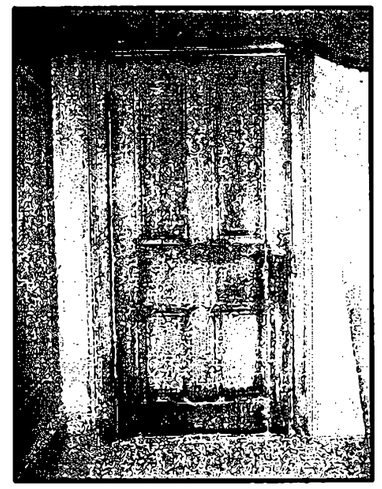
GENERAL NOTES:

1. THE DETAIL LABELED "DOOR D102 OR D103" ABOVE IS A PHOTOGRAPH OF THE ONLY REMAINING DOOR OF THIS TYPE. THE DOOR IS STORED IN THE BUILDING. THIS DOOR SHALL BE STRIPPED, REPAIRED, AND REFINISHED AS SPECIFIED. THIS DOOR FITS EITHER DOOR D102 OR D103. FIELD VERIFICATION IS REQUIRED TO DETERMINE WHICH.

2. FABRICATE A SIMILAR DOOR FOR THE REMAINING OPENING (EITHER D102 OR D103). THE FABRICATED DOOR SHALL MATCH THE EXISTING IN WOOD SPECIES, PATTERN, AND CONSTRUCTION DETAILS, AN SHALL BE SIZED TO FIT THE REMAINING OPENING (EITHER D102 OR D103). THE CASINGS AND TRANSOMS FOR BOTH DOORWAYS D102 & D103 SHALL BE STRIPPED, AND REPAIRED AS NEEDED. REPLACE MISSING TRANSOM GLAZING AND ANY MISSING TRIM TO MATCH EXISTING. DOORS, CASINGS, TRANSOMS AND TRIM SHALL BE REFINISHED, INTERIOR & EXTERIOR, AS SPECIFIED.

3. DOOR 104 – CLEAN AND REPAIR ONLY FOR DOOR, CASING, TRANSOM AND TRIM. REPLACE MISSING GLAZING AT TRANSOM. REPLACE ANY MISSING TRIM TO MATCH EXISTING & REFINISH TO MATCH EXISTING.

4. PROVIDE NEW HARDWARE SETS FOR ALL EXTERIOR DOORS AS SPECIFIED.



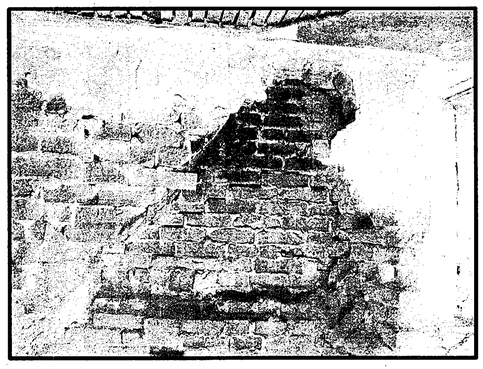
WEST DOOR (D104) INTERIOR

DESIGNED: NOT APPLICABLE DRAWN: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. EC.2D	TITLE OF SHEET D102, D103 & D104 EXISTING CONDITIONS PHOTOGRAPHS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 10 OF 41

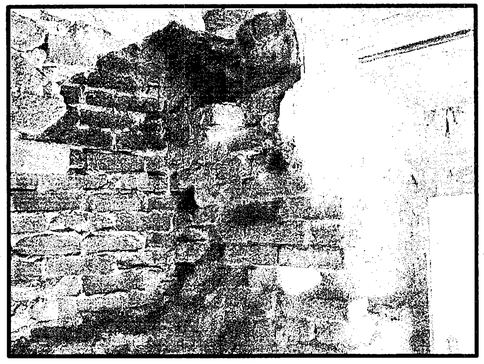
10/5/05 09:15 MTRACY R15 P:\MONO\403\DRAWINGS\MONA\EC2D_D102,3,4EXPHOTOS.DWG MACROS: ..\BASES\D102A_BW_ROTATED.JPG; ..\BASES\D104B_BW.JPG; ..\BASES\D103F_BW.JPG; ..\BASES\D102B_BW.JPG; ..\BASES\D104A_BW.JPG; ..\BASES\D103E_BW.JPG; ..\BASES\D104E_BW.JPG;



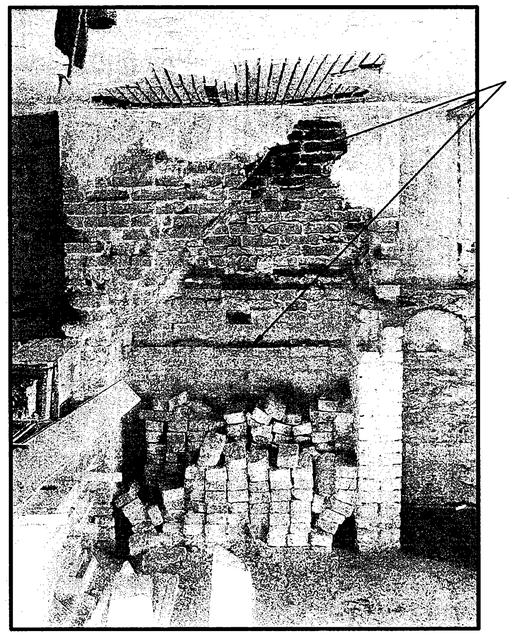
UPPER RIGHT SIDE



UPPER CENTER

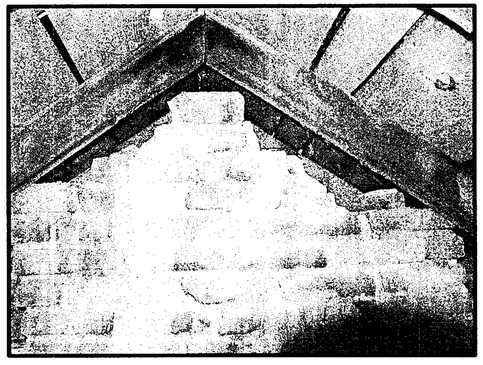


UPPER RIGHT SIDE



FRONT ELEVATION

THIS AREA TO BE REPAIRED. INFILL AREA AS INDICATED ON A6.0. ADD NEW STEEL LINTEL AND PARGE EXTERIOR SURFACES @ FRONT & 2 SIDES.

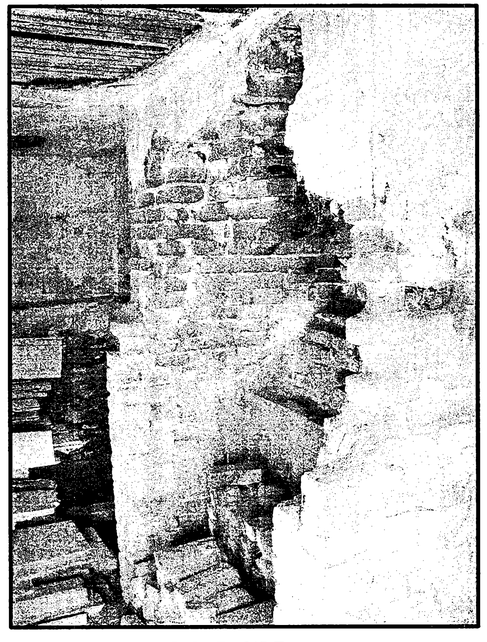


TYPICAL EXIST. CONDITION UNDER ROOF

GENERAL NOTES:

1. CHIMNEY/FIREPLACE REPAIRS INCLUDE WORK AS INDICATED ON EC.3A, EC.3B, A6.0, A6.1, AND AS SPECIFIED.

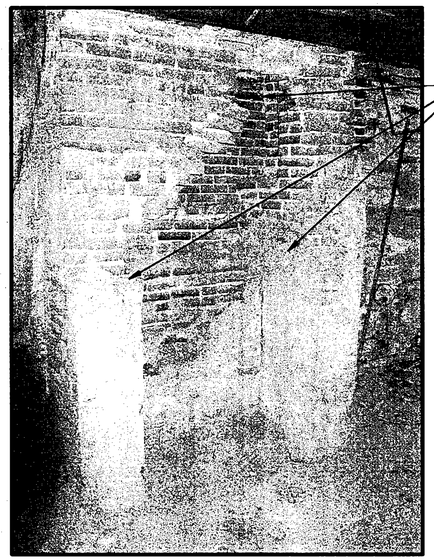
2. ORIGINAL BRICK AND REPLACEMENT BRICK FROM ORIGINAL MANUFACTURER IS STORED ON SITE IN THE BASEMENT OF THE BUILDING.



RIGHT SIDE

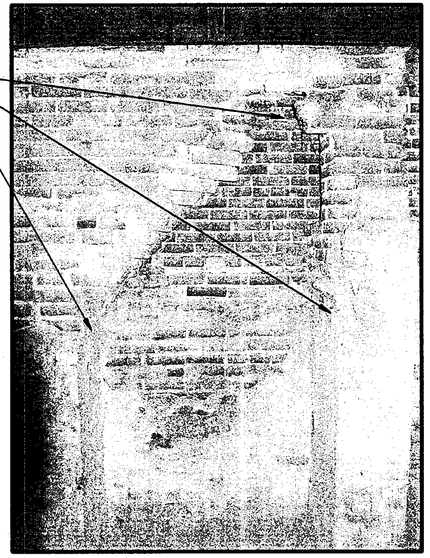
DESIGNED: NOT APPLICABLE DRAWN: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. EC.3A	TITLE OF SHEET SOUTH FIREPLACE EXISTING CONDITIONS PHOTOGRAPHS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 — SHEET 11 OF 41	

10/4/05 15:28 MTRACY R15 P:\MONO\403\DRAWINGS\ARCH\EC.3A_SFREPLACEECPHOTOS.DWG IMAGES: ..\BASES\SCHMUPPERLEFT.JPG; ..\BASES\SCHMUPPERRIGHT.JPG; ..\BASES\SCHMTOP01_BW.JPG; ..\BASES\SCHMMO6_BW_WSIDE.JPG; ..\BASES\SCHMUPPERCENTER.JPG; ..\BASES\SCHMUPPERLEFT.JPG; ..\BASES\SCHMUPPERRIGHT.JPG; ..\BASES\SCHMTOP01_BW.JPG; ..\BASES\SCHMMO6_BW_WSIDE.JPG; ..\BASES\SCHMJO7_BW.JPG;

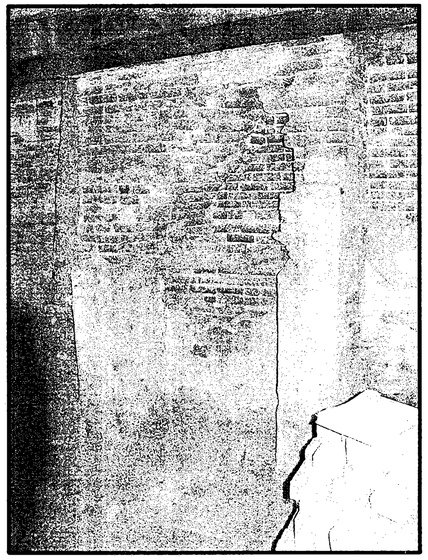


LEFT FRONT ELEVATION

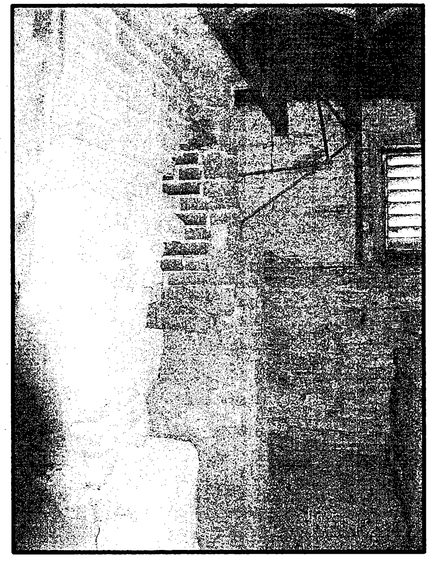
INFILL THIS AREA OF CHIMNEY. ADD NEW STEEL LINTEL AND PARGE EXTERIOR SURFACES OF FIREPLACE



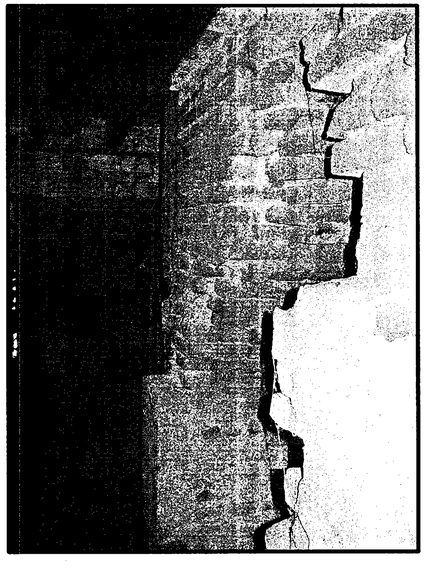
FRONT ELEVATION



RIGHT FRONT ELEVATION



LEFT FRONT CLOSEUP



RIGHT FRONT CLOSEUP



UPPER RIGHT DETAIL

GENERAL NOTE:

SEE GENERAL NOTES ON SHEET EC.3A.

DESIGNED: NOT APPLICABLE DRAWN: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. EC.3B	TITLE OF SHEET WEST FIREPLACE EXISTING CONDITIONS PHOTOGRAPHS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 12 OF 41

10/4/05 15:15 MTRACY R15 P:\MONO\403\DRAWINGS\ARCH\EC.3B_WFIREPLACEECPHOTOS.DWG IMAGES: ..\BASES\WCHIMLPRTDTL.JPG; ..\BASES\WCHIMFRONTCLOSE.JPG; ..\BASES\WCHIMRFRONT.JPG; ..\BASES\WCHIMLFRONT.JPG; ..\BASES\WCHIMFRONTEL.JPG;

*UNDERGROUND DRAINPIPE FROM DOWNSPOUT. DAYLIGHT INSIDE TREELINE @ APPROX. 80 FT. SOUTH OF SOUTH FACE OF BLDG.

*RIP-RAP

*RIP-RAP

*UNDERGROUND DRAINPIPE FROM DOWNSPOUT. DAYLIGHT @ APPROX 80 FT. NE OF BLDG CORNER SOUTH OF SOUTH FACE OF BLDG.

*RIP-RAP

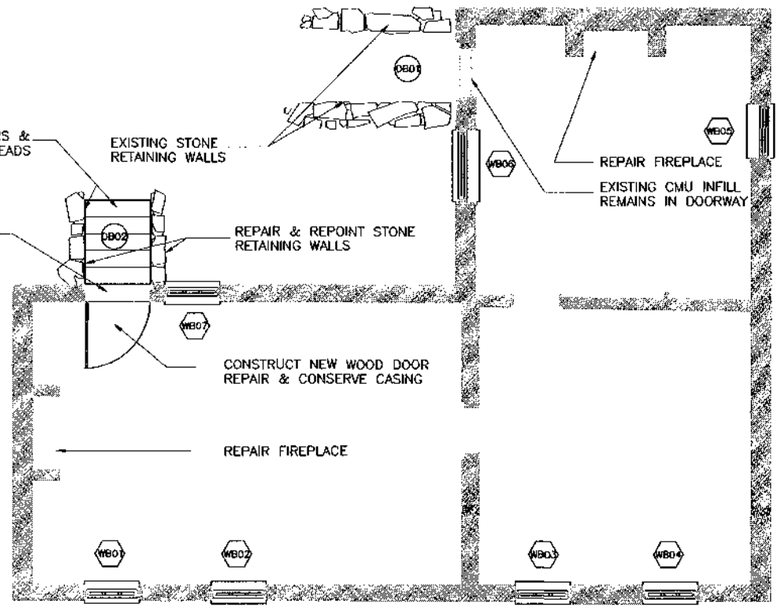
*UNDERGROUND DRAINPIPES FROM DOWNSPOUTS. DAYLIGHT INSIDE TREELINE @ APPROX 80 FT. WEST OF WEST FACE OF BLDG.

*NOTE:
NOT IN CONTRACT

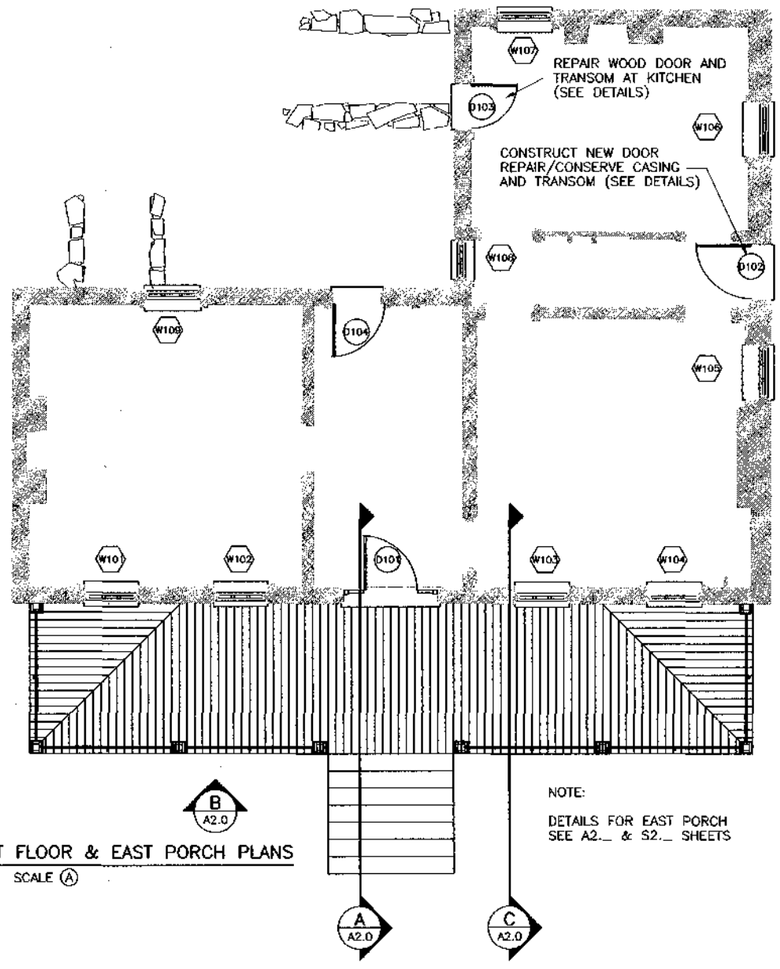
SCALE (A) 10 0 10 20
SCALE OF FEET

DESIGNED: A&E / CADD / A&E TECH. REVIEW: J ROBERSON DATE: 07/02	SUB SHEET NO. C.01	TITLE OF SHEET: SITE PLAN AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 / 25003A PKG. NO. MONO 403 SHEET 13 OF 41

10/4/05 14:46 MTRACY R:\5 P:\WORK\403\DRAWINGS\DWG\C.01_SITEPLAN.DWG



A A1.0 BASEMENT PLAN
SCALE (A)



B A1.0 1ST FLOOR & EAST PORCH PLANS
SCALE (A)

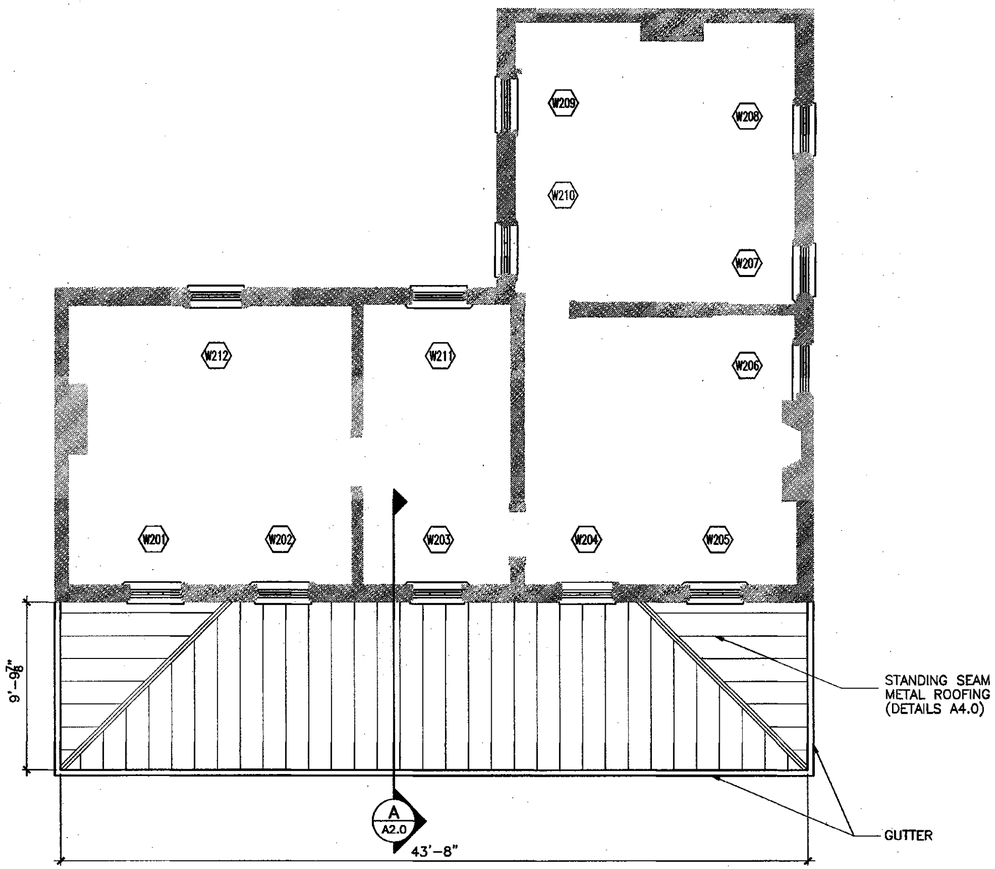
NOTE:

DETAILS FOR EAST PORCH SEE A2._ & S2._ SHEETS

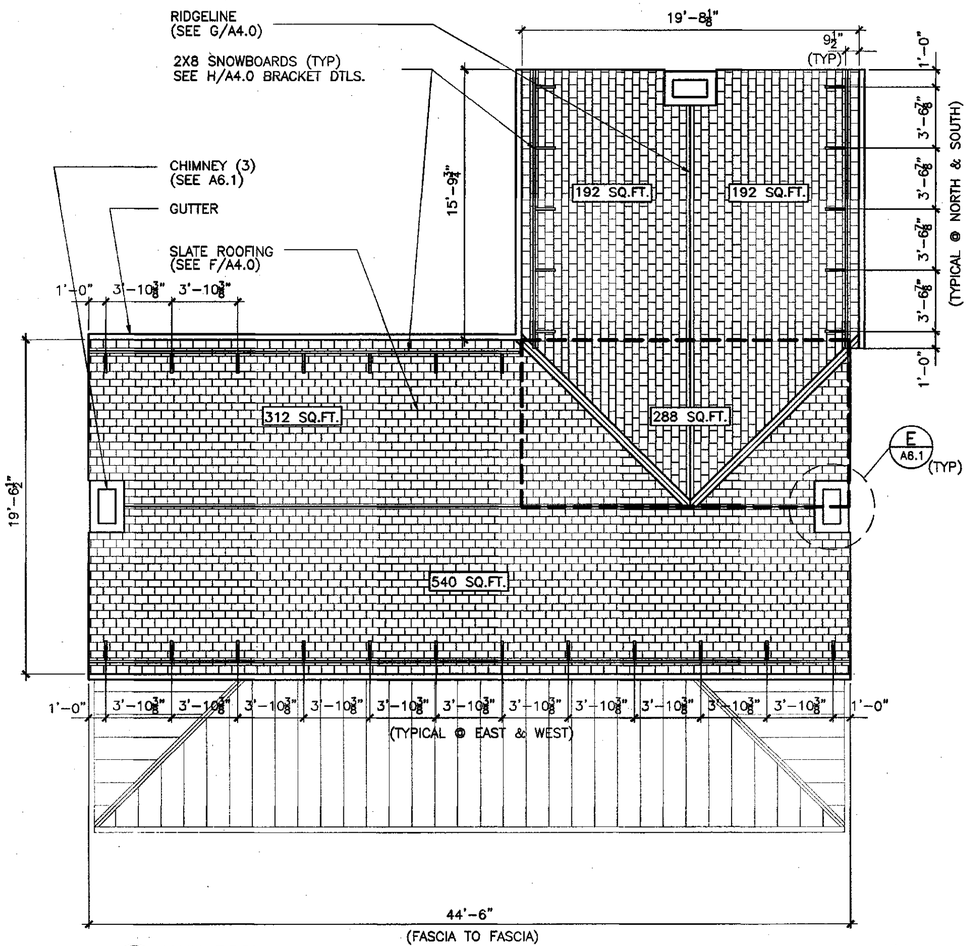
SCALE (A) 4 0 4 8
SCALE OF FEET

DESIGNED: N/A; DRAWN: J. COOK; TECH. REVIEW: D. SNOW; DATE: 07/02	SUB SHEET NO. A1.0	TITLE OF SHEET: BASEMENT, 1ST FLOOR & EAST PORCH PLANS AS–BUILT DRAWINGS; WORTHINGTON HOUSE; MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 / 25003A; PKG. NO. MONO 403; SHEET 14 OF 41

10/4/05 14:40 MTRACY RTL P:\MONO\403\DRAWINGS\ARCH\A1.0_BSMT1STFLOORPLANS.DWG



A A1.1 EAST PORCH ROOF PLAN
SCALE A



B A1.1 MAIN ROOF PLAN
SCALE A

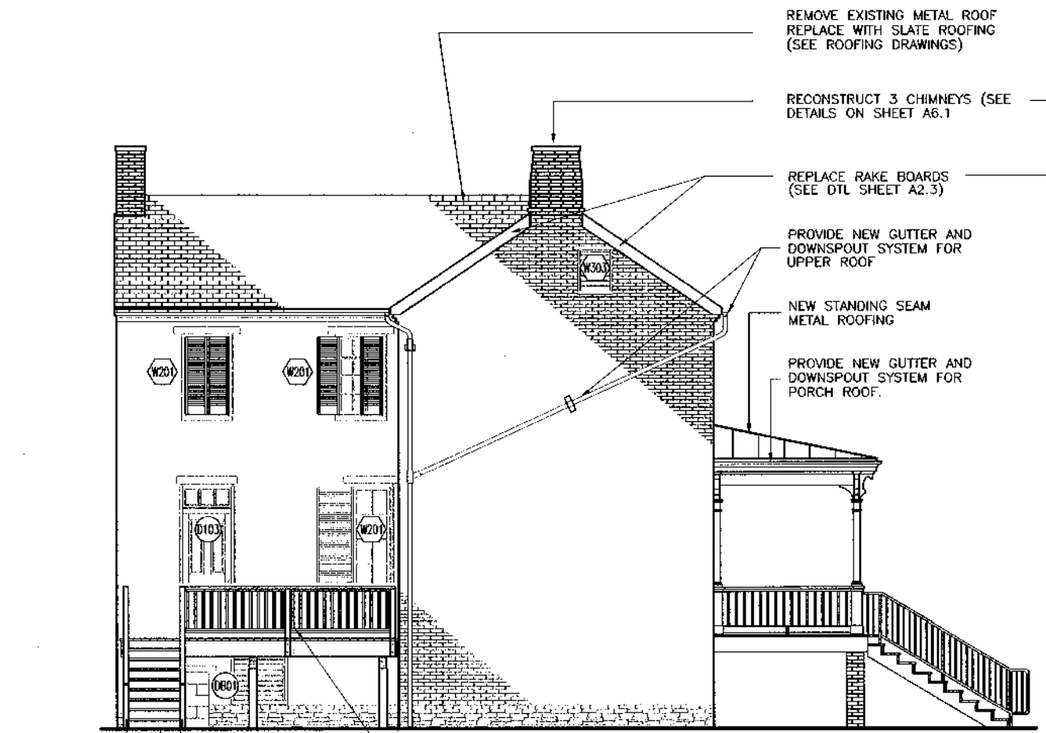
GENERAL NOTE:

SQUARE FOOTAGE SHOWN ON ROOF PLAN ARE APPROXIMATE.

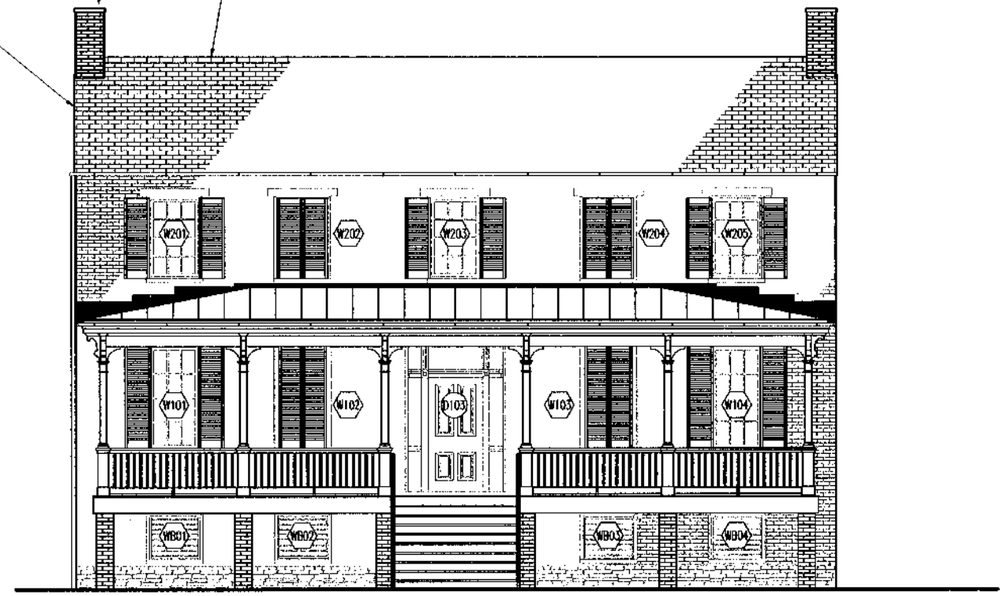
SCALE A 4 0 4 8
SCALE OF FEET

DESIGNED: N/A DRAWN: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. A1.1	TITLE OF SHEET 2ND FLOOR PLAN AND ROOF PLANS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 15 OF 41

10/4/05 14:24 MTRACY R15 P:\MONO\403\DRAWINGS\ARCH\A1.1_2NDFLRPLAN_ROOFPLANS.DWG



A / A1.2 SOUTH ELEVATION
SCALE Ⓐ

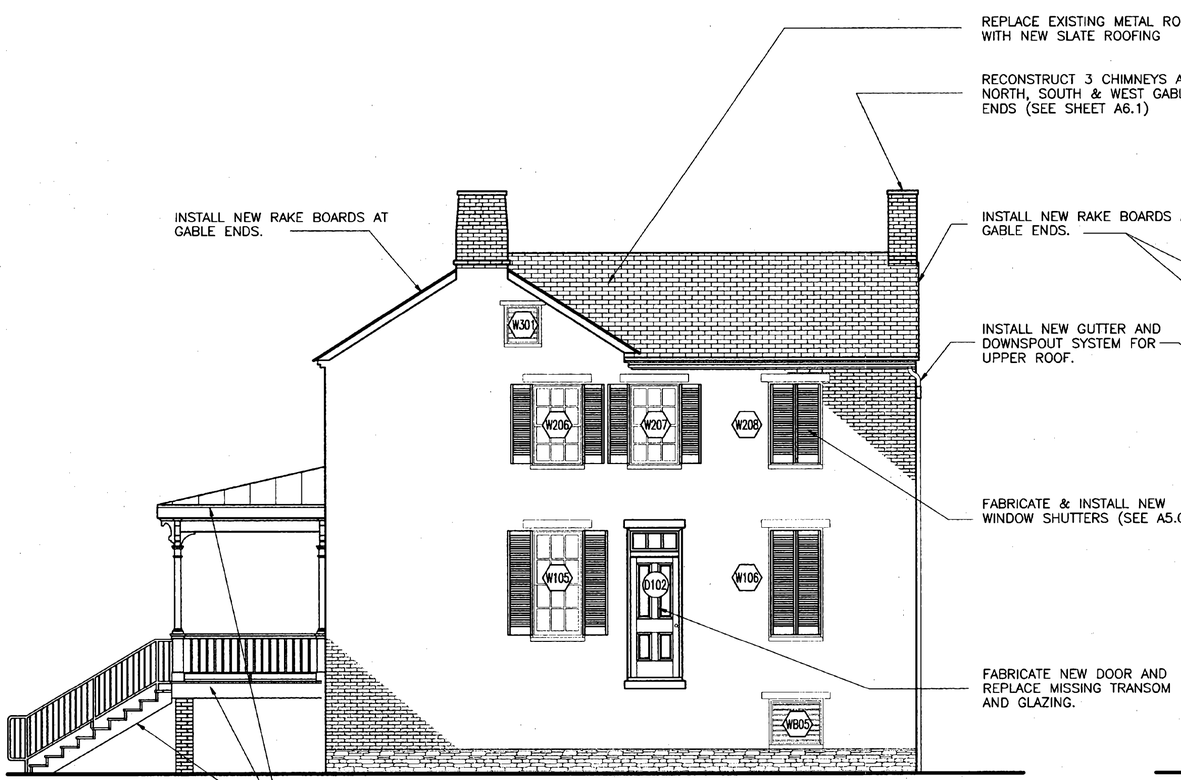


B / A1.2 EAST ELEVATION
SCALE Ⓐ

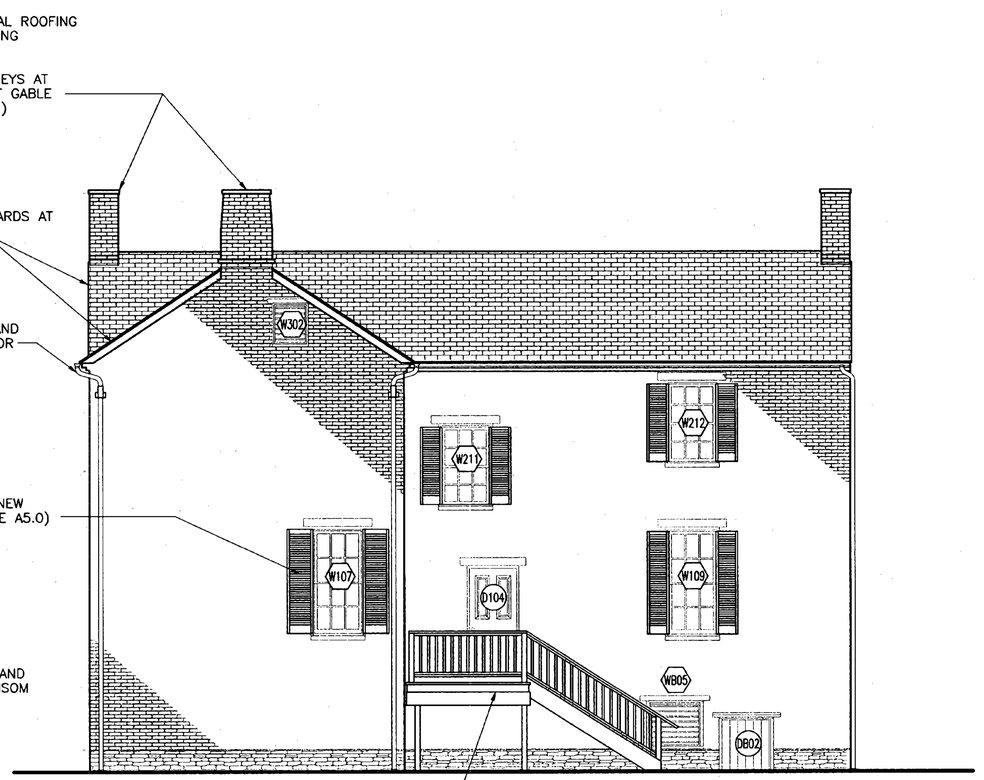
SCALE Ⓐ 4 0 4 8
SCALE OF FEET

DESIGNED: N/A DRAWN: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. A1.2	TITLE OF SHEET SOUTH AND EAST BUILDING ELEVATIONS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 16 OF 41

10/4/05 14:23 MANCY R15 P:\MONO\403\DRAWINGS\ARCH\A1.2_SANDEB.DGE/ELEVS.DWG



A A1.3 NORTH ELEVATION
SCALE (A)

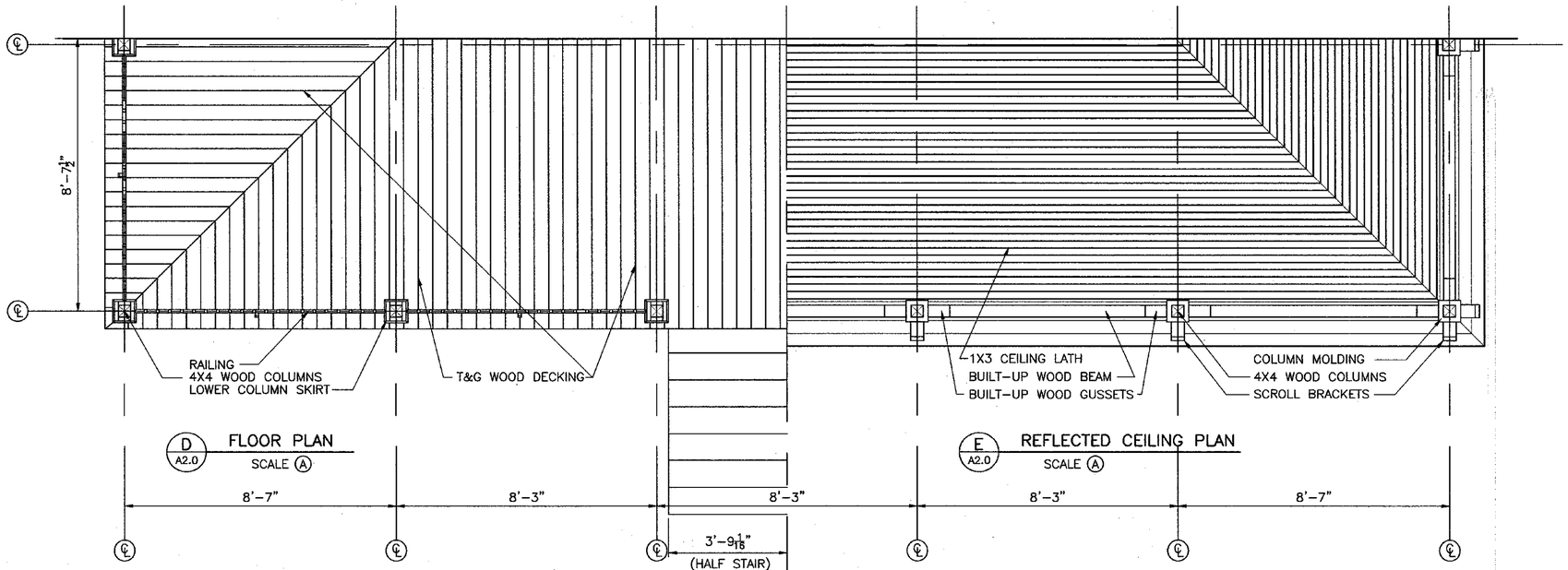


B A1.3 WEST ELEVATION
SCALE (A)

SCALE (A) 4 0 4 8
SCALE OF FEET

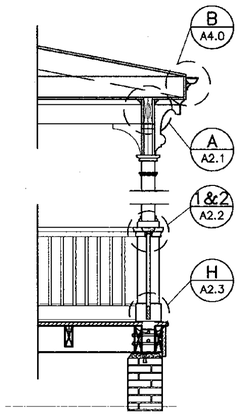
DESIGNED: N/A; DRAWN: J. COOK; TECH. REVIEW: D. SNOW; DATE: 07/02	SUB SHEET NO. A1.3	TITLE OF SHEET: NORTH AND WEST BUILDING ELEVATIONS AS-BUILT DRAWINGS — WORTHINGTON HOUSE, MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A; PKG. NO. MONO 403	SHEET 17 OF 41

10/4/05 13:57 MTRACY R15 P:\MONO\403\DRAWINGS\ARCH\A1.3_NANDWBLDGELEVS.DWG

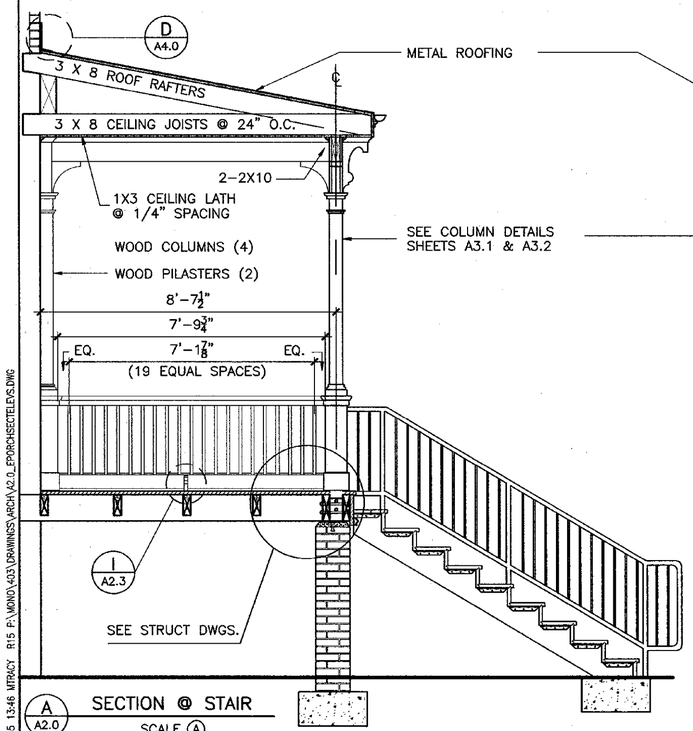


D A2.0 FLOOR PLAN
SCALE A

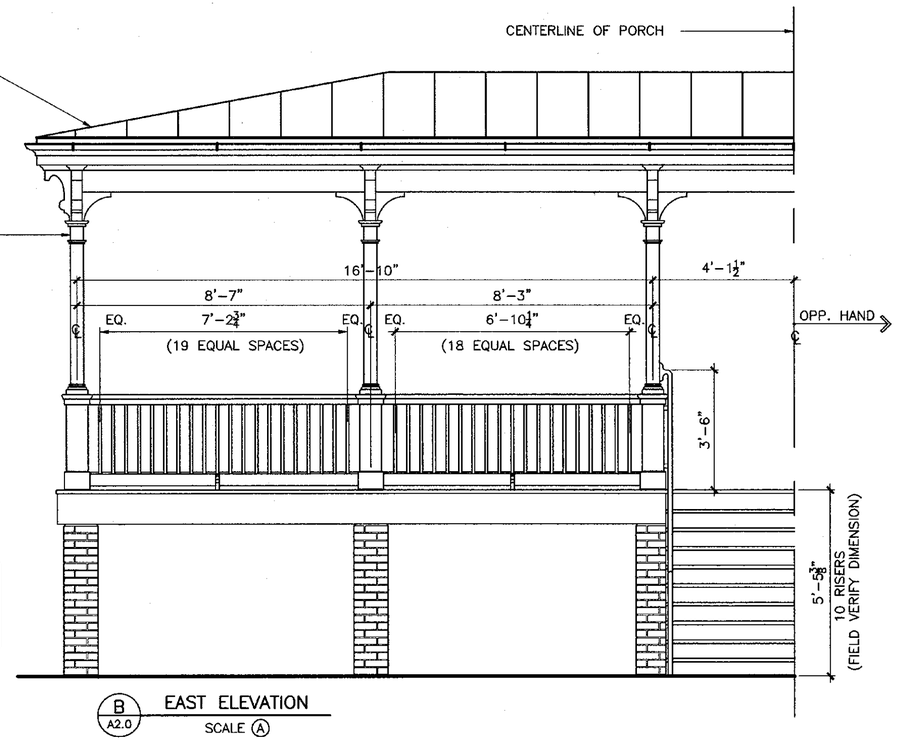
E A2.0 REFLECTED CEILING PLAN
SCALE A



C A2.0 SECTION @ RAIL
SCALE A



A A2.0 SECTION @ STAIR
SCALE A

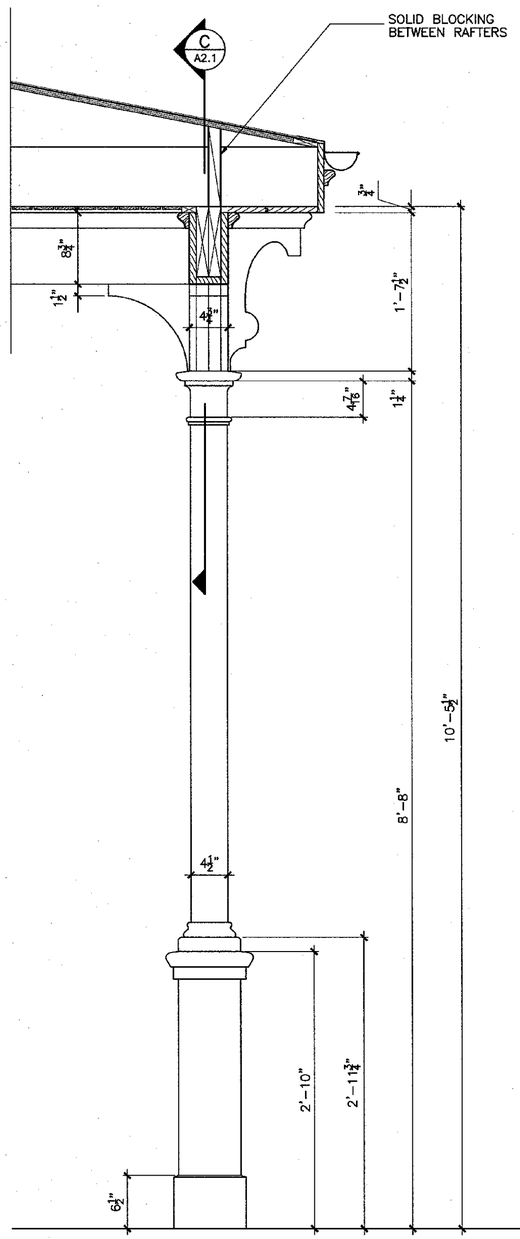


B A2.0 EAST ELEVATION
SCALE A

SCALE A 2 0 2 4
SCALE OF FEET

DESIGNED: NOT APPLICABLE; J. COOK; TECH. REVIEW: D. SNOW; DATE: 07/02	SUB SHEET NO. A2.0	TITLE OF SHEET: EAST PORCH PLANS SECTIONS & ELEVATIONS AS-BUILT DRAWINGS; WORTHINGTON HOUSE; MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A; PKG. NO. MONO 403; SHEET 18 OF 41

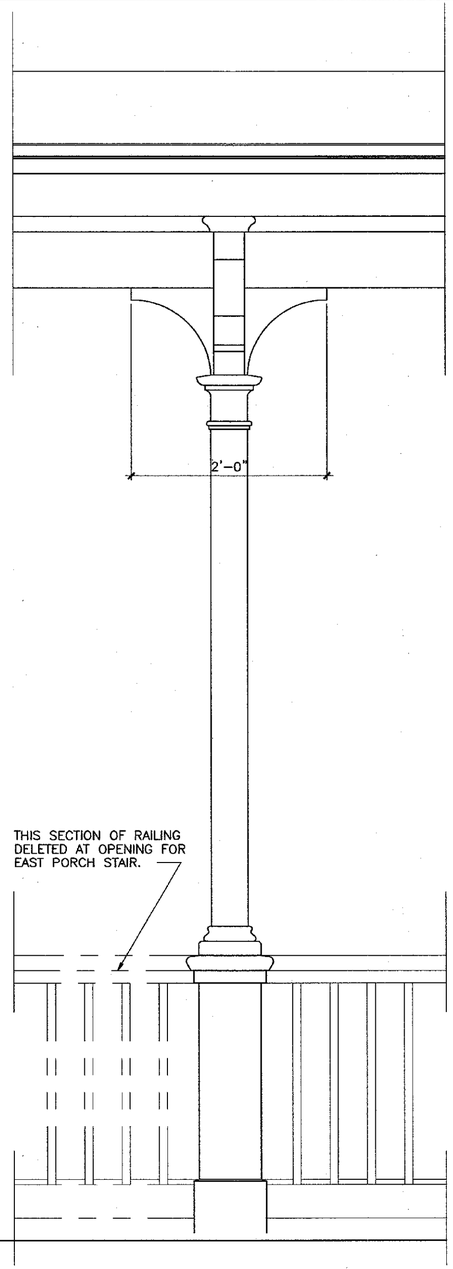
10/4/05 13:46 MTRACY R:15 P:\MONO\403\DRAWINGS\ARCH\A2.0_EPORCHSECTELEVS.DWG



A A2.1 COLUMN AT STAIR (NO RAIL SIDE)

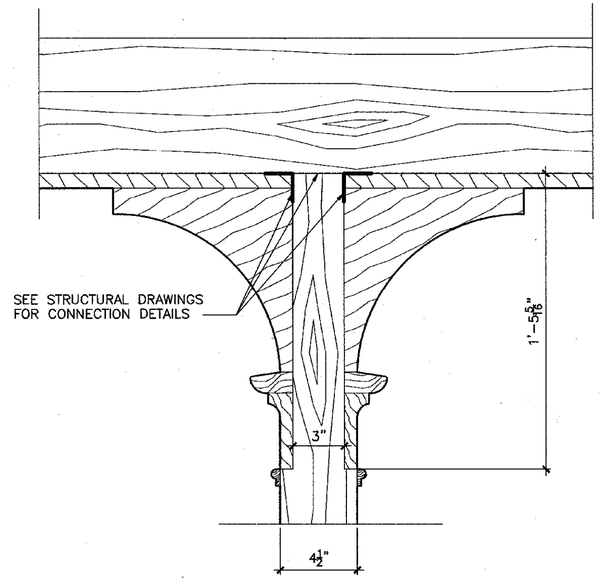
SCALE: 1 1/2" = 1'-0"

NOTE: DIMENSIONS ARE APPROXIMATE
VERIFY ACTUAL DIMENSIONS FROM
EXISTING ORIGINAL MATERIALS ON SITE.



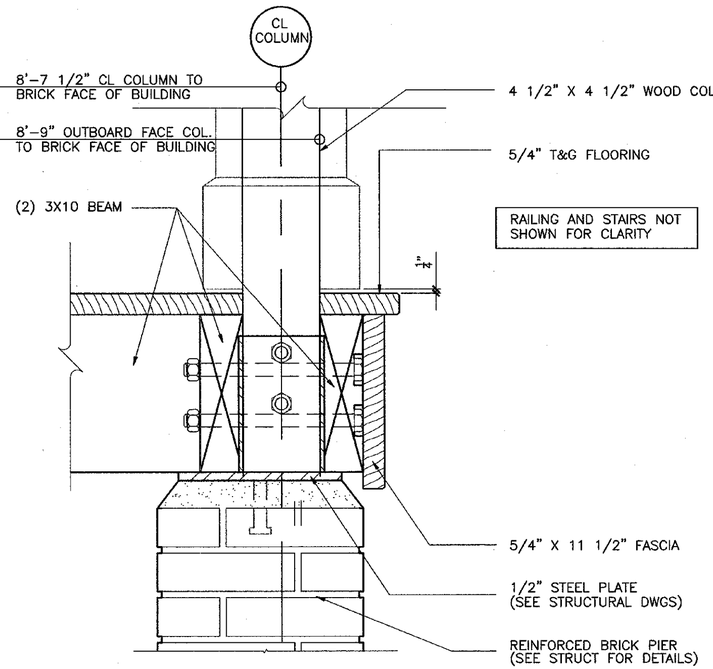
B A2.1 TYPICAL COLUMN (FRONT VIEW)

SCALE: 1 1/2" = 1'-0"



C A2.1 COLUMN SECTION

SCALE B



D A2.1 SECTION @ PORCH EDGE

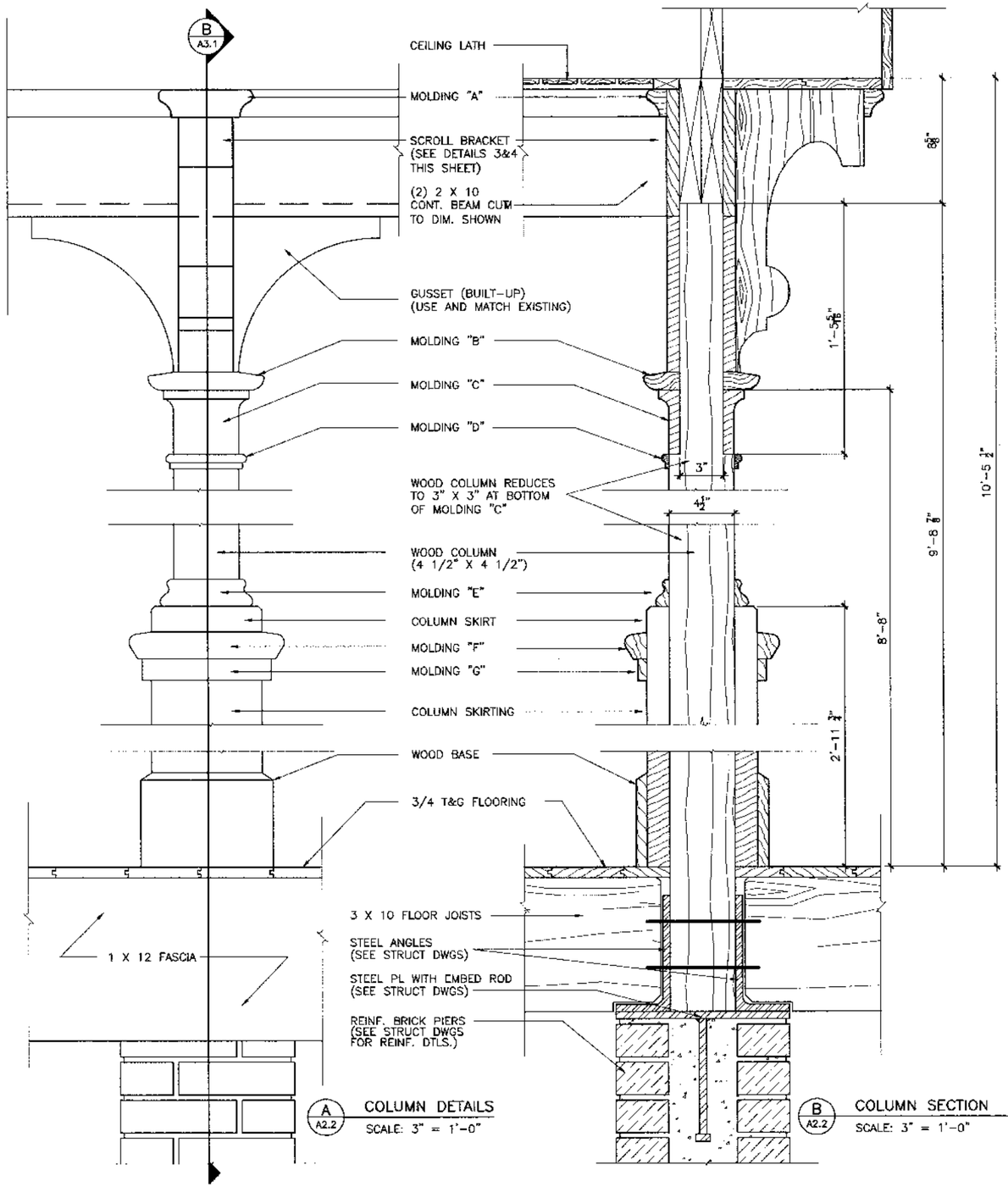
SCALE B

SCALE A 12 6 0 12
SCALE OF INCHES

SCALE B 6 3 0 6
SCALE OF INCHES

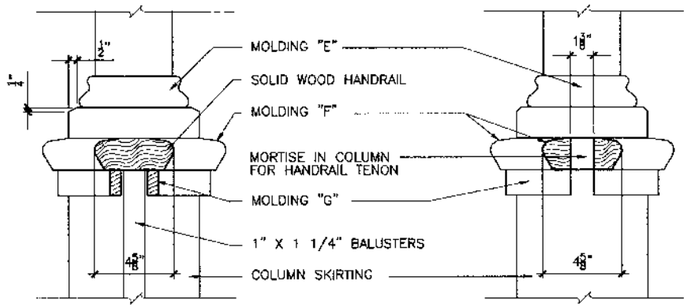
DESIGNED: N/A; CADD: J. COOK; TECH. REVIEW: D. SNOW; DATE: 07/02	SUB SHEET NO. A2.1	TITLE OF SHEET: EAST PORCH ELEVATIONS SECTIONS & DETAILS AS-BUILT DRAWINGS; WORTHINGTON HOUSE; MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A; PKG. NO. MONO 403; SHEET 19 OF 41

10/4/05 13:35 MTRACY R15 P:\MONO\403\DRAWINGS\ARCH\V2.1_EPORCH-COLELEVSDTLS.DWG



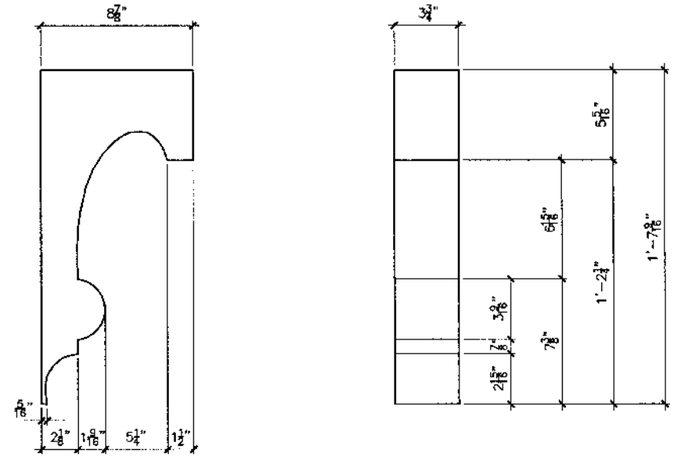
A2.2 COLUMN DETAILS
SCALE: 3" = 1'-0"

B A2.2 COLUMN SECTION
SCALE: 3" = 1'-0"



1 A2.2 SECTION THRU HANDRAIL
SCALE: 3" = 1'-0"

2 A2.2 HANDRAIL CONNECTION
SCALE: 3" = 1'-0"



3 A2.2 SCROLL BRACKET (SIDE)
SCALE: 3" = 1'-0"

4 A2.2 SCROLL BRACKET (FRONT)
SCALE: 3" = 1'-0"

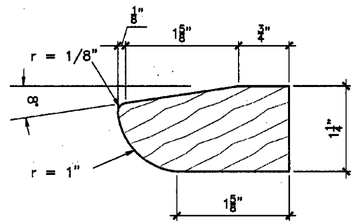
NOTE: DIMENSIONS SHOWN FOR SCROLL BRACKETS ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY ACTUAL DIMENSIONS AGAINST 3 EXISTING SCROLL BRACKETS STORED AT THE PARK. EXISTING BRACKETS ARE IN GOOD REPARABLE CONDITION. CONTRACTOR TO REPAIR AND USE ORIGINALS. ALL BRACKETS ARE TYPICAL. A TOTAL OF TEN (10) ARE REQUIRED IN THE CONSTRUCTION OF THE EAST PORCH (EAST PORCH ONLY). CONTRACTOR TO CONSTRUCT REQUIRED NEW BRACKETS FROM ONE-PIECE SOLID WOOD STOCK TO MATCH WOOD TYPE AND SHAPE OF ORIGINAL SCROLL BRACKETS.

SCALE (A) 6 3 0 6
SCALE OF INCHES

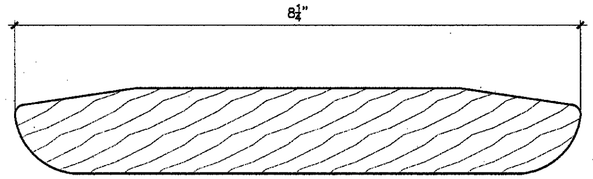
DESIGNED: NOT APPLICABLE; DRAWN: J. COOK; TECH. REVIEW: D. SNOW; DATE: 07/02	SUB SHEET NO. A2.2	TITLE OF SHEET: EAST PORCH COLUMN DETAILS AS-BUILT DRAWINGS; WORTHINGTON HOUSE; MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A; PKG. NO. MONO 403; SHEET 20 OF 41

10/4/05 13:33 MITRA'S R15 P:\MONO\403\DRAWINGS\ARCH\A2-2_EPDR-HCOLDTLS.DWG

MOLDING A

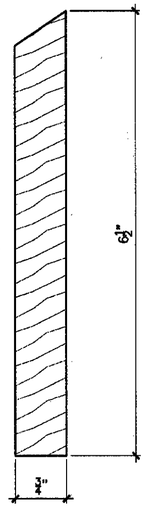


MOLDING B

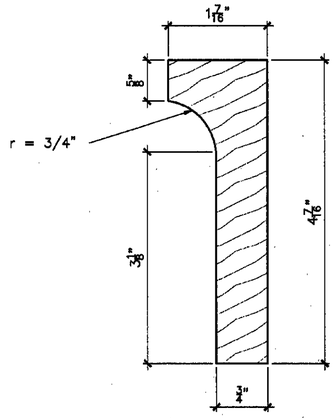


SECTION THROUGH ORIGINAL COLUMN CAP

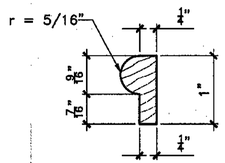
NOTE: THE HISTORIC SHAPE FOR MOLDING "B" WAS A SOLID COLUMN CAP AS SHOWN HERE. HISTORICAL COLUMNS STOPPED UNDER THIS CAP, SHORT OF ROOF EDGE BEAMS. IN ORDER TO ALLOW FOR A CONTINUOUS COLUMN CONNECTING TO BRICK PIERS AND ROOF EDGE BEAM, AND KEEP THE HISTORIC APPEARANCE OF THE COLUMNS, THE CAP MUST BE FABRICATED AS SHOWN FOR MOLDING "B".



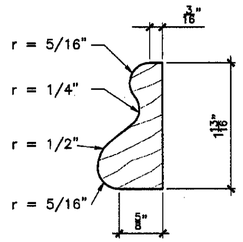
COLUMN SKIRT BASE MOLDING



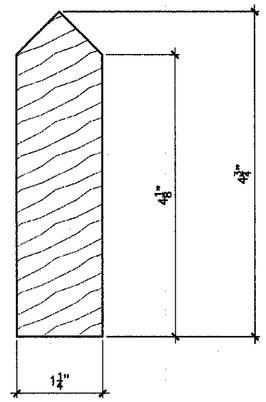
MOLDING C



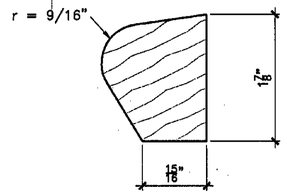
MOLDING D



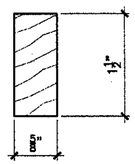
MOLDING E



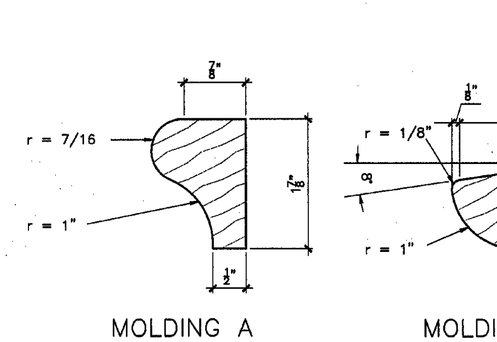
MOLDING H
(BOTTOM RAIL)



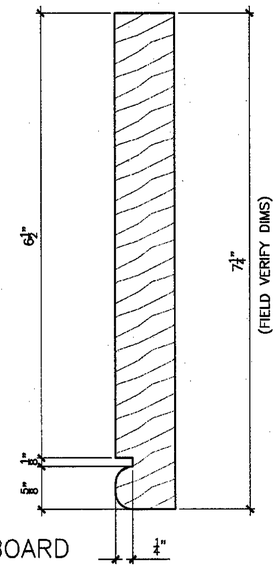
MOLDING F



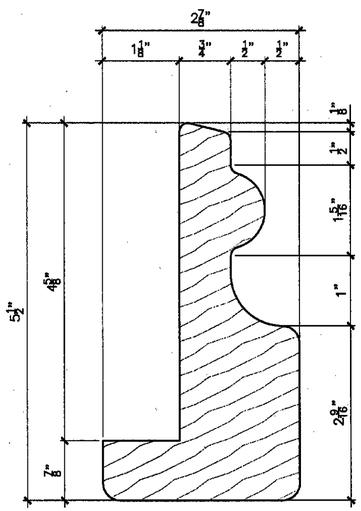
MOLDING G



HANDRAIL

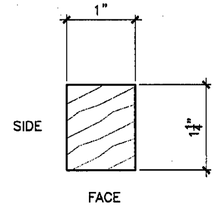


RAKE BOARD

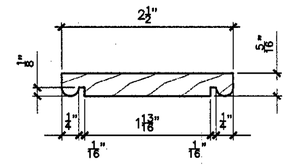


MOLDING I

SUPPORT "SHOE" FOR EAST PORCH MIDRAIL SUPPORT



BALUSTER SECTION



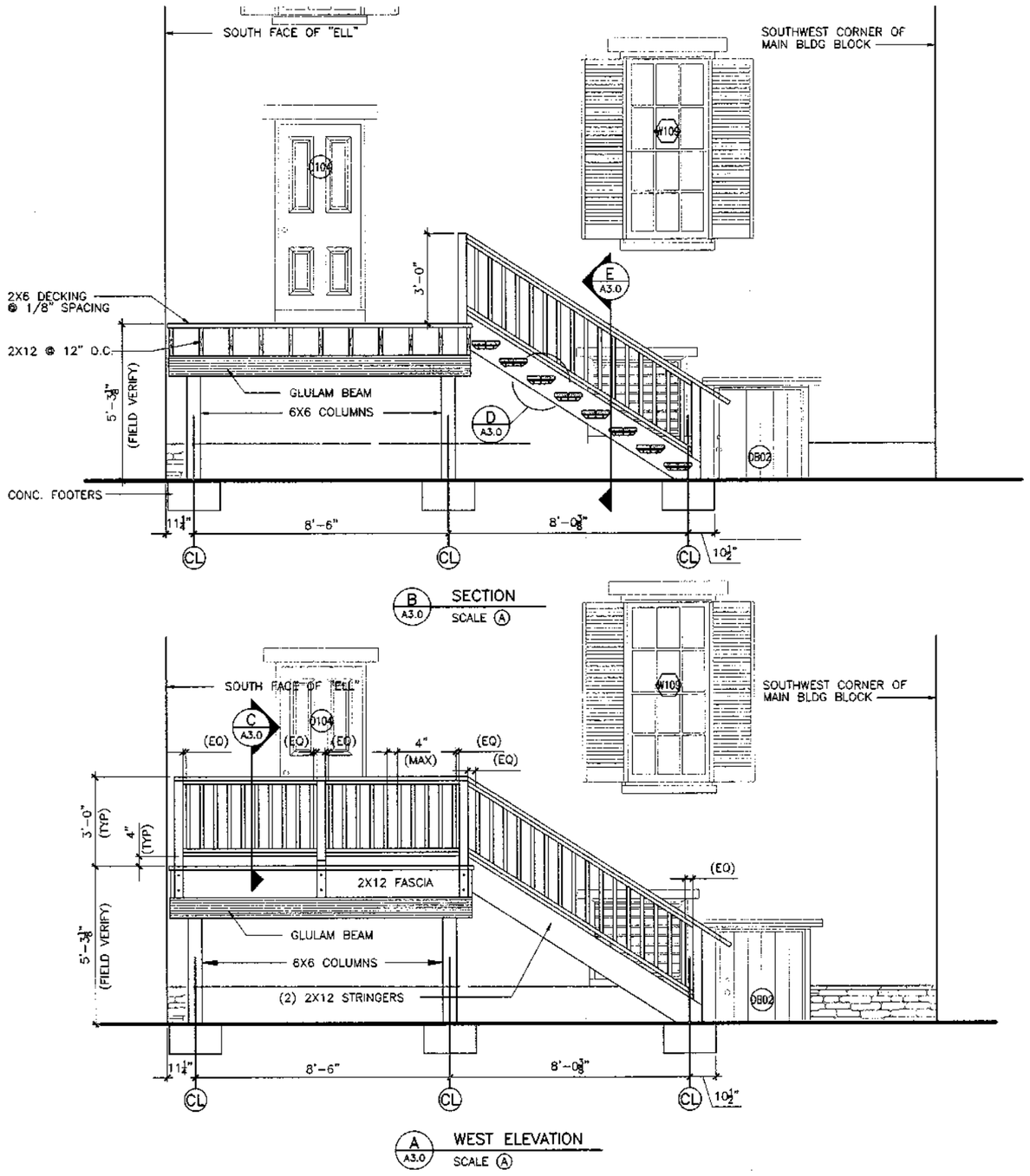
CEILING LATH

SCALE (A) 1 0 1 2
SCALE OF INCHES

NOTE: ALL DIMENSIONS, RADII, AND ANGLES SHOWN HERE ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY ACTUAL DIMENSIONS, RADII, AND ANGLES AGAINST EXISTING HISTORIC MATERIALS (STORED IN PARK) BEFORE REPLICATING THE PATTERNS FOR CONSTRUCTION. CONTRACTING OFFICER WILL ADVISE THE CONTRACTOR OF LOCATION OF STORED MATERIALS AFTER NOTICE TO PROCEED.

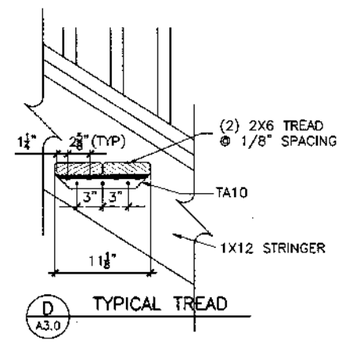
DESIGNED: NOT APPLICABLE (CADD) J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. A2.3	TITLE OF SHEET EAST & ELL PORCH MOLDING PATTERNS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 21 OF 41

10/4/05 13:28 MTRACY R15 F:\MONO\403\DRAWINGS\ARCH\A2.3_MOLDINGPATTERNS.DWG

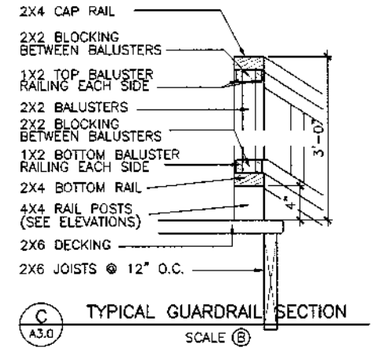


B A3.0 SECTION
SCALE Ⓐ

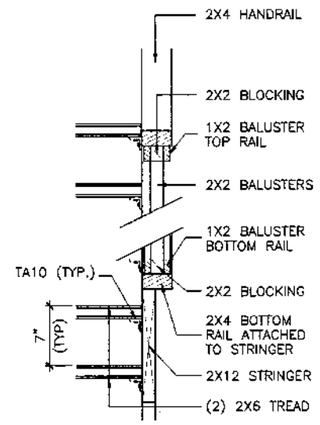
A A3.0 WEST ELEVATION
SCALE Ⓐ



D A3.0 TYPICAL TREAD



C A3.0 TYPICAL GUARDRAIL SECTION
SCALE Ⓑ



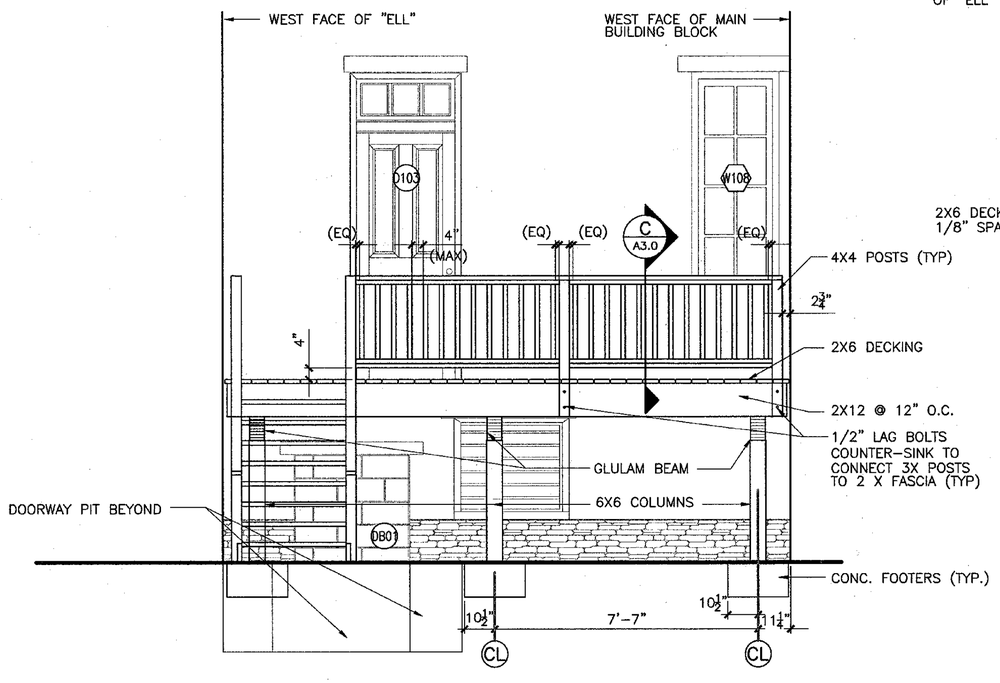
E A3.0 STAIR/HANDRAIL SECTION
SCALE Ⓑ

SCALE Ⓐ 2 0 2 4
SCALE OF FEET

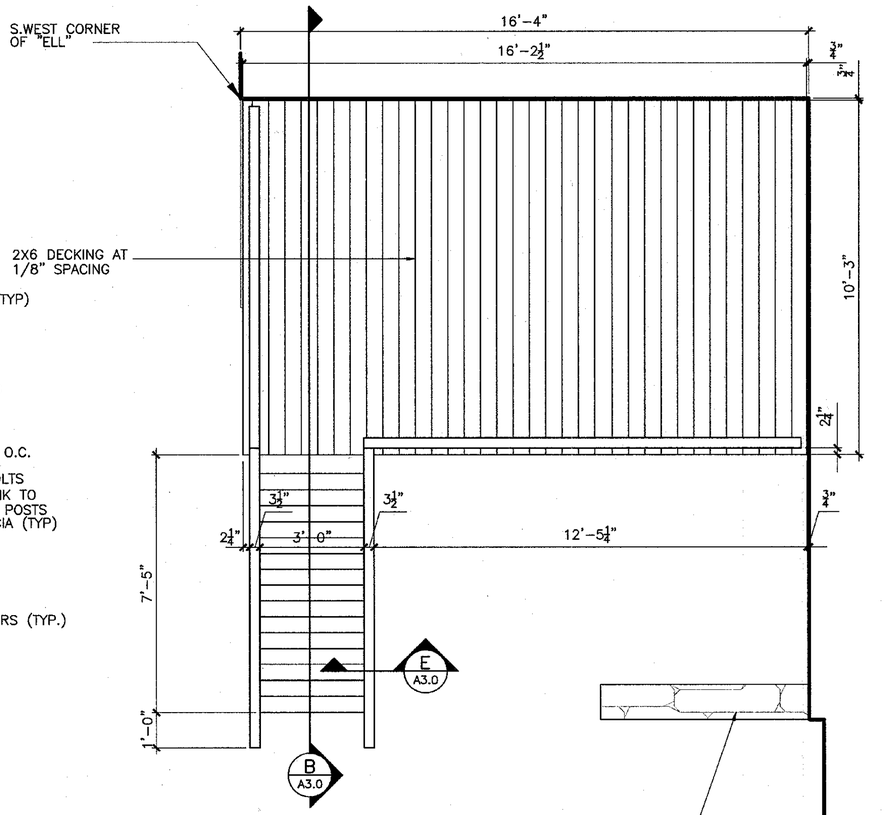
SCALE Ⓑ 12 6 0 12
SCALE OF INCHES

DESIGNED: N/A DRAFTED: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. A3.0	TITLE OF SHEET WEST DECK ELEVATION & SECTION AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 22 OF 41

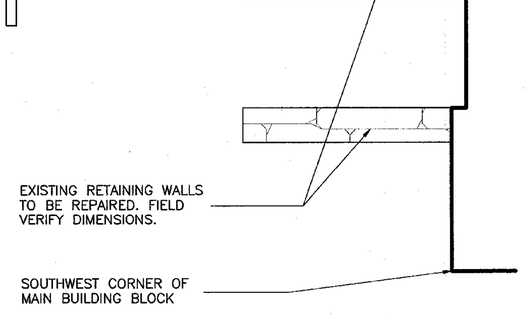
10/4/05 13:26 MTRACY R15 P:\MONO\403\DRAWINGS\ARCH\A3.0_WEST DECK ELEV AND SECTIONS



A A3.1 SOUTH ELEVATION
SCALE Ⓐ



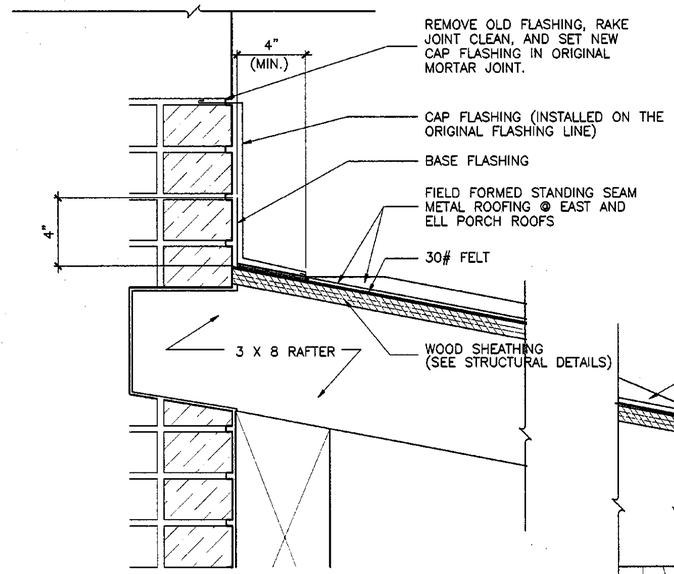
B A3.1 DECK PLAN
SCALE Ⓐ



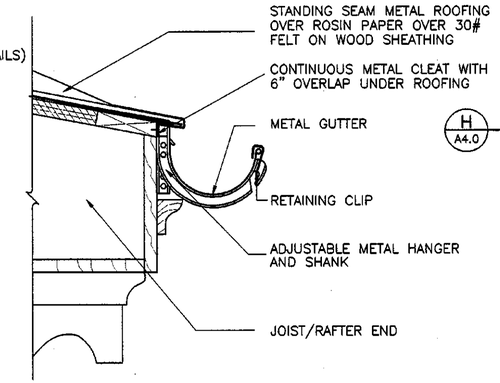
SCALE Ⓐ 2 0 2 4
SCALE OF FEET

DESIGNED: N/A CADD: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. A3.1	TITLE OF SHEET WEST DECK ELEVATION & PLAN AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 / 25003A PKG. NO. MONO 403 SHEET 23 OF 41

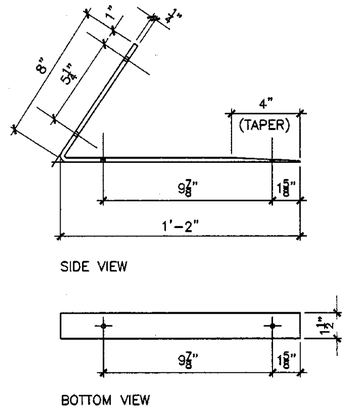
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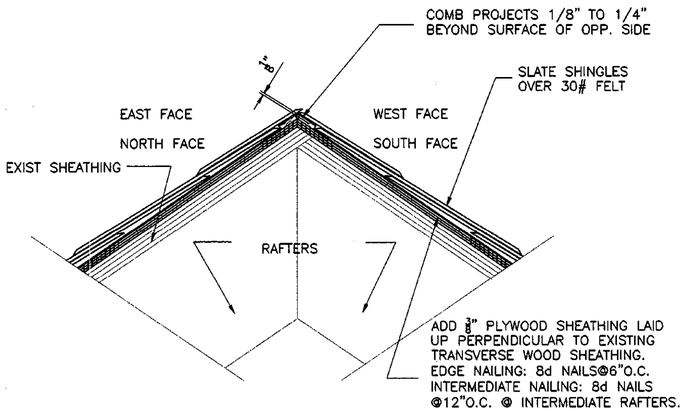
A A4.0 ROOF TO BRICK FLASHING
SCALE B



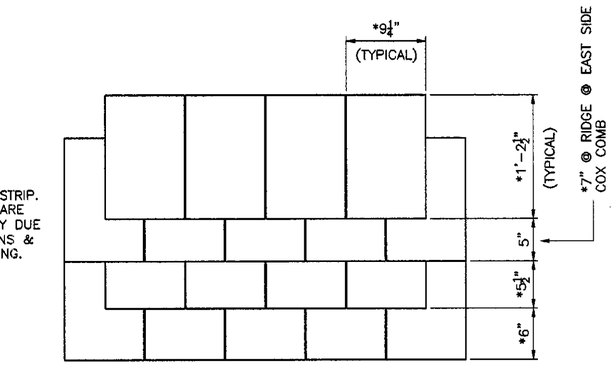
B A4.0 ROOF EDGE DETAIL/EAST PORCH
SCALE B



H A4.0 STAINLESS STEEL BOARD BRACKETS
SCALE D

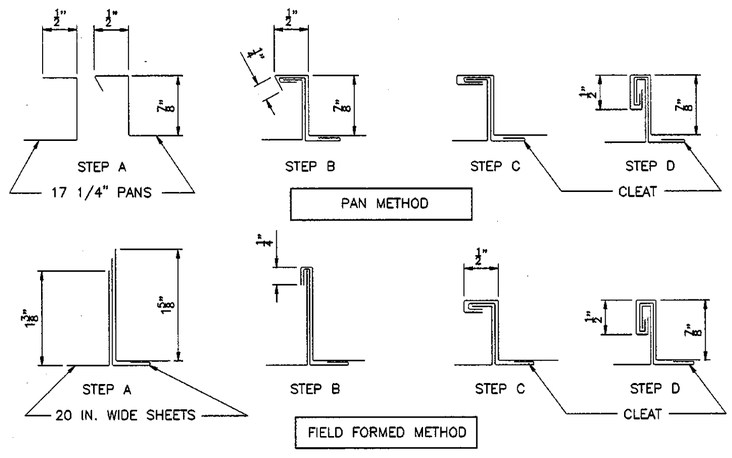


G A4.0 RIDGE DETAIL/SLATE ROOF
SCALE D

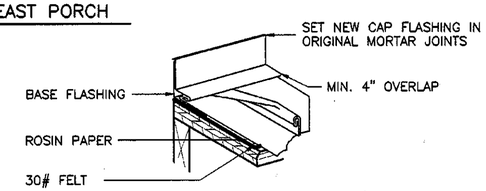


*NOTE:
INSTALLED ⅜" STARTER STRIP. ALL STARTER COURSES ARE 10"X18" LAID LENGTHWAY DUE TO HOLD SLATE PATTERNS & WILL REQUIRED REDRILLING.

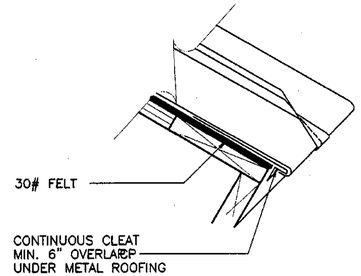
F A4.0 SLATE ROOFING EXPOSURE PATTERN
SCALE C



C A5.0 ALTERNATE FORMING DETAILS FOR STANDING SEAM METAL ROOFING
SCALE A



D A4.0 DETAIL @ ROOFING/WALL INTERSECTION
NO SCALE



E A4.0 ROOF EDGE DETAIL @ EAVES
NO SCALE

SCALE A 1 0 1 2
SCALE OF INCHES

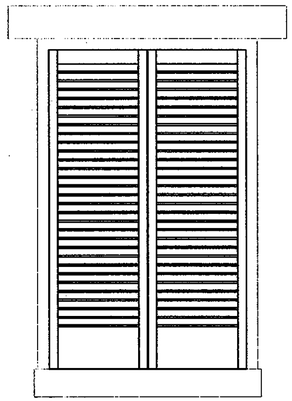
SCALE B 6 3 0 6
SCALE OF INCHES

SCALE C 12 6 0 12
SCALE OF INCHES

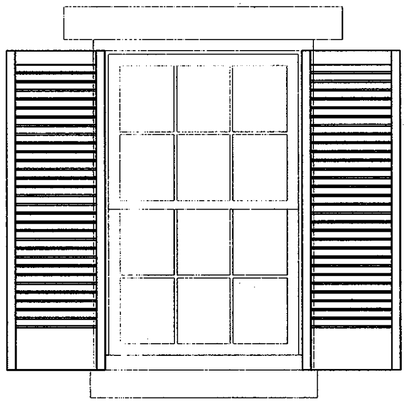
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SCALE OF INCHES

DESIGNED: NOT APPLICABLE; DRAWN: J. COOK; TECH. REVIEW: D. SNOW; DATE: 07/02	SUB SHEET NO. A4.0	TITLE OF SHEET: ROOFING DETAILS — AS-BUILT DRAWINGS — WORTHINGTON HOUSE — MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A; PKG. NO. MONO 403; SHEET 24 OF 41

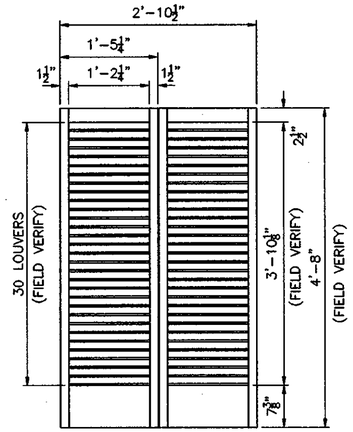
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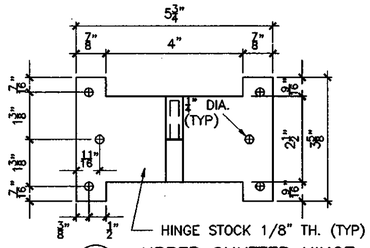
A A5.0 2ND FLOOR CLOSED
SCALE (A)
W202, W204, W208, W209, W212



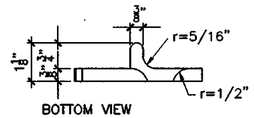
B A5.0 2ND FLOOR OPEN
SCALE (A)
W201, W203, W205, W206, W207, W210, W211



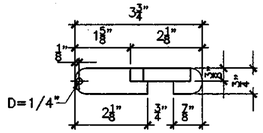
C A5.0 2ND FLOOR SHUTTERS
SCALE (A)



H A5.0 UPPER SHUTTER HINGE
SCALE (C)

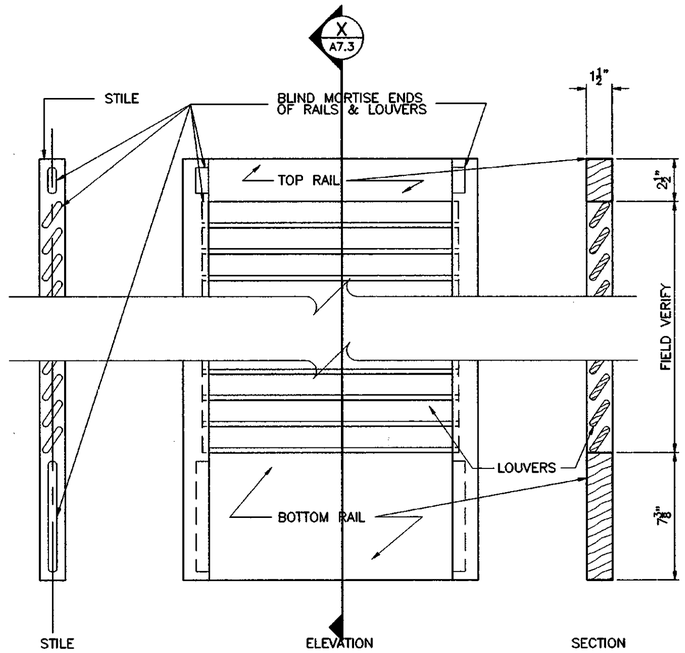


BOTTOM VIEW

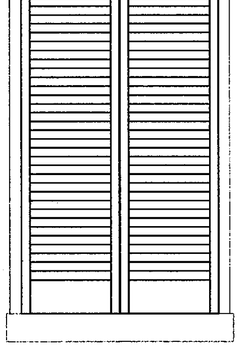


FACE VIEW

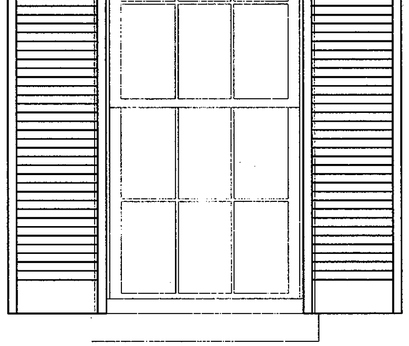
H A5.0 HINGE LATCH DETAILS
SCALE (C)



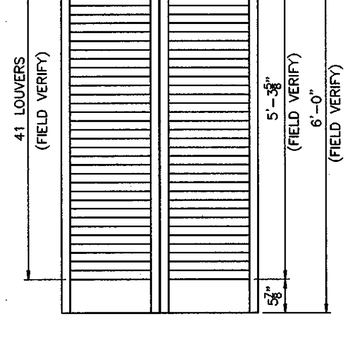
G A5.0 TYPICAL SHUTTER DETAILS
SCALE (B)



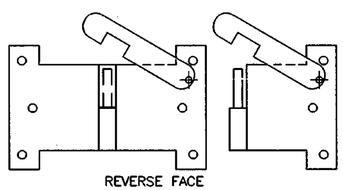
D A5.0 1ST FLOOR CLOSED
SCALE (A)
W101, W103, W106, W109

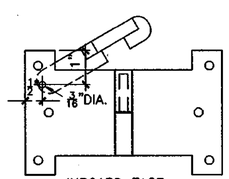


E A5.0 1ST FLOOR OPEN
SCALE (A)
W102, W104, W105, W107, W108



F A5.0 1ST FLOOR SHUTTERS
SCALE (A)





H A5.0 LOWER SHUTTER HINGE
SCALE (C)

GENERAL NOTES:

1. WINDOW & SHUTTER DIMENSIONS ARE APPROXIMATE. THEY WERE DERIVED IN PART FROM HISTORIC & RECENT FIELD PHOTOS. PRIOR TO FABRICATION & INSTALLATION OF SHUTTERS, FIELD VERIFY ALL WINDOW DIMENSIONS. VERIFY LOCATION OF ORIGINAL WINDOW HARDWARE. NEW HARDWARE SHALL BE SET IN ORIGINAL LOCATION AND MATCH ORIGINAL INSTALLATION DETAIL INASMUCH AS POSSIBLE.

2. ALL TEMPORARY LOWER SASH VENTILATION LOUVERS AT 1ST & 2ND FLOORS ARE TO BE REMOVED. REMOVE BOTH TEMPORARY VENTILATION LOUVERS AND UPPER GLAZED SASHES AT WINDOWS INDICATED IN ELEVATIONS A&D ABOVE. FABRICATE & INSTALL NEW SCREEN PANELS IN THESE WINDOWS (SEE DETAILS SHEET A5.1). INSTALL SHUTTERS FOR THESE WINDOWS IN CLOSED POSITION.

3. REMOVE TEMPORARY VENTILATION LOUVERS FROM WINDOWS W105, W107, AND W206. INSTALL LOWER GLAZED SASHES (STORED ON SITE) IN LOWER GLAZING TRACKS FOR THESE WINDOWS. THESE WINDOWS SHALL HAVE BOTH UPPER & LOWER GLAZED PANELS. INSTALL SHUTTERS FOR THESE WINDOWS IN OPEN POSITION AS INDICATED IN ELEVATIONS B&E ABOVE.

4. ALL BASEMENT TEMPORARY VENTILATION LOUVERS ARE TO BE STRIPPED OF PAINT (REMOVE & REPLACE LOUVERS FROM OPENING IF NECESSARY), REPAIRED, REPLACED, AND REFINISHED AS SPECIFIED.

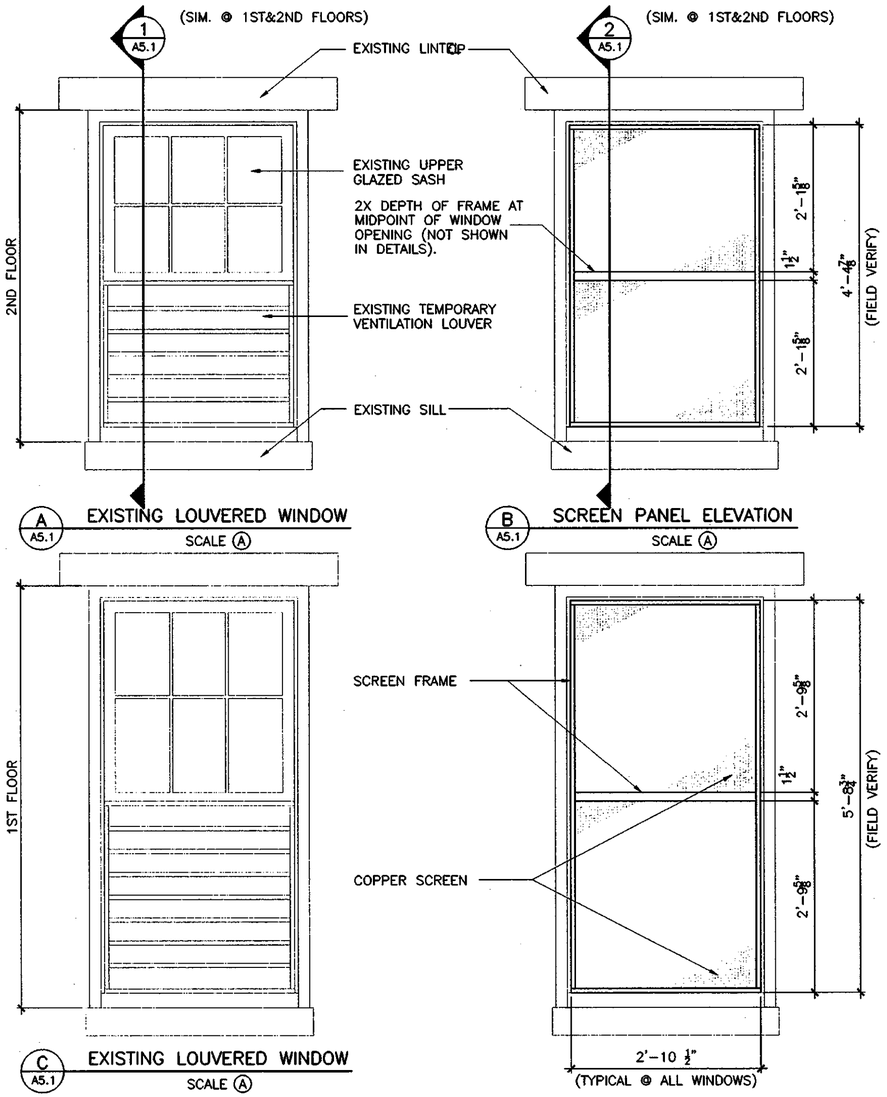
SCALE (A) 1 0 1 2
SCALE OF FEET

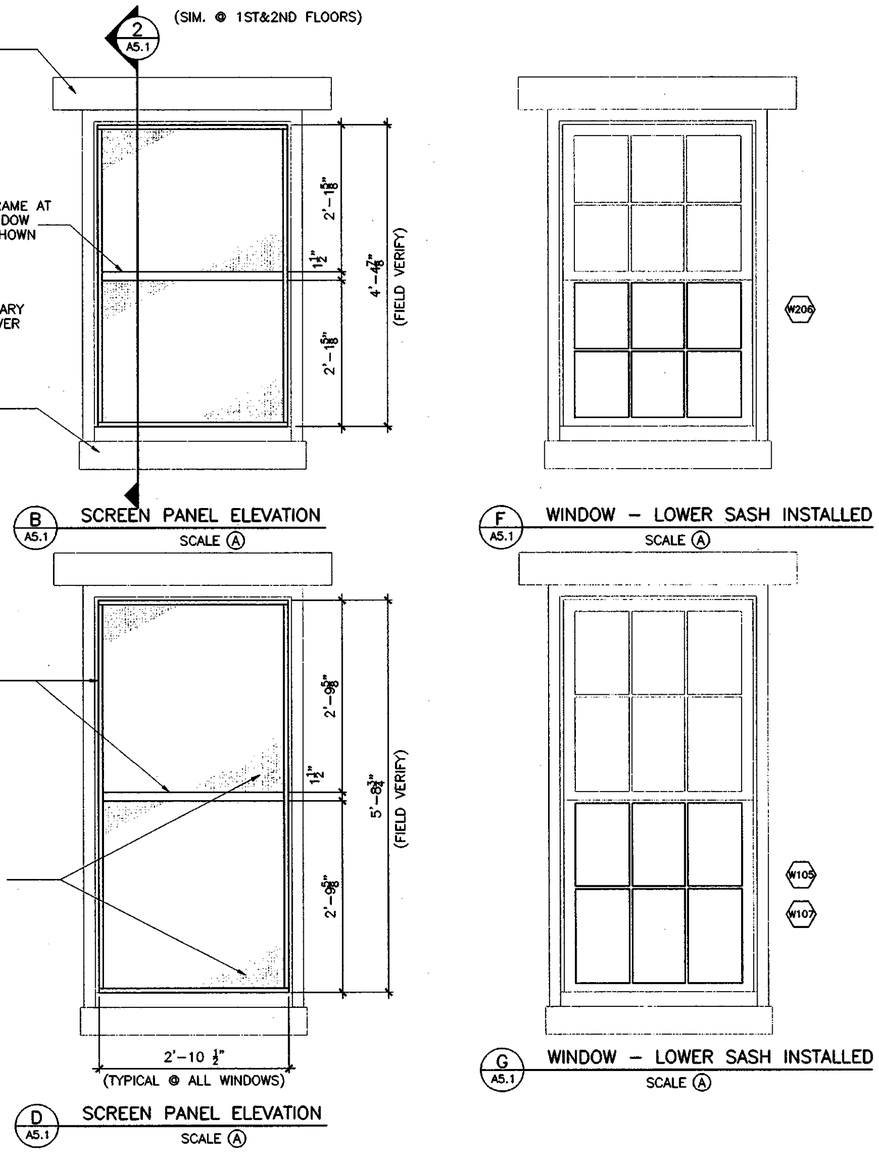
SCALE (B) 6 3 0 6
SCALE OF INCHES

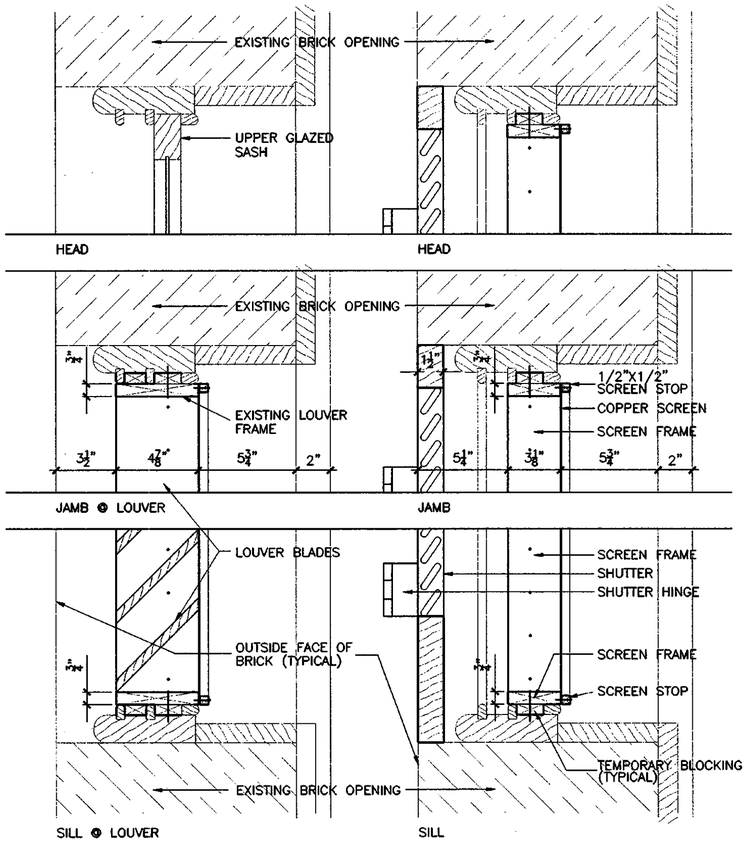
SCALE (C) 2 0 2 4
SCALE OF INCHES

DESIGNED: NOT APPLICABLE DRAWN: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. A5.0	TITLE OF SHEET WINDOW SHUTTERS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 25 OF 41

10/4/05 12:36 MTRACY R15 P:\MONO\403\DRAWINGS\ARCH\A5.0_WINDOWSHUTTERS.DWG IMAGES: P:\MONO\MONO403\PHOTOS\WINDOWS\SHUTTER HARDWARE\TV SHUTTERHINGE02.JPG;







SCALE A: 1 0 1 2 — SCALE OF FEET

SCALE B: 6 3 0 6 — SCALE OF INCHES

DESIGNED: NOT APPLICABLE DRAWN: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. A5.1	TITLE OF SHEET WINDOW LOUVERS AND SCREEN PANELS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 / 25003A PKG. NO. MONO 403 SHEET 26 OF 41

10/4/05 12:33 MTRACY R15 P:\MONO\403\DRAWINGS\ARCH\A5.1_SCREENPANELDETAILS.DWG

WINDOW SCHEDULE

⟨W⟩	DETAIL	MSRY OPNG	HARDWARE SET	SHUTTER CONFIGURATION	REMARKS
WB01	E/A5.1	36" X 38 ½"	NOT APPLICABLE	NOT APPLICABLE	EXISTING LOUVER REMAINS. REPAIR MODERATELY DAMAGED SILL.
WB02	E/A5.1	36" X 38 ½"	NOT APPLICABLE	NOT APPLICABLE	EXISTING LOUVER REMAINS. REPAIR OR REPLACE HEAVILY DAMAGED SILL.
WB03	E/A5.1	36" X 38 ½"	NOT APPLICABLE	NOT APPLICABLE	EXISTING LOUVER REMAINS. REPLACE DAMAGED SILL.
WB04	E/A5.1	36" X 38 ½"	NOT APPLICABLE	NOT APPLICABLE	EXISTING LOUVER REMAINS. REPAIR MODERATELY DAMAGED SILL.
WB05	E/A5.1	36" X 38 ½"	NOT APPLICABLE	NOT APPLICABLE	EXISTING LOUVER REMAINS. REPAIR MODERATELY DAMAGED SECONDARY SILL.
WB06	E/A5.1	36" X 38 ½"	NOT APPLICABLE	NOT APPLICABLE	EXISTING LOUVER REMAINS. REPAIR MODERATELY DAMAGED SILL.
WB07	E/A5.1	36" X 38 ½"	NOT APPLICABLE	NOT APPLICABLE	EXISTING LOUVER REMAINS
W101	E/A5.0	38 ¼" x 74"	No. 5	CLOSED	REPLACE LOUVER & UPPER SASH WITH NEW SCREEN PANEL
W102	D/A5.0	38 ¼" x 74"	No. 5	OPEN	
W103	D/A5.0	38 ¼" x 74"	No. 5	CLOSED	REPLACE LOUVER & UPPER SASH WITH NEW SCREEN PANEL
W104	E/A5.0	38 ¼" x 74"	No. 5	OPEN	REPAIR OR REPLACE HEAVILY DAMAGED LOWER SASH RAIL.
W105	E/A5.0	38 ¼" x 74"	No. 5	OPEN	INSTALL LOWER GLAZING SASH. RESET FRAME PLUMB & SQUARE.
W106	D/A5.0	38 ¼" x 74"	No. 5	CLOSED	REPLACE LOUVER & UPPER SASH WITH NEW SCREEN PANEL
W107	E/A5.0	38 ¼" x 74"	No. 5	OPEN	INSTALL LOWER GLAZING SASH
W108	E/A5.0	25 ½" x 74"	No. 5	OPEN	
W109	D/A5.0	38 ¼" x 74"	No. 5	CLOSED	REPLACE LOUVER & UPPER SASH WITH NEW SCREEN PANEL
W201	B/A5.0	38 ¼" X 57 ½"	No. 5	OPEN	
W202	A/A5.0	38 ¼" X 57 ½"	No. 5	CLOSED	REPLACE LOUVER & UPPER SASH WITH NEW SCREEN PANEL. REPLACE BROKEN PANE UPPER SASH.
W203	B/A5.0	38 ¼" X 57 ½"	No. 5	OPEN	REPLACE BROKEN PANE IN LOWER SASH
W204	A/A5.0	38 ¼" X 57 ½"	No. 5	CLOSED	REPLACE LOUVER & UPPER SASH WITH NEW SCREEN PANEL
W205	B/A5.0	38 ¼" X 57 ½"	No. 5	OPEN	
W206	B/A5.0	38 ¼" X 57 ½"	No. 5	OPEN	INSTALL LOWER GLAZING SASH. REPAIR MODERATE SILL DAMAGE.
W207	B/A5.0	38 ¼" X 57 ½"	No. 5	OPEN	
W208	A/A5.0	38 ¼" X 57 ½"	No. 5	CLOSED	REPLACE LOUVER & UPPER SASH WITH NEW SCREEN PANEL
W209	A/A5.0	38 ¼" X 57 ½"	No. 5	CLOSED	REPLACE LOUVER & UPPER SASH WITH NEW SCREEN PANEL
W210	B/A5.0	38 ¼" X 57 ½"	No. 5	OPEN	
W211	B/A5.0	38 ¼" X 57 ½"	No. 5	OPEN	REPAIR SPLIT CASING @ LOWER RIGHT
W212	A/A5.0	38 ¼" X 57 ½"	No. 5	CLOSED	REPLACE LOUVER & UPPER SASH WITH NEW SCREEN PANEL. REPLACE BROKEN PANE IN UPPER SASH.
W301	E/5.1 (SIM)	24 ½" X 35"	NOT APPLICABLE	NOT APPLICABLE	EXISTING LOUVER REMAINS
W302	E/5.1 (SIM)	24 ½" X 35"	NOT APPLICABLE	NOT APPLICABLE	EXISTING LOUVER REMAINS
W303	E/5.1 (SIM)	24 ½" X 35"	NOT APPLICABLE	NOT APPLICABLE	EXISTING LOUVER REMAINS

GENERAL NOTES:

1. FIELD VERIFY ALL WINDOW DIMENSIONS PRIOR TO ANY REPAIRS TO, OR ANY FABRICATION OF OR FOR ANY WINDOW.

2. ALL 1ST & 2ND FLOOR WINDOWS ARE DOUBLE HUNG. BASEMENT & ATTIC WINDOWS ARE CASEMENTS WITH EXISTING LOUVERS WHICH SHALL BE STRIPPED, (REMOVED AND REPLACED IF NECESSARY) REPAIRED, AND REFINISHED AS PER SPECIFICATIONS.

3. ALL 1ST & 2ND FLOOR WINDOWS RECEIVE NEW SHUTTERS, SHUTTER AND WINDOW HARDWARE AS NOTED.

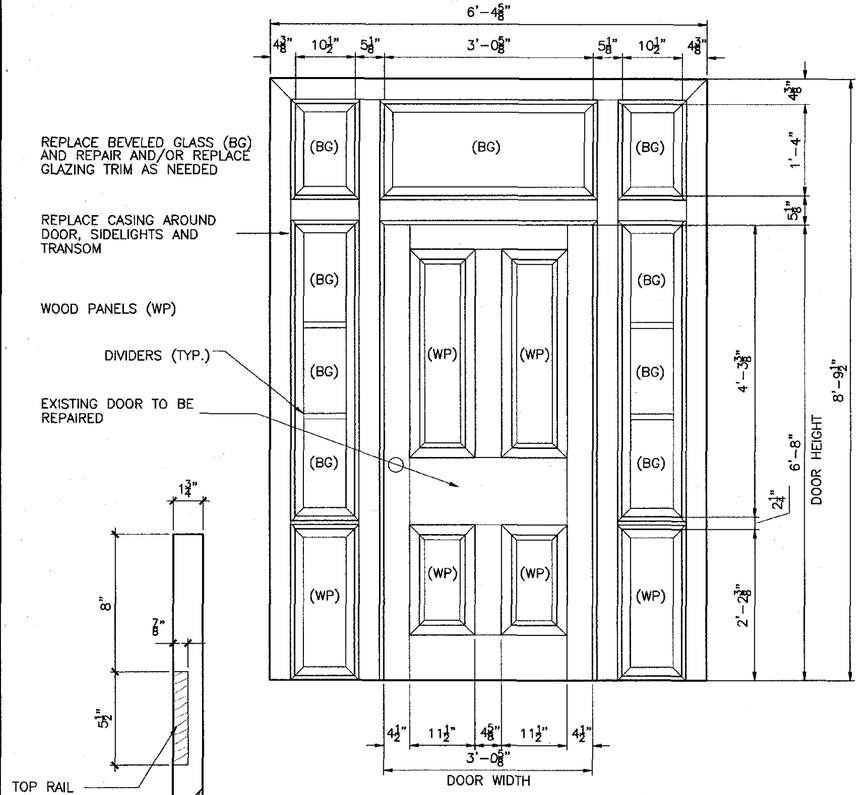
4. SEE SHEET A5.0 FOR CONFIGURATION OF SHUTTERS (OPEN OR SHUT) AT 1ST & 2ND FLOOR WINDOWS.

5. ALL WINDOWS AND CASINGS AT 1ST & 2ND FLOORS SHALL BE STRIPPED (INTERIOR & EXTERIOR) , REPAIRED AS NEEDED, AND REFINISHED AS PER SPECIFICATIONS.

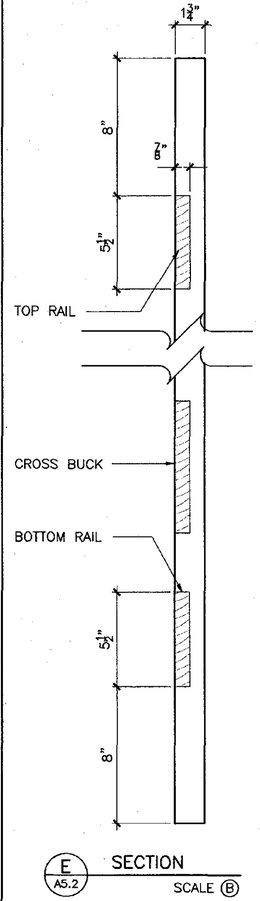
SCALE (A) 4 0 4 8
SCALE OF FEET

DESIGNED: N/A (CADD) J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. A5.2	TITLE OF SHEET: WINDOW SCHEDULE AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 27 OF 41

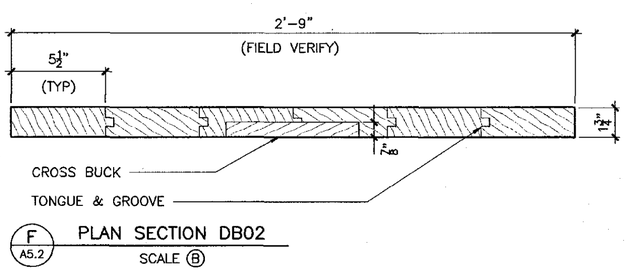
10/4/06 12:30 JMRACY R15 P:\MONO\403\DRAWINGS\ARCH\A5.2_WINDOWSCHEDULE.DWG



A A5.2 INTERIOR ELEVATION DOOR D101
SCALE A

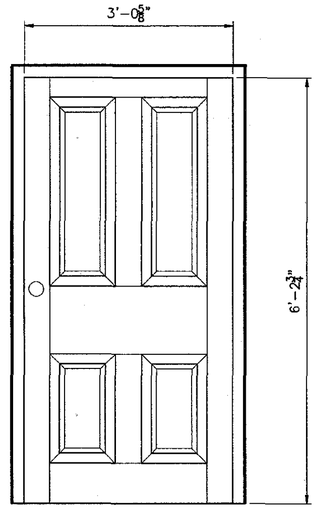


E A5.2 SECTION
SCALE B

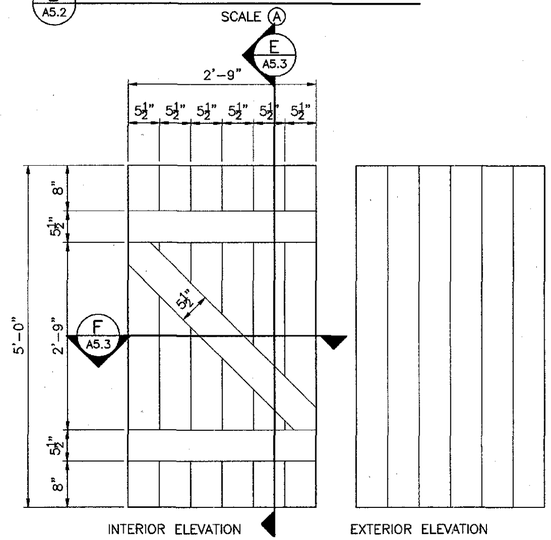


F A5.2 PLAN SECTION DB02
SCALE B

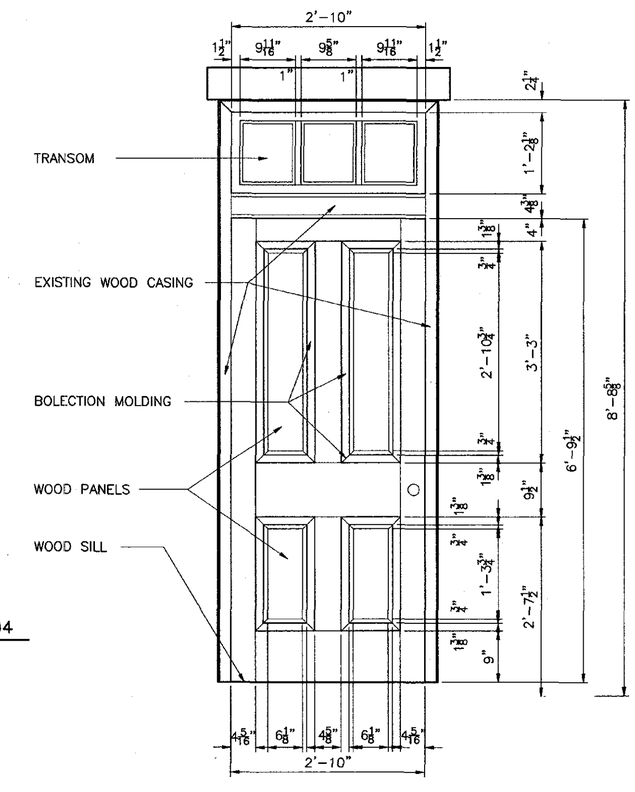
DOOR D104 IS SIMILAR IN PATTERN AND CONSTRUCTION DETAILING TO DOOR D101 WITH MINOR VARIATION IN DIMENSIONS OF PATTERN. FIELD VERIFY ALL DIMENSION.



B A5.2 EXTERIOR ELEVATION DOOR D104
SCALE A



D A5.2 INTERIOR ELEVATION DOOR D101
SCALE A



C A5.2 EXTERIOR ELEVATION/DOORS D102 & D103
SCALE A

SCALE A 1 0 1 2
SCALE OF FEET

SCALE B 6 3 0 6
SCALE OF INCHES

10/4/05 12:21 MTRACY R15 P:\MONO\403\DRAWINGS\ARCH\A5.3_DOORDETAILS.DWG

DESIGNED: NOT APPLICABLE DRAWN: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. A5.3	TITLE OF SHEET DOOR DETAILS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 28 OF 41

GENERAL NOTES:

1. FIELD VERIFY DIMENSIONS OF ALL DOORS, CASINGS, TRANSOMS, SIDELITES, ROUGH OPENINGS AND ASSOCIATED TRIM. DIMENSIONS SHOWN ARE APPROXIMATE.

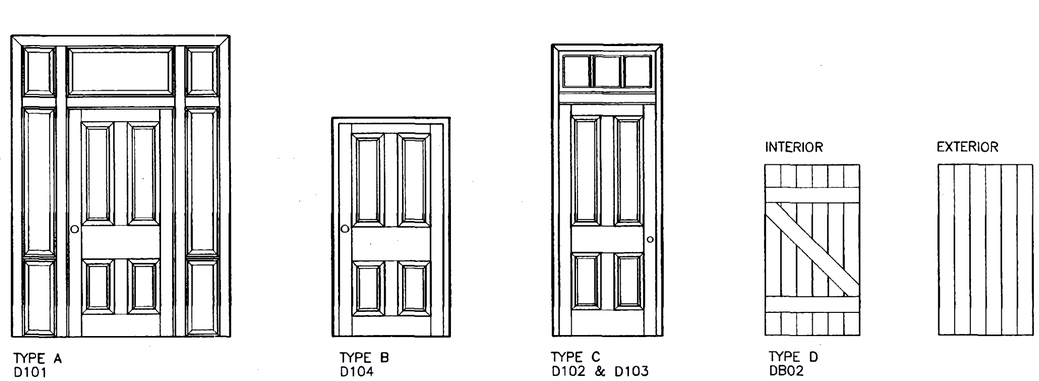
2. "REPAIR" IS DEFINED AS REPAIRING WOOD FEATURES BY PATCHING, PIECING-IN, CONSOLIDATING, OR OTHERWISE REINFORCING THE WOOD USING RECOGNIZED PRESERVATION METHODS. REPAIR MAY ALSO INCLUDE THE LIMITED REPLACEMENT IN KIND – OR WITH COMPATIBLE SUBSTITUTE MATERIAL – OF THOSE EXTENSIVELY DETERIORATED OR MISSING PARTS OF FEATURES WHERE THERE ARE SURVIVING PROTOTYPES SUCH AS BRACKETS, MOLDING, OR SECTIONS OF SIDING.

3. "REPLACE" IS DEFINED AS REPLACING IN KIND AN ENTIRE WOOD FEATURE THAT IS TOO DETERIORATED TO REPAIR – IF THE OVERALL FORM AND DETAILING ARE STILL EVIDENT – USING THE PHYSICAL EVIDENCE AS A MODEL T REPRODUCE THE FEATURE. IF USING THE SAME KIND OF MATERIAL IS NOT TECHNICALLY OR ECONOMICALLY FEASIBLE, THEN A COMPATIBLE SUBSTITUTE MATERIAL MAY BE CONSIDERED.

4. "CONSERVE" – WHEN REPAIRING A DOOR, CASING, ETC., IS IS NOT INTENDED THAT THE WOOD BE FINISHED TO A SMOOTH, "LIKE-NEW" FINISH. CONSERVATION OF THE FEATURE, RATHER THAN RETURNING IT TO A STATE SIMILAR TO THAT WHEN IT WAS NEW, IS THE INTENT. MINOR SCRATCHES DENTS, AND BLEMISHES, WHICH MAY APPEAR ON THE SURFACES, ARE ACCEPTABLE.

DOOR SCHEDULE

Ⓓ	TYPE	HARDWARE SET	DIMENSIONS	NOTES
DB01	X	None	2'-9" X 5'-0"	BLOCKED-IN OPENING TO REMAIN. REPLACE EXISTING WOOD LINTEL WITH NEW LINTEL FABRICATED AND INSTALLED MATCHING ORIGINAL DETAILS (AS FOUND).
DB02	D	No. 4	2'-9" X 5'-0"	EXISTING PLYWOOD PANEL DOOR TO BE REPLACED WITH NEWLY FABRICATED DOOR. STRIP PAINT AND REPAIR MODERATE DAMAGE TO DOOR CASING. SQUARE & PLUMB OPENING AS NEEDED. THE CASING AND NEW DOOR SHALL REFINISHED AS SPECIFIED. HANG NEW DOOR IN OPENING. SEE DOOR DETAILS SHEET A5.2
D101	A	No. 1	3'-0" X 6'-8"	DOOR WITH SIDELIGHTS AND TRANSOM. REPLACE MISSING TRANSOM AND SIDELIGHT BEVELED GLAZING AND TRIM. REPAIR EXISTING DOOR, CASING, & TRIM. STRIP EXTERIOR SURFACES, CLEAN & REPAIR INTERIOR SURFACES. HANG REPAIRED/REFINISHED DOOR IN OPENING. SEE DOOR DETAILS SHEET A5.3.
D102	B	No. 2	2'-10" X 6'-9"	D102 & D103 ARE ASSUMED TO HAVE BEEN SIMILAR IN PATTERN, SIZE & CONSTUCTION. BOTH DOORS HAVE TRANSOMS. THE ONLY DOOR REMAINING IS EITHER FOR DOOR OPENING D102 OR D103. THIS DOOR SHALL BE STRIPPED, REPAIRED AND REFINISHED AS SPECIFIED, THEN HUNG IN THE APPROPRIATE OPENING. CASING AND TRANSOM FOR DOOR D102 SHALL BE STRIPPED, REPAIRED, MISSING TRIM, FRAMING, & GLAZING REPLACED IN KIND. REFINISH AS SPECIFIED.
D103	B	No. 2	2'-10" X 6'-9"	NOTES FOR D102 APPLY. FABRICATE NEW DOOR FOR EITHER THE D102 OR D103 OPENING (WHICHEVER APPLYS). NEW DOOR SHALL MATCH THE EXISTING DOOR IN WOOD SPECIES, PATTERN, ALL CONSTRUCTION DETAILS, AND SIZED TO FIT REMAINING OPENING.
D104	C	No. 3	2'-10" X 6'-2"	STRIP & REPAIR DOOR & CASING, HANG DOOR IN OPENING AND REFINISH AS SPECIFIED.



TYPE A
D101

TYPE B
D104

TYPE C
D102 & D103

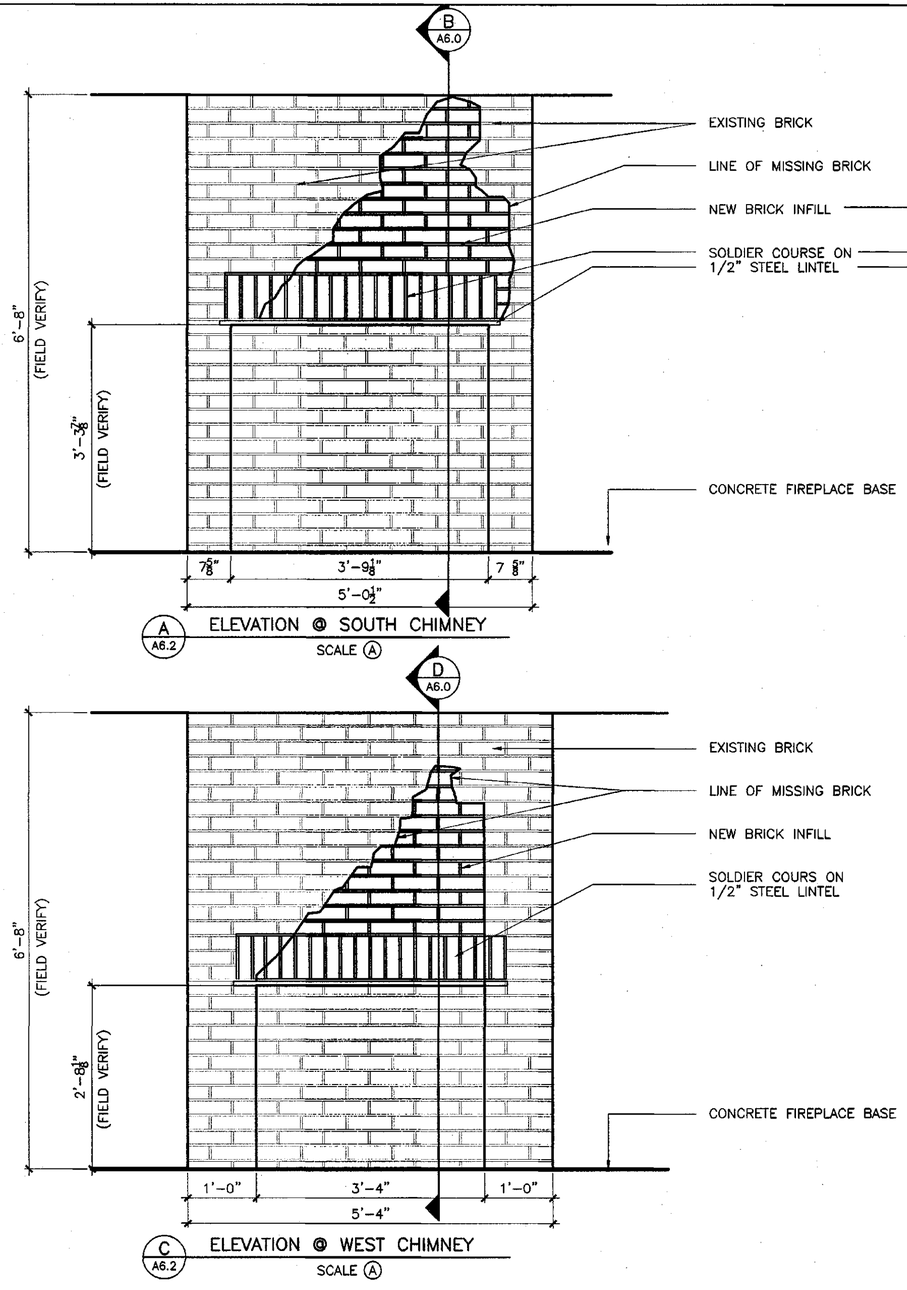
TYPE D
DB02

A5.4 DOOR TYPES
SCALE Ⓐ

SCALE Ⓐ 2 0 2 4
SCALE OF FEET

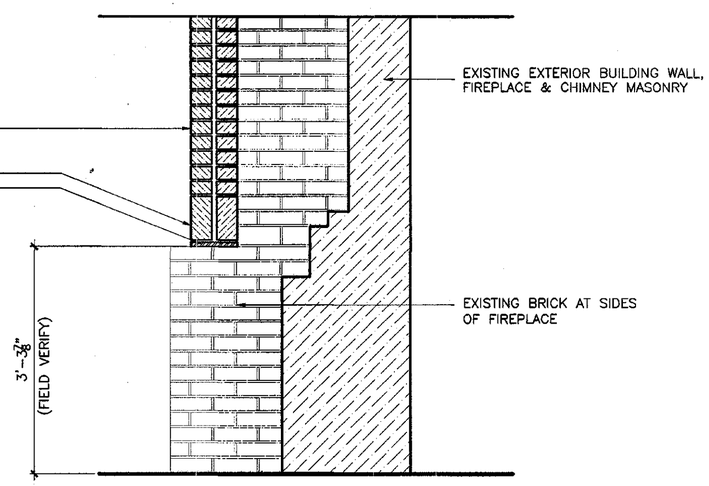
DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
N/A CADD J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	A5.4	DOOR SCHEDULE AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	894 25003A PKG. NO. MONO 403 SHEET 29 OF 41

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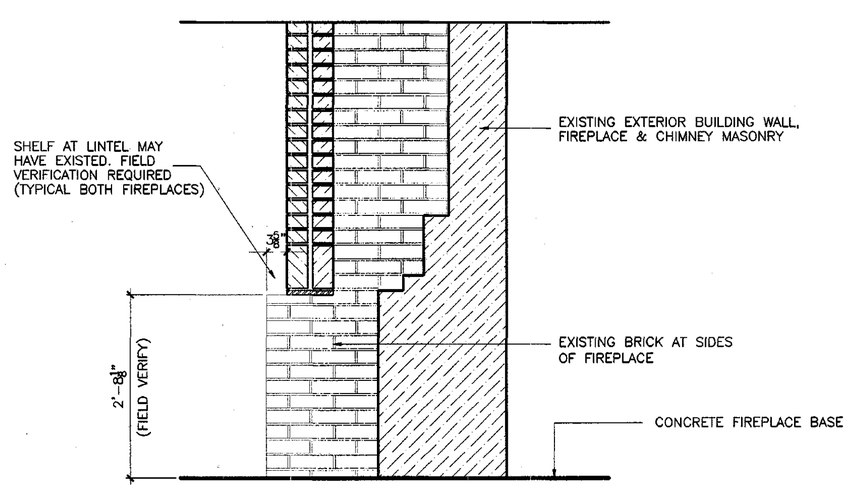


A A6.2 ELEVATION @ SOUTH CHIMNEY
SCALE A

C A6.2 ELEVATION @ WEST CHIMNEY
SCALE A



B A6.2 SECTION THRU SOUTH CHIMNEY
SCALE A

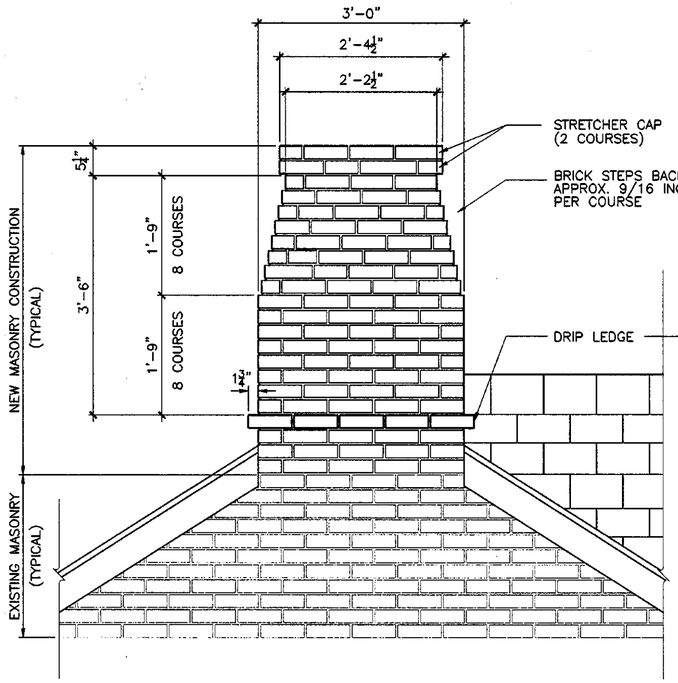


D A6.2 SECTION THRU WEST CHIMNEY
SCALE A

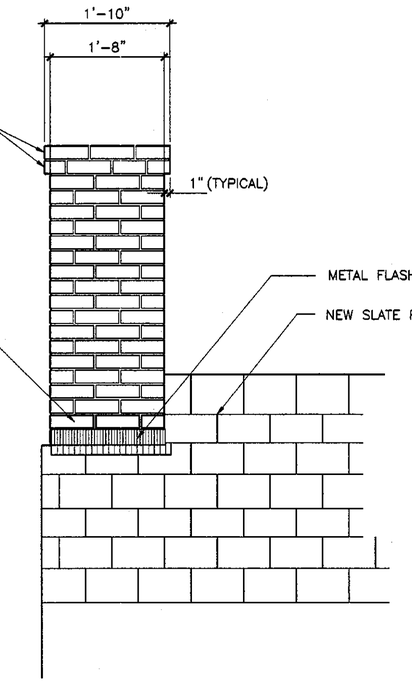
SCALE A 1 0 1 2
SCALE OF FEET

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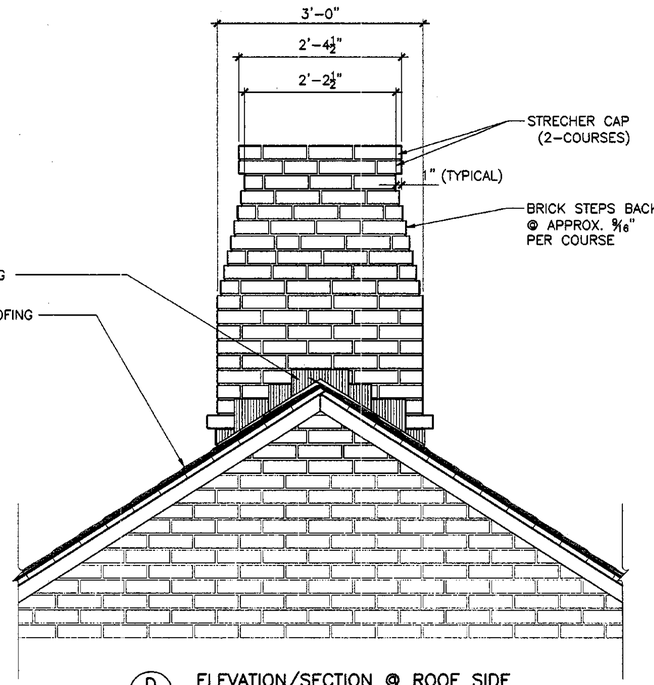
DESIGNED: NOT APPLICABLE DRAWN: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. A6.0	TITLE OF SHEET FIREPLACE REPAIR DETAILS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 30 OF 41



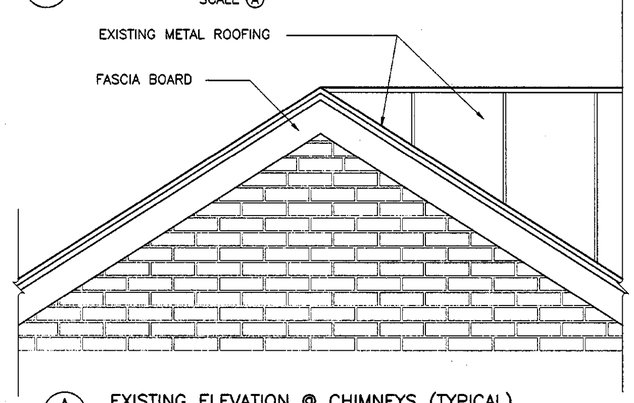
B A6.1 TYPICAL FACE ELEVATION
SCALE A



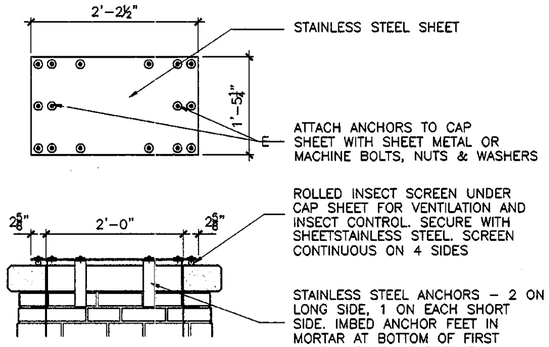
C A6.1 TYPICAL SIDE ELEVATION
SCALE A



D A6.1 ELEVATION/SECTION @ ROOF SIDE
SCALE A



A A6.1 EXISTING ELEVATION @ CHIMNEYS (TYPICAL)
SCALE A



E A6.1 CHIMNEY CAP PLAN & SECTION
SCALE A

SCALE A 1 0 1 2
SCALE OF FEET

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DESIGNED: NOT APPLICABLE DRAWN: J. COOK TECH. REVIEW: D. SNOW DATE: 07/02	SUB SHEET NO. A6.1	TITLE OF SHEET CHIMNEY REPAIR DETAILS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 — SHEET 31 OF 41	

GENERAL NOTES

GENERAL

1. FIELD VERIFY EXISTING CONDITIONS. OBTAIN DIRECTION FOR ADDRESSING DISCREPANCIES BEFORE PROCEEDING WITH WORK.

DESIGN LOADS

1. DESIGN CONFORMS TO INTERNATIONAL BUILDING CODE, 2000 EDITION (IBC–2000)
2. DESIGN LOADS:

DEAD LOAD	12 PSF
ROOF LIVE LOAD	16 PSF
SNOW LOAD	30 PSF @ ROOF LEVEL
FLOOR LIVE LOAD	60 PSF
WIND LOAD	V = 90 MPH, EXPOSURE C, I=1.0
SEISMIC	S_s=0.2g, S_1=0.07g, SITE CLASS D

3. SOIL BEARING CAPACITY: 2000 PSF

CONCRETE CONSTRUCTION NOTES

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF F'c = 4000 PSI.
2. REINFORCING STEEL SHALL CONFORM TO ASTM A615A–01a, GRADE 60, FOR DEFORMED BARS.
3. ALL SPLICES SHALL BE CONTACT LAP SPLICES. MINIMUM LAP LENGTHS UNLESS OTHERWISE NOTED:

BAR SIZE	TOP* BARS	OTHER BARS
#3	2'–0"	1'–7"
#4	2'–8"	2'–1"
#5	3'–4"	2'–7"

*TOP BARS ARE HORIZONTAL REINFORCEMENT WITH 12 INCHES OR MORE CONCRETE CAST BELOW THE SPLICE

4. MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE AS FOLLOWS:
   CONCRETE CAST AGAINST EARTH 3"
   CONCRETE EXPOSED TO EARTH OR WEATHER: 1½"
5. EXTEND ALL REINFORCEMENT CONTINUOUS AROUND CORNERS AND THROUGH INTERSECTIONS OR PROVIDE LAP LENGTH x LAP LENGTH CORNER BARS.
6. PROVIDE CHAIRS, BOLSTERS, CARRIER BARS, ANCHOR BOLT TEMPLATES AND OTHER ACCESSORIES REQUIRED TO SECURELY SUPPORT STEEL REINFORCEMENT AND OTHER EMBEDDED ITEMS TO PREVENT DISPLACEMENT PRIOR TO AND DURING CONCRETE PLACEMENT.
7. COORDINATE AND VERIFY BLOCK OUTS, INSERTS, AND EMBEDDED ITEMS FOR ALL TRADES.

STEEL

1. PLATES AND SHAPES: ASTM A36–01
2. ANCHOR BOLTS: ASTM A307–00
3. BOLTS: ASTM A307–00
4. WELDING ELECTRODES: E70
5. WELDING: MINIMUM WELD SIZE SHALL BE 3/16" IN ACCORDANCE WITH AISC SPECIFICATIONS, 9th EDITION, TABLE J2.4 UNLESS NOTED OTHERWISE. ALL WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1.

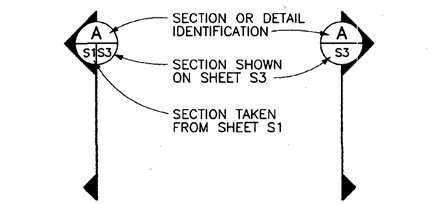
WOOD

1. LUMBER: SOUTHERN PINE NO.2 OR BETTER, S4S.
2. CONNECTORS: SIMPSON STRONG–TIE, OR APPROVED EQUAL.
3. PRESSURE TREAT ALL NEW LUMBER WITH CCA TO A A MINIMUM NET RETENTION OF .40 POUND PER CUBIC FOOT.
4. PLYWOOD SHEATHING SHALL BE APA RATED, EXP. 1, WITH A MINIMUM SPAN RATING OF 32/16, SIZE AS SHOWN ON DRAWINGS. SHEATHING SHALL BE LAYED PERPENDICULAR TO FRAMING MEMBERS.
5. LAMINATED VENEER LUMBER (LVL) SHALL HAVE THE FOLLOWING PROPERTIES: AT 100% LOAD DURATION THE ALLOWABLE DESIGN STRESSES ARE:
   SHEAR MODULUS OF ELASTICITY G = 118,750 psi
   MODULUS OF ELASTICITY E = 1,900,000 psi
   FLEXURAL STRESS Fb = 2600 psi FOR A 12" DEPTH
   COMPRESSION ⊥ TO GRAIN/II TO GLUE LINE Fcl = 750 psi, THIS SHALL–NOT BE INCREASED FOR DURATION OF LOAD
   COMPRESSION II TO GRAIN Fcll = 2310 psi
   HORIZONTAL SHEAR ⊥ TO GLUE LINE Fv = 285 psi
6. GLUED LAMINATED TIMBER (GLULAM) SHALL HAVE THE FOLLOWING PROPERTIES: MANUFACTURED FROM SOUTHERN PINE LUMBER
   MODULUS OF ELASTICITY E = 1,700,000 psi
   FLEXURAL STRESS Fb = 2400 psi
   COMPRESSION ⊥ TO GRAIN/II TO GLUE LINE Fcl = 740 psi,
   COMPRESSION II TO GRAIN Fcll = 1700 psi
7. NAIL ROOF SHEATHING AS FOLLOWS:
   8d @ 4" O.C. @ DIAPHRAGM BOUNDARIES
   8d @ 6" O.C. @ PANEL EDGES
   8d @ 12" O.C. AT INTERMEDIATE FRAMING MEMBERS
8. PRESSURE TREAT LUMBER WITH CCA TO A MINIMUM RETENTION OF 0.40 POUNDS PER CUBIC FOOT.

BRICK & MASONRY

1. PEDESTAL BRICK SHALL MATCH COLOR OF EXISTING BRICK AS CLOSELY AS POSSIBLE.
2. BRICK SHALL BE FACING BRICK, GRADE N, TYPE II, WITH A MINIMUM NET AREA COMPRESSIVE STRENGTH OF 3000 psi.
3. GROUT SHALL BE COARSE, TYPE I OR II WITH A MINIMUM COMPRESSIVE
4. STRENGTH OF 2000 psi AND A SLUMP OF 9" ± 1".

SYMBOL LEGEND



SECTION OR DETAIL IDENTIFICATION SYMBOLS

ABBREVIATIONS

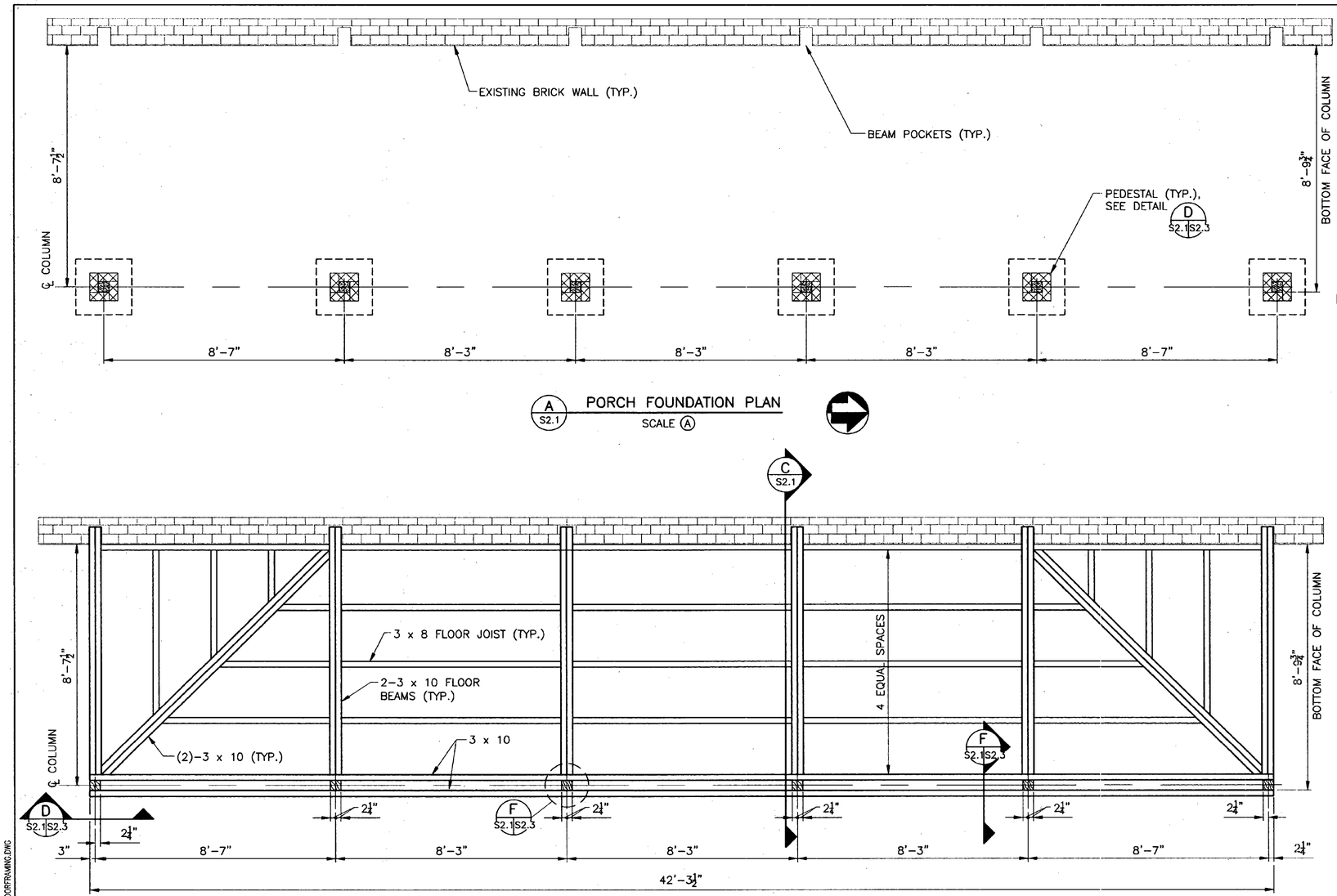
A.B.	ANCHOR BOLT
A.F.F.	ABOVE FINISHED FLOOR
AGG.	AGGREGATE
ALT.	ALTERNATING
APA	AMERICAN PLYWOOD ASSOCIATION
ARCH.	ARCHITECTURAL
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASTM	AMERICAN SOCIETY OF TESTING MATERIALS
BM	BEAM
B.O.	BOTTOM OF
BOT.	BOTTOM
BRG.	BEARING
CCA	CHROMATED COPPER ARSENATE
C.J.	CONTROL JOINT OR CONSTRUCTION JOINT
℄	CENTERLINE
CLR.	CLEAR
C.M.U.	CONCRETE MASONRY UNIT
CONT.	CONTINUOUS
d	PENNY
DET.	DETAIL
EA.	EACH
E.J.	EXPANSION JOINT
EL.	ELEVATION
EQ.	EQUALLY
E.W.	EACH WAY
EXP.	EXPANSION
FDN	FOUNDATION
FFE	FINISHED FLOOR ELEVATION
FIN. FLR.	FINISHED FLOOR
HORIZ.	HORIZONTAL
IBC	INTERNATIONAL BUILDING CODE
JT.	JOINT
LVL	LAMINATED VENEER LUMBER
MAS.	MASONRY
M.O.	MASONRY OPENING
MAX.	MAXIMUM
MIN.	MINIMUM
O.C.	ON CENTER
ℙ	PLATE (ON STRUCTURAL SHEETS)
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PREFAB	PREFABRICATED
REINF.	REINFORCEMENT
R.O.	ROUGH OPENING
SIM	SIMILAR
T&G	TONGUE AND GROOVE
T.O.	TOP OF
T.O.F.	TOP OF FOOTING
TS	TUBULAR STEEL
TYP.	TYPICAL
VERT.	VERTICAL
W/	WITH
WWF	WELDED WIRE FABRIC
IBC	INTERNATIONAL BUILDING CODE
W.P.	WORKING POINT

MATERIAL LEGEND

- CONCRETE
- EARTH
- WOOD BLOCKING
- FRAMING LUMBER
- PLYWOOD
- STEEL

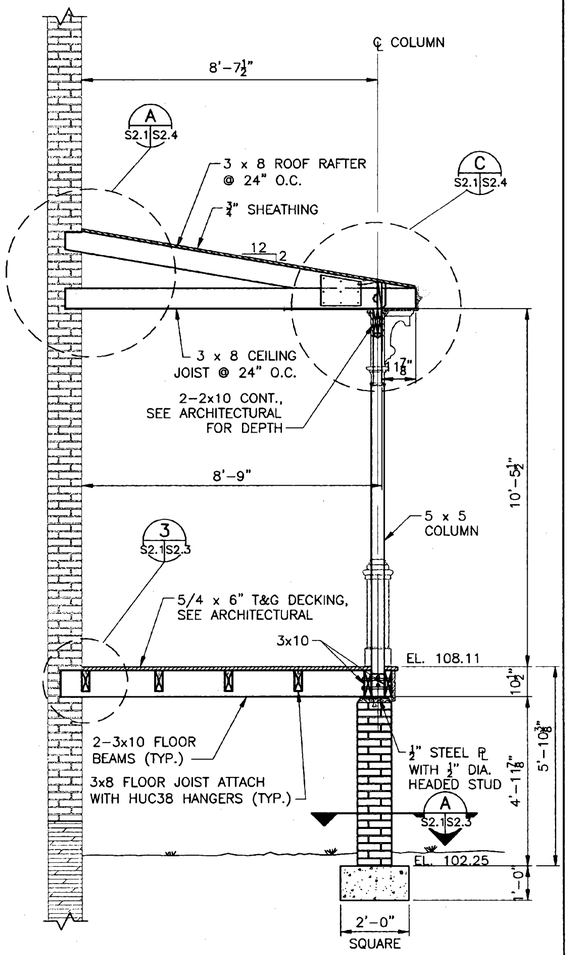
10/4/05 09:07 MTRACY R15 P:\MONO\403\DRAWINGS\STRUC\S1.0_GENERALNOTES.DWG

DESIGNED: L. CREAGER DRAWN: L. CREAGER TECH. REVIEW: LR DATE: 07/02	SUB SHEET NO. S1.0	TITLE OF SHEET STRUCTURAL GENERAL NOTES AS–BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 32 OF 41



A S2.1 PORCH FOUNDATION PLAN
SCALE A

B S2.1 PORCH FLOOR FRAMING PLAN
SCALE A



C S2.1 S2.2 PORCH SECTION AT COLUMN
SCALE A

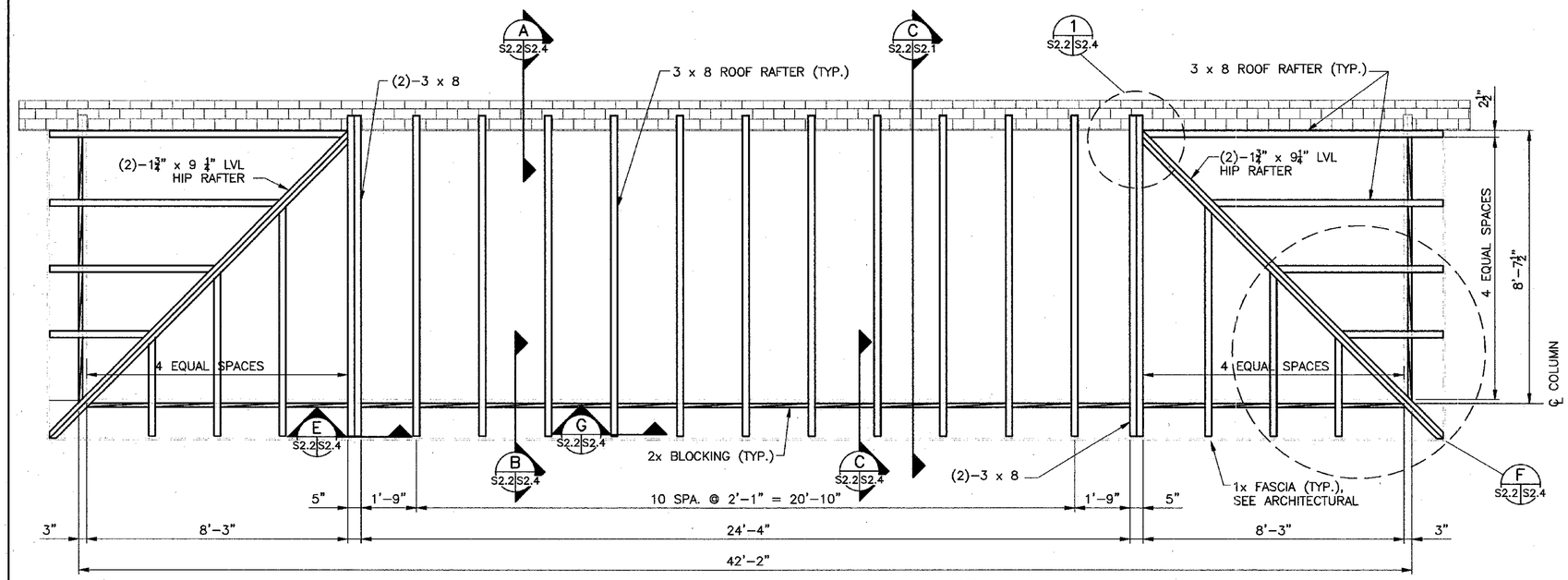
SCALE A 2 0 2 4
SCALE OF FEET

NOTE:

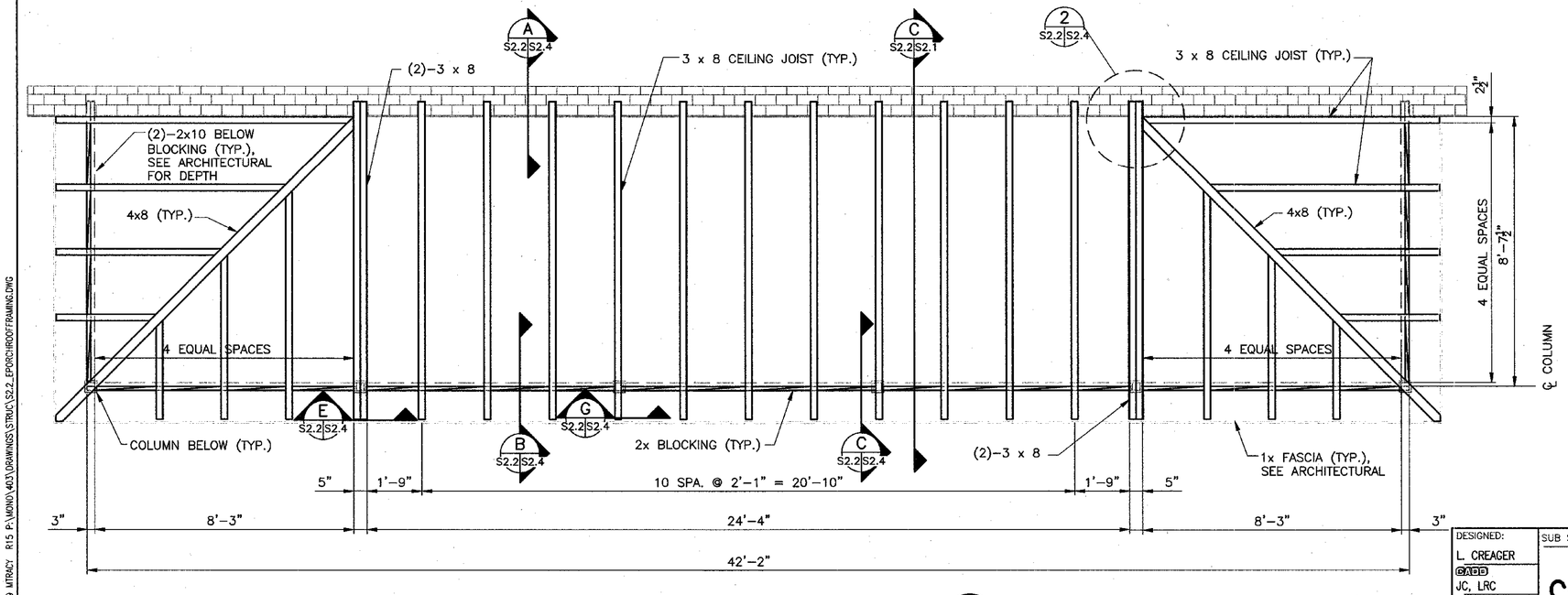
1. ROOF RAFTERS, CEILING JOISTS EXCEPT FOR MODIFIED RAFTERS, & FLOOR BEAMS SHALL BE SEATED IN BRICK POCKETS. POCKETS SHALL NOT BE GROUTED. USE ½" E.J. MATERIAL BETWEEN BRICK AND WOOD. LEAVE A MINIMUM OF A ¼" GAP BETWEEN END OF WOOD AND POCKET.

DESIGNED: L. CREAGER DRAWN: JC, LRC TECH. REVIEW: LR DATE: 07/02	SUB SHEET NO. S2.1	TITLE OF SHEET EAST PORCH FOUNDATION & FLOOR FRAMING PLANS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 33 OF 41

10/4/05 09:04 MTRACY R15 F:\MONO\403\DRAWINGS\STRUC\S2.1_EPORCHFLOORFRAMING.DWG



A S2.2 PORCH ROOF FRAMING PLAN
SCALE (A)



B S2.2 PORCH CEILING FRAMING PLAN
SCALE (A)

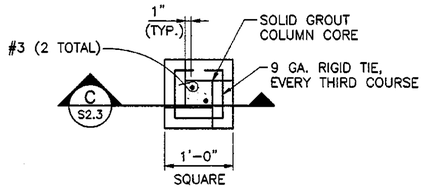
NOTE:

1. ROOF RAFTERS, CEILING JOISTS EXCEPT FOR MODIFIED RAFTERS, & ONE FLOOR BEAM SHALL BE SEATED IN BRICK POCKETS. POCKETS SHALL NOT BE GROUTED. USE ½" E.J. MATERIAL BETWEEN BRICK AND WOOD. LEAVE A MINIMUM OF A ¼" GAP BETWEEN END OF WOOD AND POCKET.

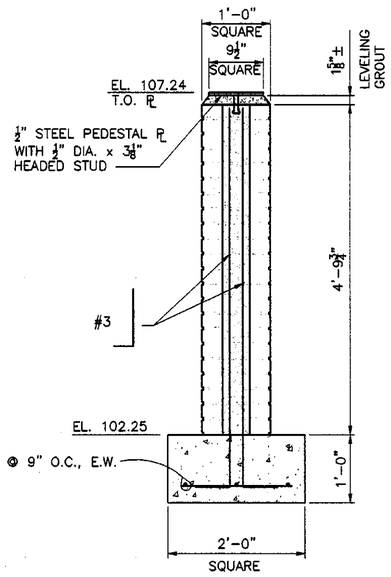
SCALE (A) 2 0 2 4
SCALE OF FEET

DESIGNED: L. CREAGER DRAFTED: JC, LRC TECH. REVIEW: LR DATE: 07/02	SUB SHEET NO. S2.2	TITLE OF SHEET EAST PORCH ROOF FRAMING PLAN AS–BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 34 OF 41

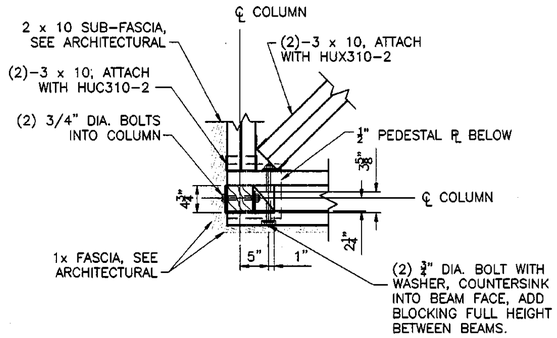
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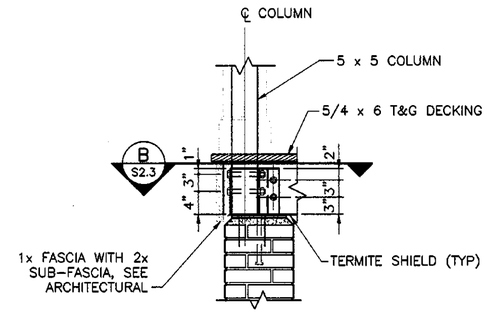
A S2.1|S2.3 PEDESTAL SECTION
SCALE (A)



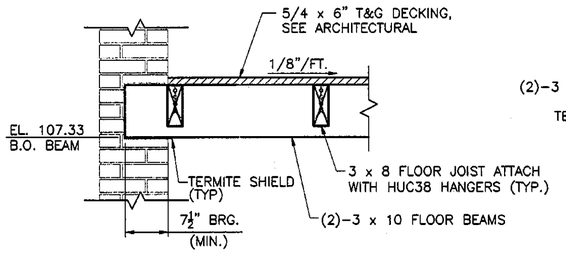
C S2.3 PEDESTAL SECTION
SCALE (A)



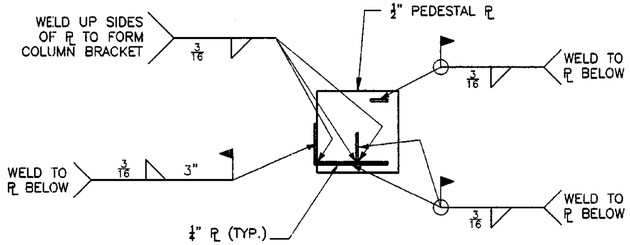
B S2.3 END BEAM/COLUMN CONNECTION SECTION
SCALE (A)



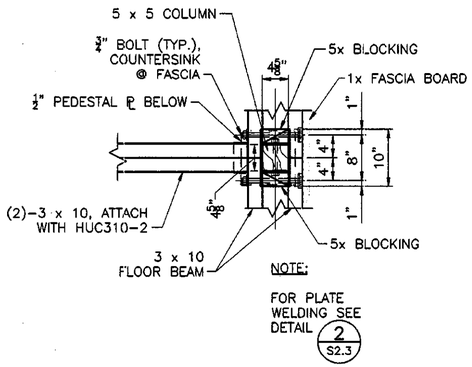
D S2.3 END BEAM/COLUMN CONNECTION SECTION
SCALE (A)



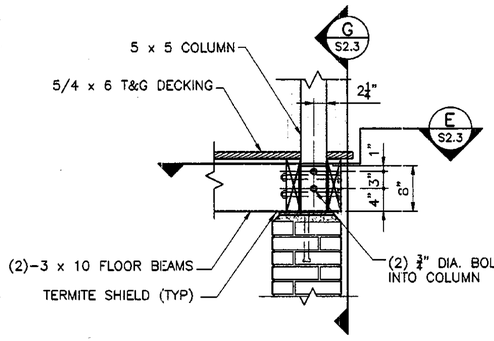
3 S2.1|S2.3 WALL/BEAM CONNECTION DETAIL
SCALE (A)



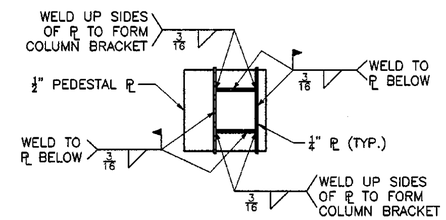
1 S2.3 END COLUMN PLATE WELDING DETAIL
SCALE (B)



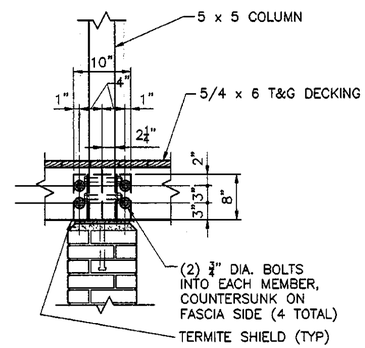
E S2.1|S2.3 BEAM/COLUMN CONNECTION SECTION
SCALE (A)



F S2.1|S2.3 BEAM/COLUMN CONNECTION SECTION
SCALE (A)



2 S2.3 PLATE WELDING DETAIL
SCALE (B)



G S2.3 BEAM/COLUMN CONNECTION ELEVATION
SCALE (A)

SCALE (B) 12 6 0 12
SCALE OF INCHES

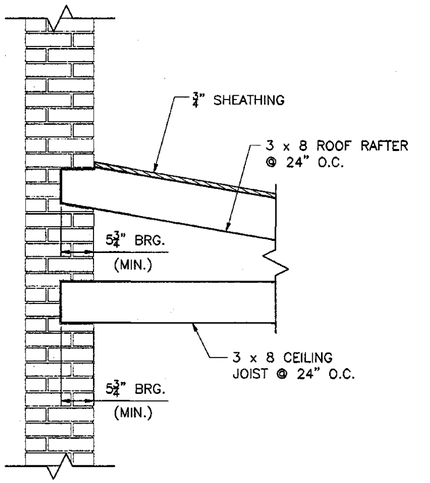
SCALE (A) 1 0 1 2
SCALE OF FEET

NOTE:

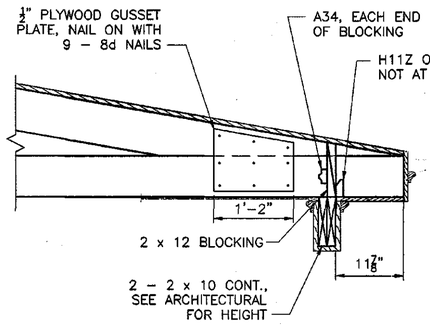
1. ROOF RAFTERS, CEILING JOISTS EXCEPT FOR MODIFIED RAFTERS, & FLOOR BEAMS SHALL BE SEATED IN BRICK POCKETS. POCKETS SHALL NOT BE GROUTED. USE ½" E.J. MATERIAL BETWEEN BRICK AND WOOD. LEAVE A MINIMUM OF A ¼" GAP BETWEEN END OF WOOD AND POCKET.

10/4/05 08:56 MTRACY R15 P:\MONO\403\DRAWINGS\STRUCT\S2.3_EPORCHFLOORFRAMINGDETAILS.DWG

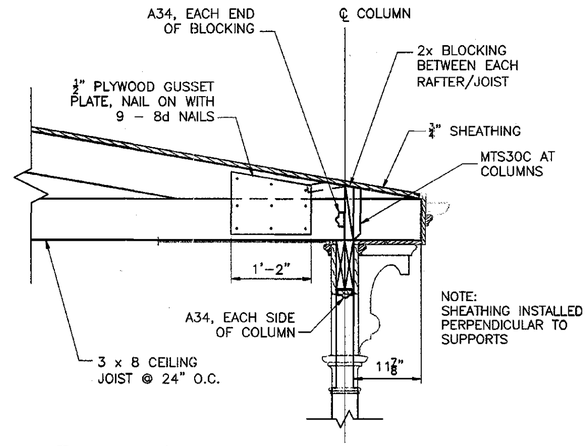
DESIGNED: L. CREAGER DRAWN: LRC TECH. REVIEW: LR DATE: 07/02	SUB SHEET NO. S2.3	TITLE OF SHEET EAST PORCH FLOOR FRAMING DETAILS AS-BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 35 OF 41



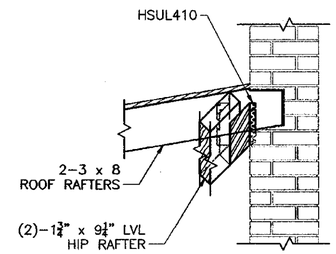
A S2.2|S2.4 ROOF BEAM ATTACHMENT SECTION
SCALE (A)



B S2.2|S2.4 ROOF/CEILING FRAMING SECTION
SCALE (A)



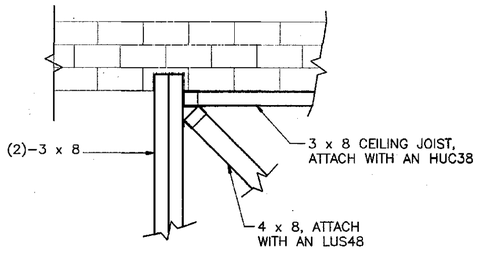
C S2.1|S2.2|S2.4 ROOF/CEILING FRAMING SECTION @ COLUMN
SCALE (A)



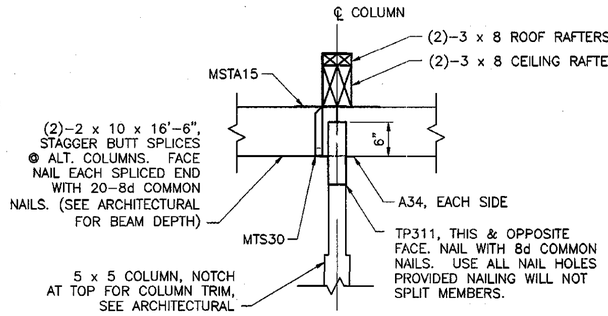
NOTE:

1. 3 x 8 ROOF RAFTER NOT SHOWN FOR CLARITY.
2. CEILING JOIST CONNECTION DETAILS SIMILAR.

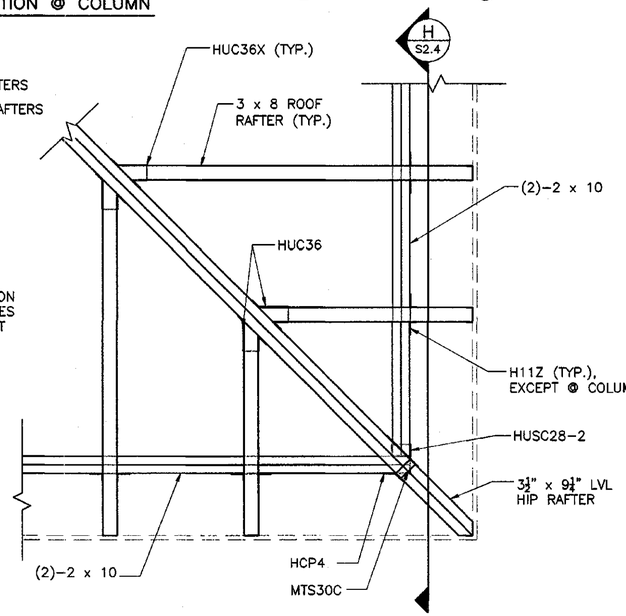
D S2.4 ROOF HIP RAFTER SECTION
SCALE (A)



NOTE: CONNECTIONS SIMILAR TO THAT SHOWN IN DETAIL D S2.4

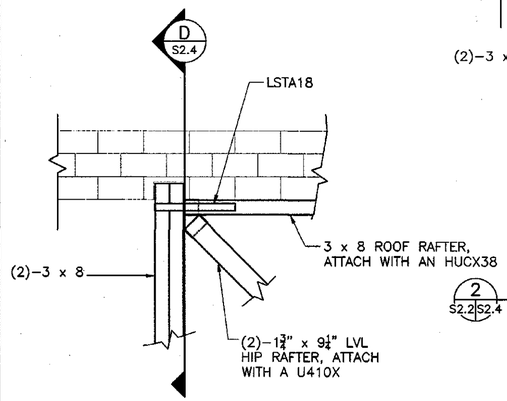


E S2.2|S2.4 COLUMN/DOUBLE JOIST SECTION
SCALE (A)

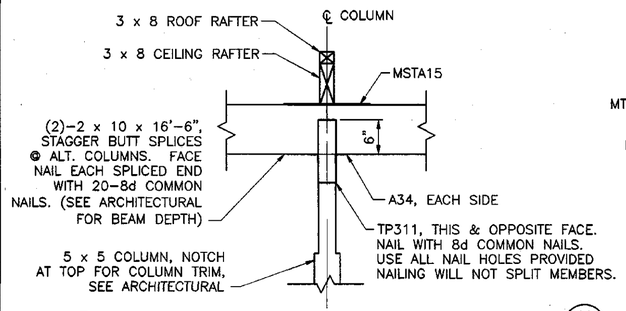


NOTE: CEILING JOIST DETAILS SIMILAR. BLOCKING NOT SHOWN FOR CLARITY.

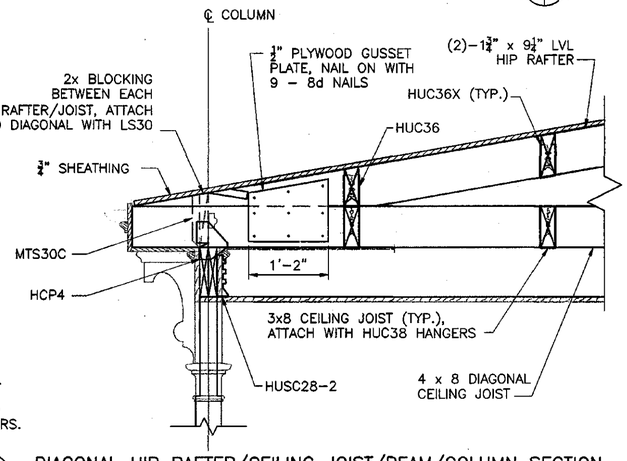
F S2.2|S2.4 TYPICAL HIP ROOF FRAMING PLAN
SCALE (A)



1 S2.2|S2.4 ROOF HIP RAFTER ATTACHMENT DETAIL
SCALE (A)



G S2.2|S2.4 BEAM/COLUMN CONNECTION DETAIL
SCALE (A)



H S2.4 DIAGONAL HIP RAFTER/CEILING JOIST/BEAM/COLUMN SECTION
SCALE (A)

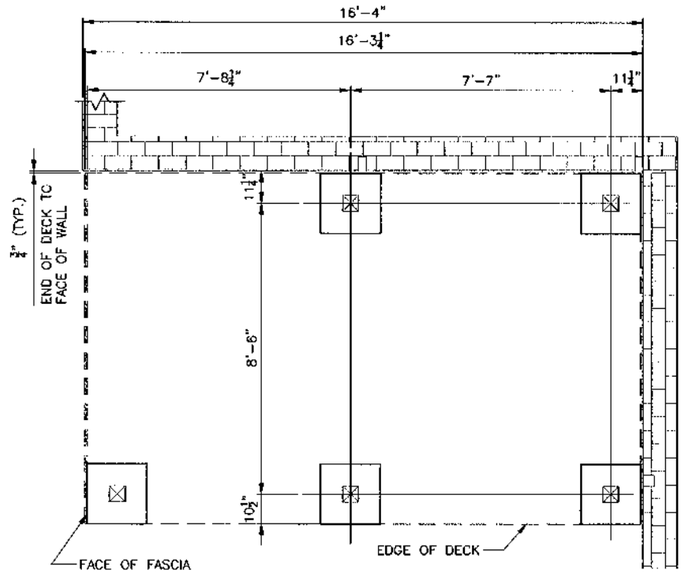
NOTE:

1. ROOF RAFTERS, CEILING JOISTS EXCEPT FOR MODIFIED RAFTERS, & FLOOR BEAMS SHALL BE SEATED IN BRICK POCKETS. POCKETS SHALL NOT BE GROUTED. USE ½" E.J. MATERIAL BETWEEN BRICK AND WOOD.

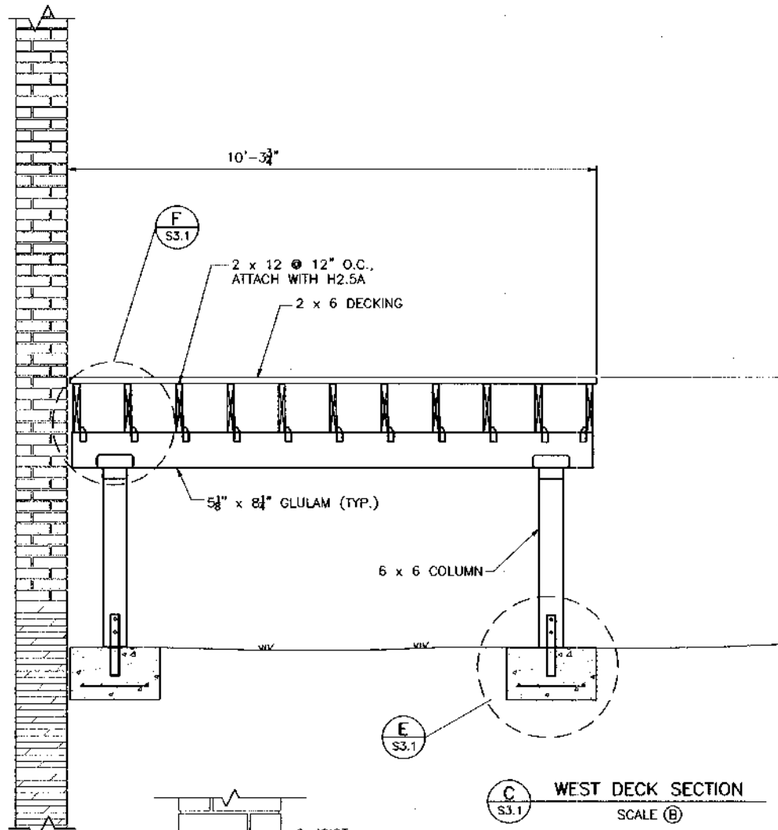
SCALE (A) 1 0 1 2
SCALE OF FEET

DESIGNED: L. CREAGER DRAWN: LRC TECH. REVIEW: LR DATE: 07/02	SUB SHEET NO. S2.4	TITLE OF SHEET EAST PORCH ROOF FRAMING DETAILS AS–BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 36 OF 41

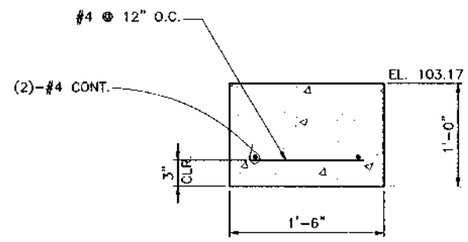
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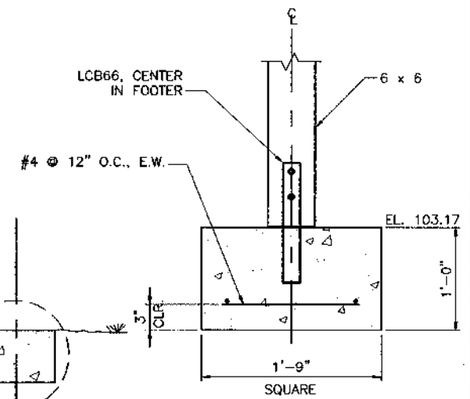
A S3.1 FOUNDATION PLAN
SCALE Ⓐ



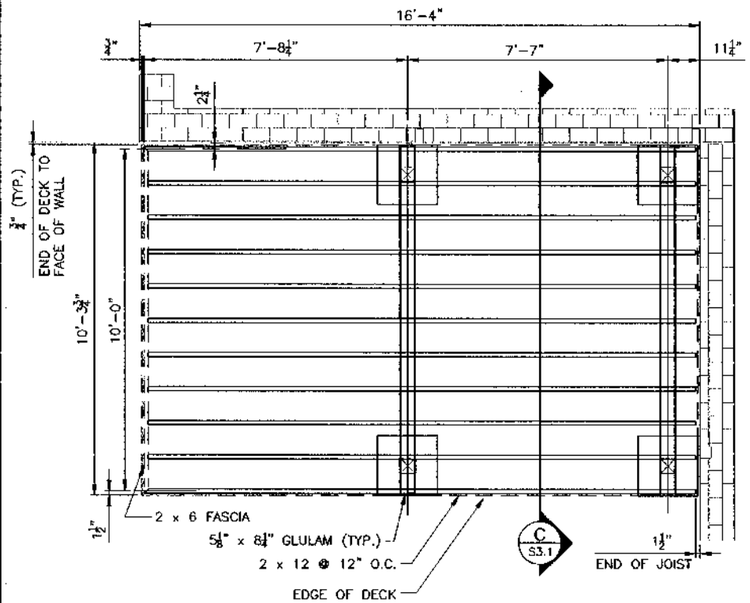
C S3.1 WEST DECK SECTION
SCALE Ⓑ



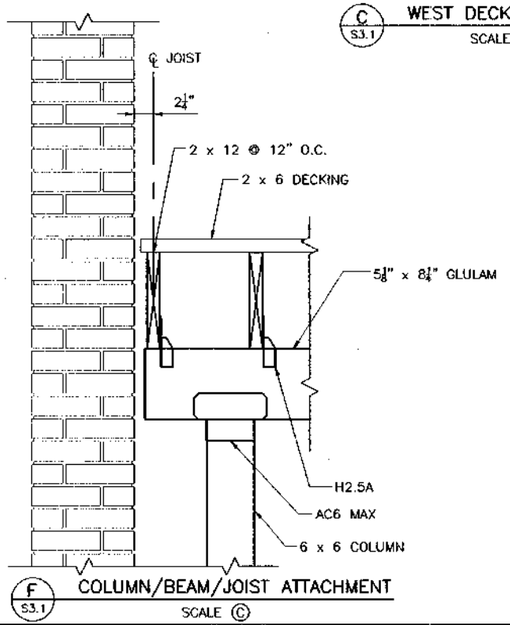
D S3.1 STEP FOUNDATION SECTION
SCALE Ⓒ



E S3.1 COLUMN FOUNDATION SECTION
SCALE Ⓒ



B S3.1 FLOOR FRAMING PLAN
SCALE Ⓐ



F S3.1 COLUMN/BEAM/JOIST ATTACHMENT
SCALE Ⓒ

NOTE:

1. SLOPE GRADE AWAY FROM FOUNDATION OF HOUSE.

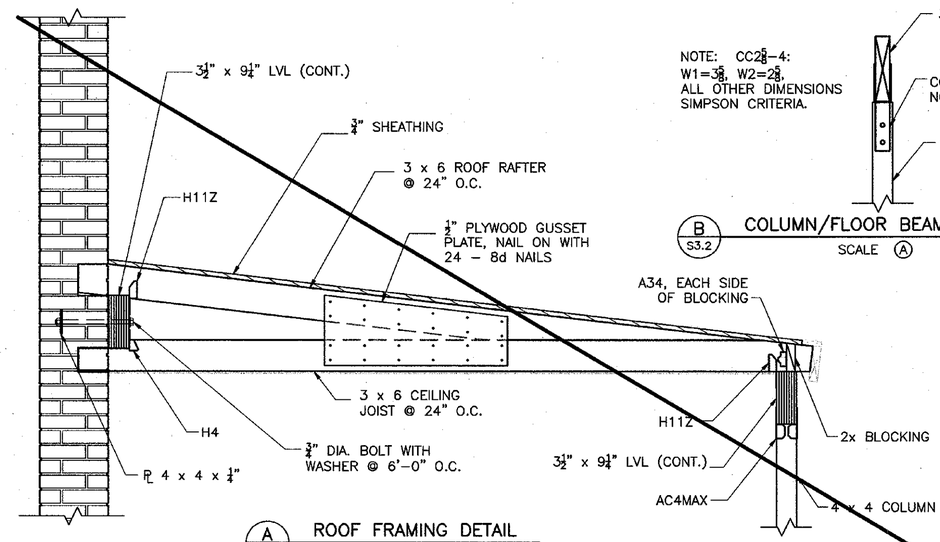
SCALE Ⓒ 12 6 0 12 SCALE OF INCHES

SCALE Ⓑ 1 0 1 2 3 SCALE OF FEET

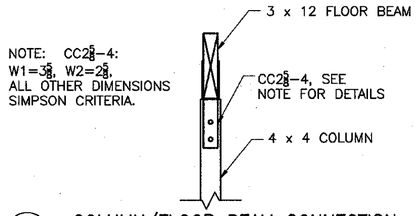
SCALE Ⓐ 2 0 2 4 SCALE OF FEET

DESIGNED: LRC; DRAWN: LRC; TECH. REVIEW: LR; DATE: 07/02	SUB SHEET NO. S3.1	TITLE OF SHEET: WEST DECK PLANS & DETAILS AS-BUILT DRAWINGS; WORTHINGTON HOUSE; MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A; PKG. NO. MONO 403; SHEET 37 OF 41

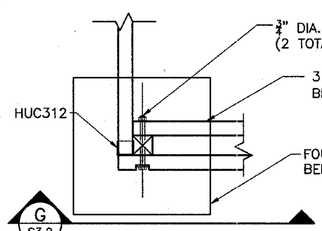
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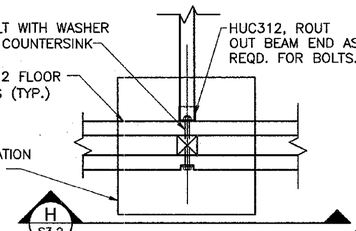
A S3.2 ROOF FRAMING DETAIL
SCALE A



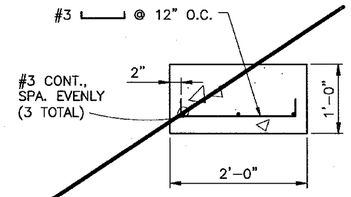
B S3.2 COLUMN/FLOOR BEAM CONNECTION
SCALE A



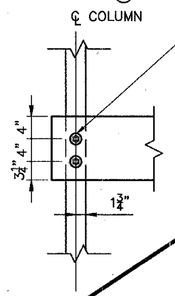
G S3.2 END BEAM/COLUMN CONNECTION
SCALE A



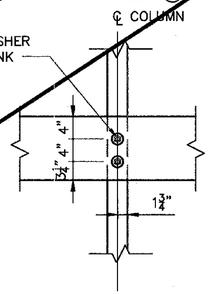
H S3.2 BEAM/COLUMN CONNECTION
SCALE A



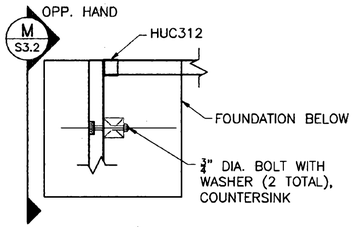
E S3.2 STAIRWAY FOUNDATION SECTION
SCALE A



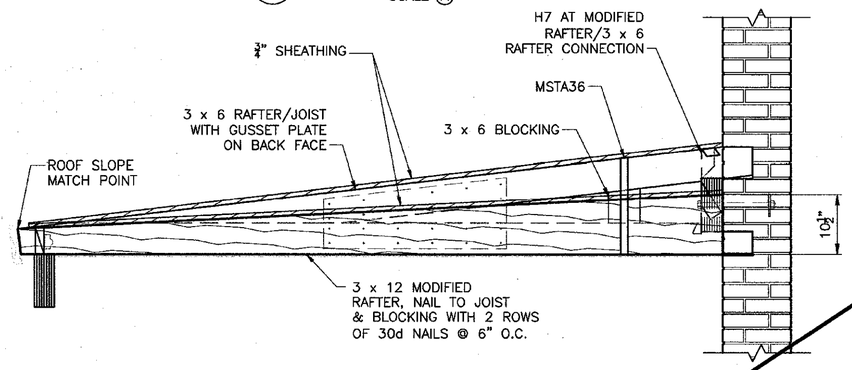
G S3.2 END BEAM/COLUMN ELEVATION
SCALE A



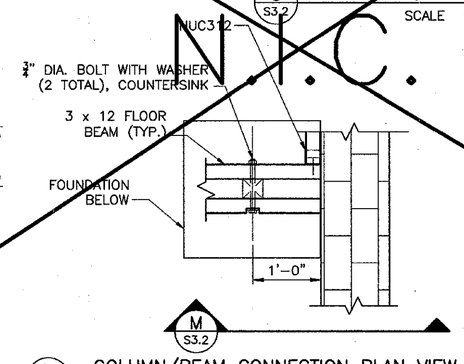
H S3.2 BEAM/COLUMN ELEVATION
SCALE A



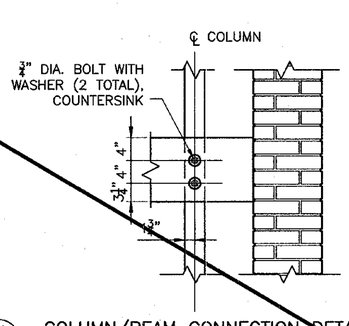
J S3.2 BEAM/COLUMN CONNECTION
SCALE A



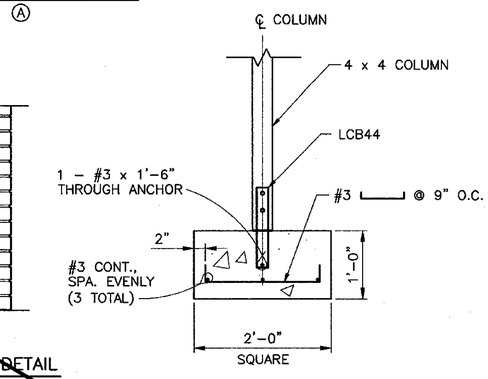
F S3.2 MODIFIED RAFTER ATTACHMENT DETAIL
SCALE A



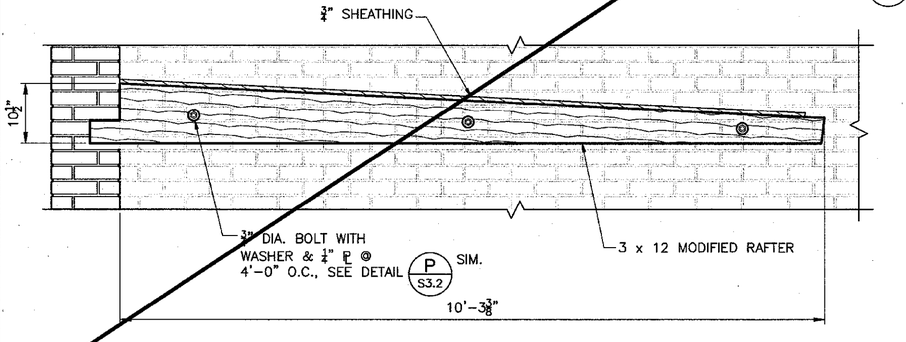
M S3.2 COLUMN/BEAM CONNECTION PLAN VIEW
SCALE A



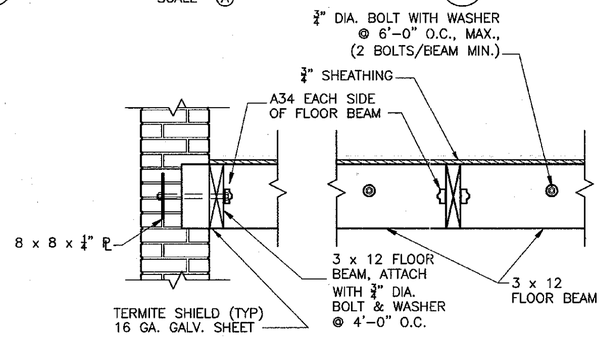
M S3.2 COLUMN/BEAM CONNECTION DETAIL
SCALE A



N S3.2 FOUNDATION DETAIL
SCALE A



K S3.2 MODIFIED RAFTER/ WALL ATTACHMENT DETAIL
SCALE A



P S3.2 WALL/BEAM CONNECTION DETAIL
SCALE A

N.T.S.

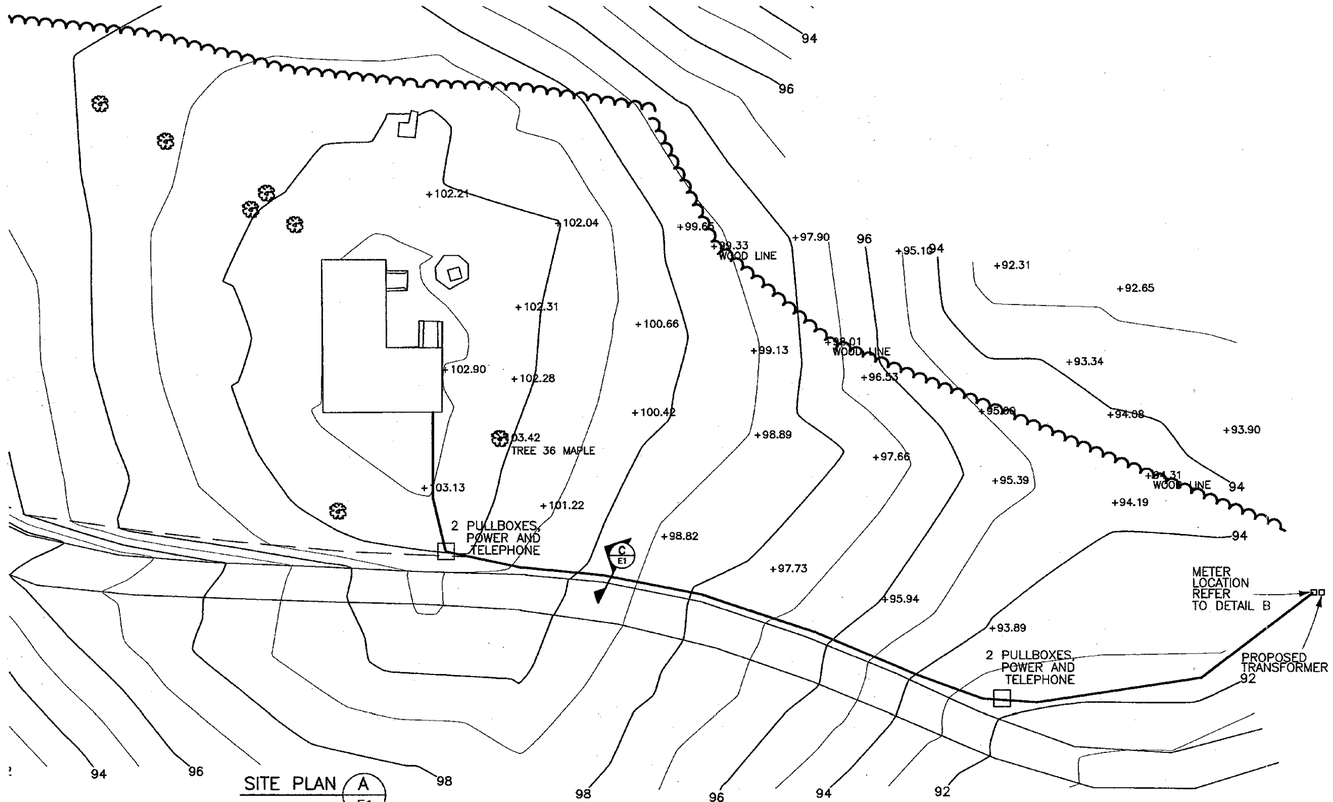
NOTE:

1. ROOF RAFTERS, CEILING JOISTS EXCEPT FOR MODIFIED RAFTERS, & ONE FLOOR BEAM SHALL BE SEATED IN BRICK POCKETS. POCKETS SHALL NOT BE GROUTED. USE ½" E.J. MATERIAL BETWEEN BRICK AND WOOD.
2. SHEATHING SHALL BE LAYED PERPENDICULAR TO FRAMING MEMBERS. FOR NAILING REQUIREMENTS, SEE NOTE ON SHEET S3.1

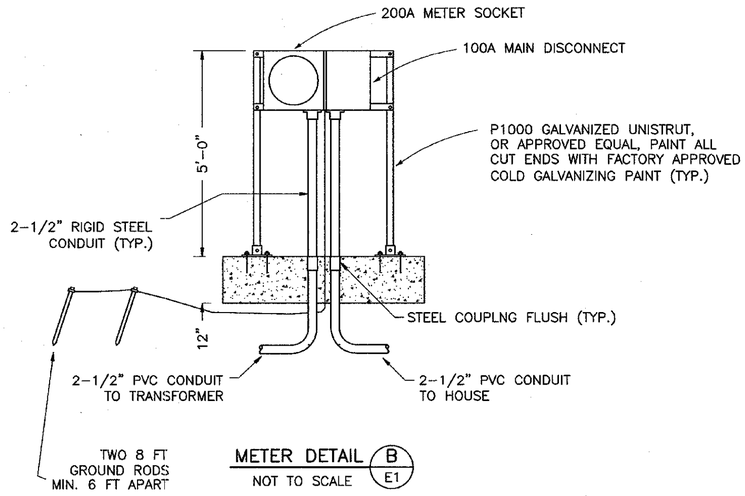
SCALE A 1 0 1 2
SCALE OF FEET

DESIGNED: L. CREAGER DRAWN: L. CREAGER TECH. REVIEW: DATE: 02/02	SUB SHEET NO. S3.2	TITLE OF SHEET ELL PORCH FRAMING DETAILS AS–BUILT DRAWINGS WORTHINGTON HOUSE MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A PKG. NO. MONO 403 SHEET 37A OF 41

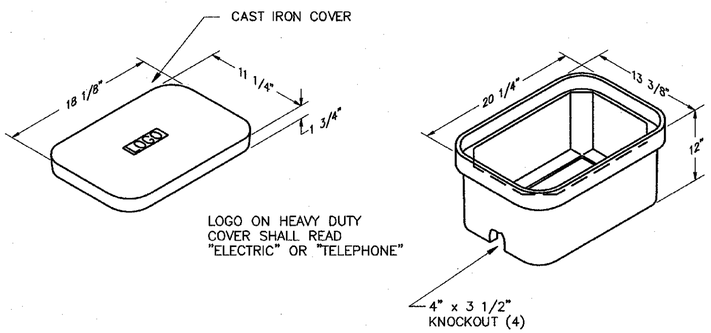
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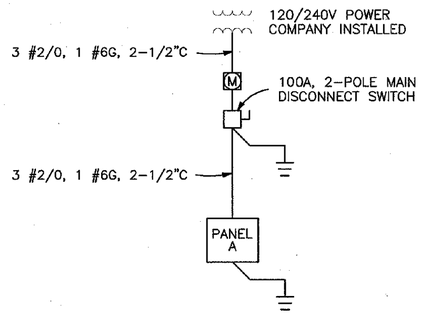
SITE PLAN A / E1



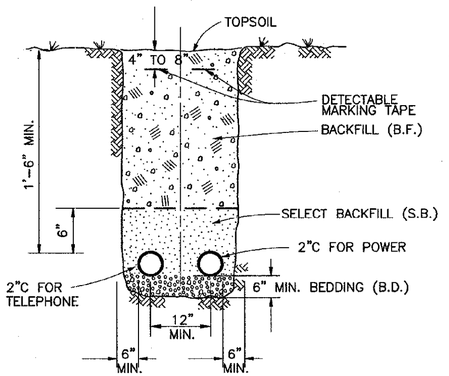
METER DETAIL B / E1
NOT TO SCALE



TYPICAL PRECAST CONCRETE PULLBOX D / E1
NOT TO SCALE
QUAZITE PG STYLE OR APPROVED EQUAL



SINGLE LINE DIAGRAM E / E1
NOT TO SCALE

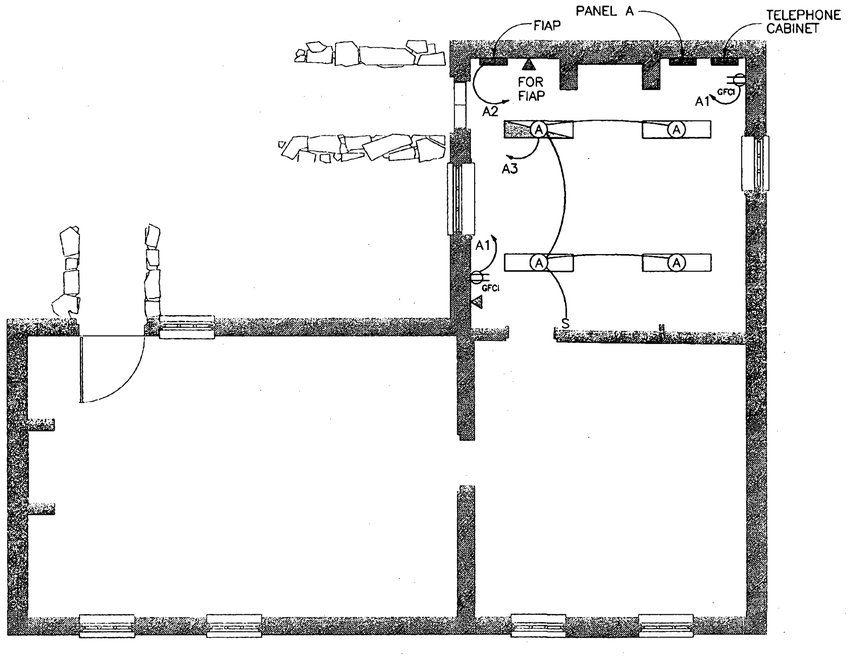


TRENCH DETAIL C / E1

20 0 20 40
SCALE OF FEET

DESIGNED: Greg Loosmore; DRAWN: Greg Loosmore; TECH. REVIEW: ; DATE: 07/02	SUB SHEET NO. E1	TITLE OF SHEET: ELECTRICAL SITE PLAN AS-BUILT DRAWINGS; WORTHINGTON HOUSE; MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A; PKG. NO. MONO 403; SHEET 38 OF 41

10/4/05 07:28 MTRACY R15 P:\MONO\403\DRAWINGS\ELEC\E1SITEPLAN.DWG XREFS: ..\ELEC\MONOCACY_BATTLEFIELD.DWG;



BASEMENT FLOOR PLAN (A / E2)

PANELBOARD A SCHEDULE

120/240 VOLTS, 1ø, 3 WIRE, 100A BUS, 100A MAIN C.B., SURFACE MOUNT
SYM. A.I.R. (MAIN C.B. 10,000, BRANCH C.B. 10,000), SOLID NEUTRAL BUS, PROVIDE GROUND BUS
20 BRANCH C.B., NEMA 1 ENCLOSURE, MANUFACTURER AND CAT. NO. SQUARE D, TYPE NQOD

LOAD VA	DESCRIPTION	L1	L2	DESCRIPTION	LOAD VA	BUS LOAD (VA) L1	BUS LOAD (VA) L2
360	RECEPTACLES	20/1	2/20	F.A. PANEL + HEATER	440	800	
480	LIGHTING	20/3	4/20	SPARE			480
	SPARE	20/5	6/20	SPARE			
	SPARE	20/7	8/20	SPARE			
	SPARE	20/9	10/20	SPARE			
		11	12				
		13	14				
		15	16				
		17	18				
		19	20				
				BUS LOAD TOTALS (KVA)		0.8	0.5
				TOTAL LOAD (KVA)		1.3	
				ESTIMATED MAXIMUM DEMAND (KVA)		1.3	

ELECTRICAL LEGEND

(*)	NOTE SYMBOL, * INDICATES NOTE NUMBER
S_3	THREE WAY SWITCH
	DUPLEX RECEPTACLE, GFCI INDICATES GFCI RECEPTACLE
	TELEPHONE OUTLET
(*)	FLUORESCENT FIXTURE, * INDICATES TYPE
(*)	EMERGENCY FIXTURE, * INDICATES TYPE
A1	BRANCH CIRCUIT HOME RUN TO PANELBOARD WITH CIRCUIT NUMBER

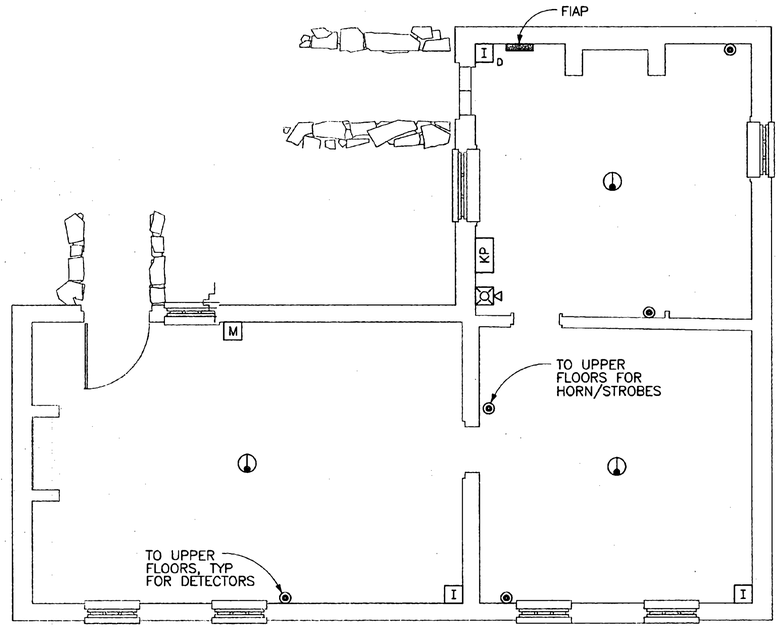
LIGHT FIXTURE SCHEDULE

SYMBOL	FIXTURE TYPE	LAMP TYPE	FIXTURE MOUNTING	MANUFACTURER AND PART NUMBER	COMMENTS
(A)	6" X 48" ENCLOSED FLUORESCENT	TWO 60 WATT, 800mA HO	CEILING	LITHONIA, CAT. NO. DM-248HO-120-CW20, CONYERS, GEORGIA, 770-922-9000	MINIMUM -20° F STARTING TEMP

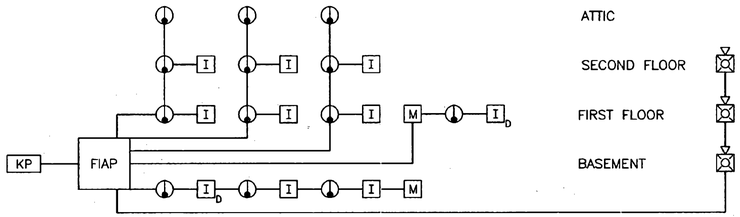
4 0 4 8
SCALE OF FEET

DESIGNED: Greg Loesmore; CADD: Greg Loesmore; TECH. REVIEW: ; DATE: 07/02	SUB SHEET NO. E2	TITLE OF SHEET: ELECTRICAL FLOOR PLAN AS-BUILT DRAWINGS; WORTHINGTON HOUSE; MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 / 25003A; PKG. NO. MONO 403; SHEET 39 OF 41

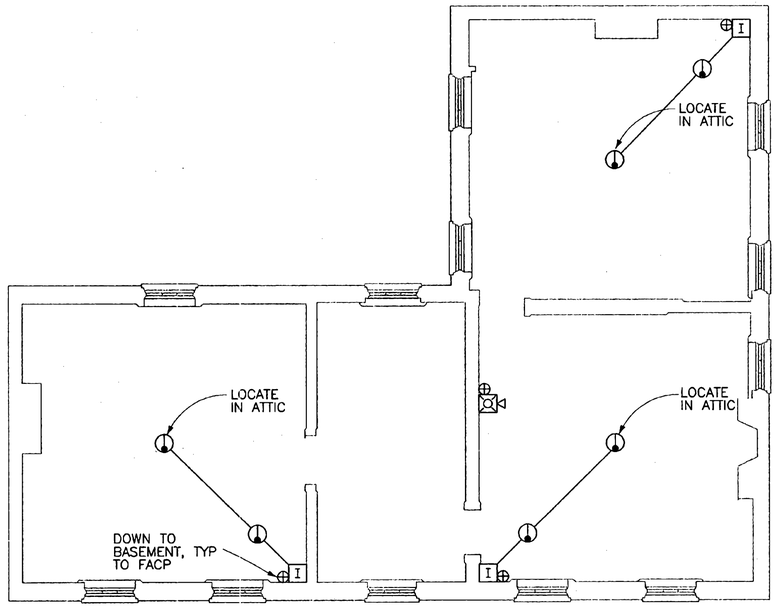
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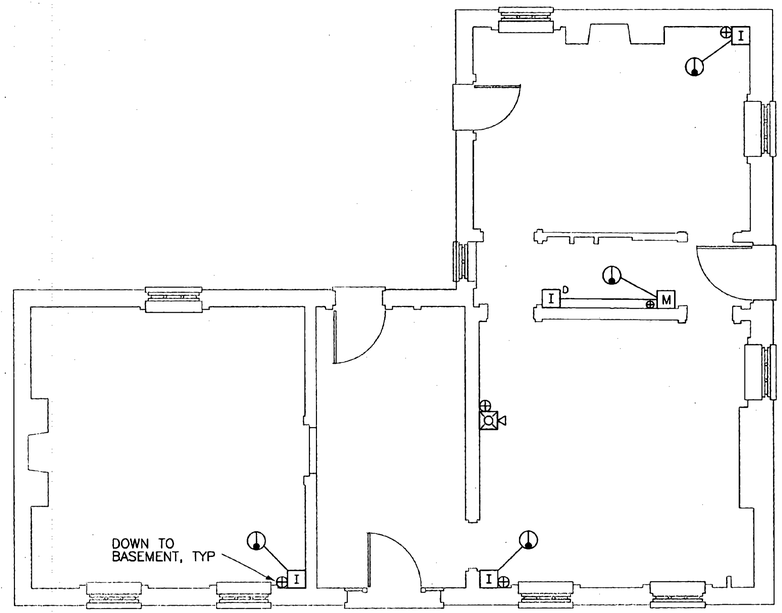
BASEMENT FLOOR PLAN (A / E3)



FIRE/INTRUSION ALARM RISER DIAGRAM (D / E3)



SECOND FLOOR PLAN (C / E3)



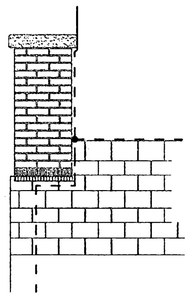
FIRST FLOOR PLAN (B / E3)

FIRE/INTRUSION ALARM LEGEND	
FIAP	FIRE/INTRUSION ALARM CONTROL PANEL
KP	KEY PAD
	HEAT DETECTOR, THERMAL, FIXED TEMP
M	MANUAL PULL STATION
	FIRE ALARM HORN WITH STROBE
I D	MOTION DETECTOR, INFRARED, SUBSCRIPT D INDICATES ENTRY/EXIT DELAY

4 0 4 8
SCALE OF FEET

DESIGNED: Greg Loosmore; DRAWN: Greg Loosmore; TECH. REVIEW: ; DATE: 07/02	SUB SHEET NO. E3	TITLE OF SHEET: FIRE AND SECURITY ALARM PLAN AS-BUILT DRAWINGS; WORTHINGTON HOUSE; MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A; PKG. NO. MONO 403; SHEET 40 OF 41

10/4/05 07:17 MTRACY R15 P:\MONO\403\DRAWINGS\ELEC\E3FIREALARM.DWG

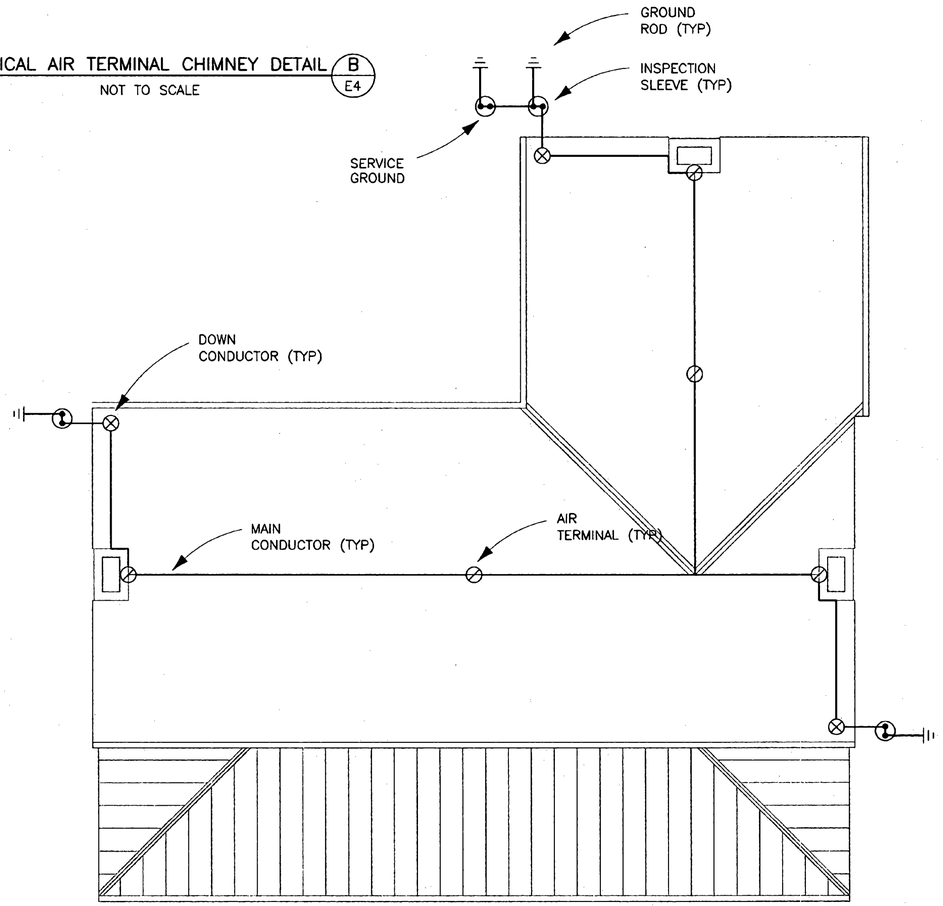


TYPICAL AIR TERMINAL CHIMNEY DETAIL (B / E4)

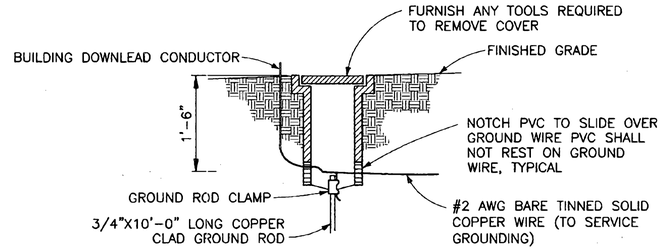
NOT TO SCALE

NOTES

1. MAINTAIN HORIZONTAL OR DOWNWARD SLOPE WITH GROUNDING CONDUCTORS AT ALL TIMES.
2. GROUNDING CONDUCTORS SHALL NEVER BE BENT MORE THAN 90 DEGREES OR AT A RADIUS LESS THAN 8 INCHES AT ANY ONE CHANGE OF DIRECTION.
3. MATERIALS AND CAT. NUMBERS ARE FROM THOMPSON LIGHTNING PROTECTION, ST. PAUL, MINNESOTA, OR APPROVD EQUAL.

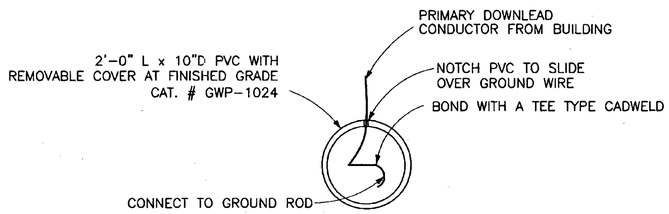


ROOF PLAN (A / E4)



GROUND ROD INSPECTION SLEEVE DETAIL (C / E4)

NOT TO SCALE



PRIMARY CONNECTION INSPECTION SLEEVE DETAIL (D / E4)

NOT TO SCALE

4 0 4 8

SCALE OF FEET

DESIGNED: Greg Loosmore; CADD: Greg Loosmore; TECH. REVIEW:; DATE: 07/02	SUB SHEET NO. E4	TITLE OF SHEET: LIGHTNING PROTECTION AS-BUILT DRAWINGS; WORTHINGTON HOUSE; MONOCACY NATIONAL BATTLEFIELD	DRAWING NO. 894 25003A; PKG. NO. MONO 403; SHEET 41 OF 41

10/4/05 07:14 MTRACY R15 P:\MONO\403\DRAWINGS\ELEC\E4LIGHTNING.DWG

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Appendix B. SMACNA Gutter Calculations

Downspout & Gutter Sizing Reports

Rainfall Intensity (in/hr): 7.1
Rainfall Intensity manually entered by user

Roof Rainfall Design Area (ft²): 1,478.00
* Area of Largest Roof Serving a Single Gutter System
Design Area manually entered by user

Gutter in Lineal Ft: 157
* Length at Largest Roof Serving a Single Gutter System

Gutter Length Serving Single DS (ft.): 27
*Assumption: downspouts are equally spaced
**Maximum gutter length to be served by a downspout is 50ft per SMACNA ASMM

M (depth to width ratio): 0.75

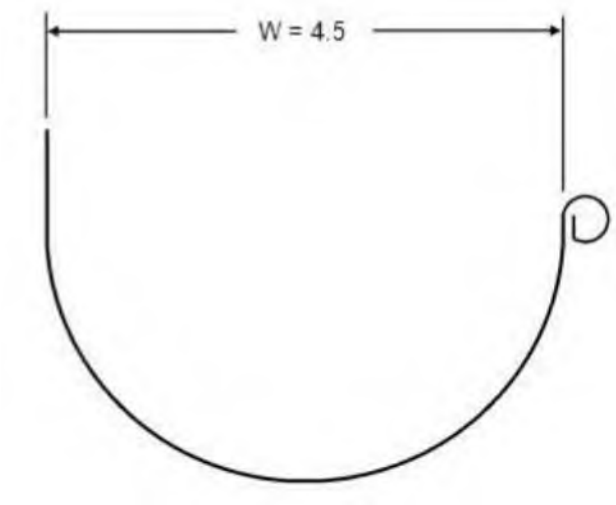
Min. Gutter Width (in.): 4.5 [Half-Round]

# of Downspouts: 6

Additional Downspouts: 2
*to reduce size of gutter and downspouts additional downspouts can be added

Min. Area per DS (in²): 1.51

Min. DS Size (in): 3 [Plain Round]
*Per Table 1-3 on page 1.4 of SMACNA ASMM



Calculations are derived using the 7th Edition of SMACNA's Architectural Sheet Metal Manual

Downspout & Gutter Sizing Reports

Rainfall Intensity (in/hr): 7.1
Rainfall Intensity manually entered by user

Roof Rainfall Design Area (ft²): 1,478.00
* Area of Largest Roof Serving a Single Gutter System
Design Area manually entered by user

Gutter in Lineal Ft: 157
* Length at Largest Roof Serving a Single Gutter System

Gutter Length Serving Single DS (ft.): 40
*Assumption: downspouts are equally spaced
**Maximum gutter length to be served by a downspout is 50ft per SMACNA ASMM

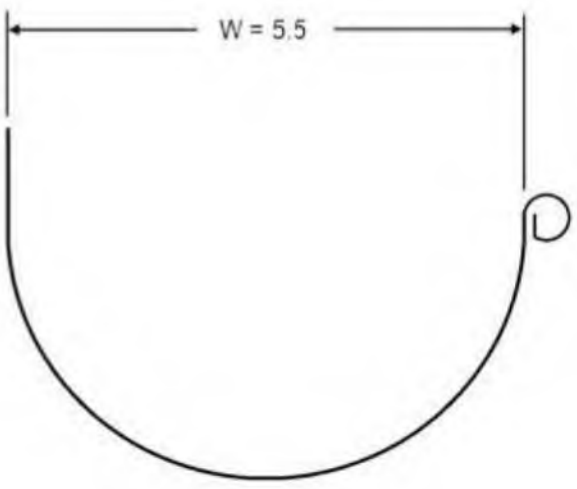
M (depth to width ratio): 0.75

Min. Gutter Width (in.): 5.5 [Half-Round]

# of Downspouts: 4

Min. Area per DS (in²): 2.27

Min. DS Size (in): 3 [Plain Round]
*Per Table 1-3 on page 1.4 of SMACNA ASMM



Calculations are derived using the 7th Edition of SMACNA's Architectural Sheet Metal Manual

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