

HFR-59

project evaluation program
restoration of buildings 12 and 12A

december 1983

Property of
Harpers Ferry 1982

1ST. REPORT
ON PK.
BLOGS.

HARPERS FERRY

NATIONAL HISTORICAL PARK / MARYLAND - WEST VIRGINIA



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December 12, 1983

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HFR 59

PROJECT EVALUATION PROGRAM
RESTORATION OF BUILDINGS 12 AND 12A
HARPERS FERRY NATIONAL HISTORICAL PARK

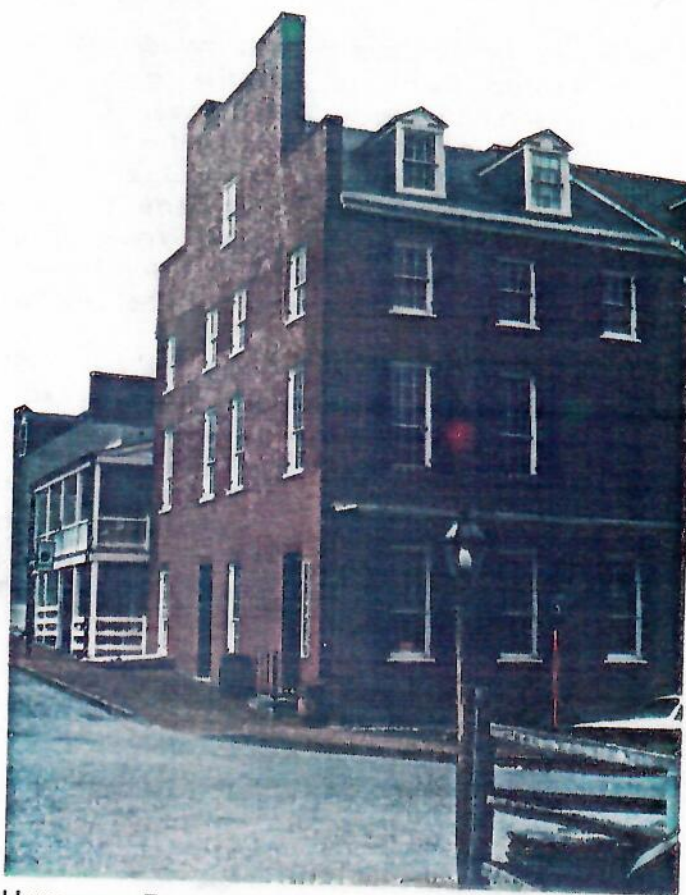
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Harper's Ferry National Historical Park, buildings 12, 11, 10, and 9 (left to right). Photo taken in April 1983.



Harpers Ferry National Historical Park, building 12, with building 12A behind and adjoining building 12. Photo taken in April 1983.

INTRODUCTION

The Denver Service Center is conducting a pilot project evaluation program. The purpose of the program is to objectively evaluate selected DSC projects after completion of construction and to prepare written reports about the successes and shortcomings of the project. The evaluation is to be based primarily on the performance of the facility, client satisfaction, and how well the facility relates to the building program.

The restoration of buildings 12 and 12A, located in the Lower Town of Harpers Ferry National Historical Park, was among the projects selected for evaluation. The evaluation team has reviewed available files associated with this project, has visited the site, and has interviewed individuals involved with the project to obtain information contained in this report.

The park staff is highly satisfied with the overall renovation itself, and with the operation and appearance of the completed facility. However, several areas of concern with the design and construction have been identified. These problems relate to an inadequate heating system, probable excessive energy usage, lack of storm windows, lack of air conditioning, exterior wood deterioration, door hardware problems, and improper sizing of gutters and downspouts.

The evaluation team found that the planning and design for buildings 12 and 12A was started without a final determination as to how the structures would be used. The original concept was for the buildings to serve as a museum, with period rooms on the first and second floors to depict life during the Civil War era. Consequently, planning and design were undertaken to ensure the preservation of the structures' historic integrity. The present uses as a bookstore, exhibit area, and office and storage space were not proposed in time for adaptations suitable to these uses to be incorporated into the design.

The evaluation team's recommendations include final determination of building use before any restoration work begins on future projects, improved coordination between the Denver Service Center and Harpers Ferry Center for exhibit planning, modification of door hardware to meet present needs, determination of the cause of ceiling cracks and correction, and incorporation of energy-saving retrofits. Problems with exterior wood deterioration are already being addressed by the park staff and the National Capital Team.

PROJECT HISTORY

PACKAGE 110 RESTORATION

The restoration of buildings 12 and 12A was a part of package 110 at Harpers Ferry National Historical Park. In addition to work on buildings 12 and 12A, package 110 included the restoration of buildings 8, 9, 10, 11, 11A, 15, and the respective backyards. Major planning, design, and construction for the overall project were completed between 1975 and 1981.

The following is a short review of the construction activity accomplished under package 110:

Phase 1 - Exterior restoration of buildings 10 & 10A

Project number - 3850-0976

Contract number - CX-3000-6-9010

Construction contract period - October 1976-June 1977

Construction contract amount - \$163,300

Phase IB - Exterior restoration of buildings 8 & 9

Phase IIA - Exterior restoration of buildings 11 & 11A

Project number - 3850-0976A

Contract number - CX-3000-7-9003

Construction contract period - October 1977-October 1978

Construction contract amount - \$575,000

Phase IIB - Restoration of buildings 12 & 12A

Project number - 3850-78A

Contract number - CX-3000-8-9017

Construction contract period - February 1979-December 1980

Construction contract amount - \$520,115

Interior rehabilitation of buildings 8, 9, 10, 11, 11A

Project number - 3850-79A

Contract number - CX-3000-9-9006

Construction contract period - December 1979-September 1981

Construction contract amount - \$635,366.38

Backyard restoration

IFB number - 3850-80A

Contract number - CX-3000-0-9010

Construction contract period - April 1981-October 1981

Construction contract amount - \$112,000

Restoration of building 15 is being done by day labor. Work is still in progress, and the construction cost is not yet known.

The interiors of buildings 8, 9, 10, 11, and 11A were adaptively restored. Buildings 12 and 12A were originally restored and used adaptively. The first floors of all the buildings are now open to the public, as specified in the park's "Interpretive Prospectus" (1980). The only other public spaces in the complex at this time are the second floors of buildings 9, 10, and 11. The rest of the space is used by park staff

for a library, master control room for fire and security, office space, storage, and mechanical equipment.

BUILDINGS 12 AND 12A RESTORATION

Planning and design for the restoration of buildings 12 and 12A were undertaken with a high level of concern for retaining the structures' historic integrity, and considerable investment was made in determining the historical accuracy of the restoration. The buildings were initially identified as a museum site, primarily because they were considered to have the greatest historic integrity of all of the package 110 structures. Period rooms were to be located on the first and second floors to depict life during the Civil War, in keeping with the restorations of adjoining buildings 8, 9, 10, and 11, and with the park Master Plan then in effect. However, the proposed museum usage had not been fully defined or specifically detailed by the time that planning and design began. Consequently, the design effort had to proceed on a "flexible" basis so that variables in the final museum planning and layout could be accommodated.

With the basic museum function in mind, the heating system was designed to be as inconspicuous as possible, with radiant electrical heating cable embedded in the ceilings and probe sensors installed for individual room temperature control. Walls, doors, and other features were to be restored to the Civil War period (1859-65). Also a structural steel system was designed that would not affect historic dimensions and would be completely unobtrusive. Insulation was not called for in the exterior walls so as to retain historic integrity.

The structural design analysis for buildings 12 and 12A was completed under a professional services contract by Beach-Hanson Associates in Washington, D.C. The "Draft Historic Structure Report" for buildings 12 and 12A was completed by Scott Jacobs of the Denver Service Center. Principal DSC designers for the project were Scott Jacobs, team captain for the preparation of construction documents; Frank Gerner, Richard Geiser, and Randall Copeland, preparation of construction drawings; Addison Hulse, mechanical engineer; and Roy Richardson, electrical engineer. W. Lewis Barlow (now stationed at Lowell National Historical Park) was project manager.

Drawings and specifications were completed in August 1978, and requests for proposals were sought from prospective contractors. After evaluation of the proposals received, a cost plus fixed fee contract (contract no. CX-3000-8-9017) was awarded to W. Harley Miller, Inc., of Martinsburg, West Virginia. The original contract amount was \$487,200. Notice of the contract award was made on September 29, 1978, and notice to proceed was issued effective February 15, 1979.

The restoration included the following major areas of work:

- repainting and rebuilding the stone foundation walls

- rebuilding portions of historic brick walls

installing a steel structural system to support historic brick wall and floor systems

reproducing and restoring historic windows and doors

reconstructing two porches and a cast-iron balcony

installing a new slate roof on building 12A

restoring all interior trim and features

replastering all interiors

roughing in bathroom plumbing

installing radiant heat cables in plaster

providing basement drainage systems

performing limited site work relevant to the historic period

Drawing numbers 385/25006, sheets A-8 through A-11, are included in the appendix to this report and generally depict the restoration that was accomplished.

Construction was performed under the supervision of Charles Wolford and was completed on September 23, 1980. Various changes in the scope of work were made in the contract in the amount of \$32,915, resulting in a final contract amount of \$520,115. The principal changes were to demolish and rebuild the south areaway wall of building 12A, to demolish and rebuild the north foundation wall of building 12A, to apply additional whitewash, and to add lighting and receptacles for the bookstore. (The decision to provide a bookstore was made approximately 6 months after construction started.)

The Denver Service Center is now preparing a historic structure preservation guide for several buildings at Harpers Ferry National Historical Park, including buildings 12 and 12A. The guide will be the official document directing all preservation maintenance activity. It will be a reference for park maintenance personnel for programming, continued housekeeping, and routine and cyclic preservation maintenance. It will provide the information needed to ensure proper inspection, as well as a means for evaluating maintenance activities and adopting appropriate corrective measures. As required by the "Cultural Resources Management Guidelines" (NPS-28), the preservation guide will be a working document produced in a loose-leaf format so that it can be updated as necessary.

Present use of the building has deviated substantially from the original museum concept. The first floors of buildings 12 and 12A are currently used as a bookstore plus an exhibit room; the upper two floors, as office and storage space.

FACILITY PERFORMANCE

Before the team conducted a site evaluation of buildings 12 and 12A, a questionnaire was completed by the park staff. According to the completed questionnaire, the staff were highly satisfied with both construction supervision and post-construction performance, and they were reasonably satisfied with the design effort. They expressed a high degree of satisfaction with the overall operation and appearance of the completed facility, and they stated that the visiting public was well served by the facility.

The completed questionnaire, however, identified several areas of concern with the design and construction, as noted below:

- improperly functioning heat sensors and contactors for the heating system

- excessive energy usage

- lack of storm windows

- lack of air conditioning

- exterior wood deterioration

- door hardware problems

- improper sizing of gutters and downspouts

Each of these problems is discussed below, and possible solutions are included in the "Recommendations" section.

HEATING SYSTEM

The heating system for buildings 12 and 12A has been a matter of some controversy and considerable discussion. The system was designed to be compatible with the original museum use of the structure. It consists of radiant electrical heating cables that were embedded in the plaster ceiling during construction. Temperature levels in individual rooms are controlled by thermistors or heat sensors located in each room. The thermistors are pencil-like probes that are wired to the control room, where temperature settings are manually adjusted for individual rooms. The present system does not have automatic night setback capability, nor can automatic setback be obtained without system modification.

Ceilings containing the embedded electrical cable have cracked in many places throughout buildings 12 and 12A. It has not been determined whether the cracking is due to the system, faulty curing, improper operation, or other causes. However, building 15 was nearing completion at the time that the evaluation team visited the park, and cracking comparable to that in buildings 12 and 12A was beginning in ceilings with embedded heating cable. It appears that the cracking may be caused by plaster expansion and contraction due to the heat cable.

ENERGY USAGE

Energy usage figures are not available for buildings 12 and 12A because they are not separately metered. However, a number of factors suggest that energy usage is excessive. No wall insulation was included in the restoration because of concerns for preserving the historic fabric. As noted above, there is no provision for either night or weekend automatic thermostat setbacks. Heat loss caused by air infiltration at doors is high. Weatherstripping was not installed on the exterior doors, and the doors have been cut down since construction because moisture has caused them to swell. Double glazing was not provided in the original design but has been applied by the park as a retrofit. The electrical heating system was chosen to be historically unobtrusive and to keep the facility from freezing, but it may not be the most appropriate system for the way the buildings are now used.

AIR CONDITIONING

The park staff also noted the lack of air conditioning as a concern. Air conditioning was not considered in the original design because it would have been inconsistent with the historic character of the structures. Furthermore, present building uses, which make it desirable to have air conditioning, were not anticipated at the time of design. A window air conditioning unit has been added to the bookstore (first floor of building 12A) by the park staff.

EXTERIOR WOOD DETERIORATION

The exterior wood shutters, located on the southwest elevation of building 12, developed brown rot within one year after fabrication and installation, and they had to be removed and repaired. In 1982, a sample of typical decayed wood from a shutter was sent to the Forest Products Lab in Madison, Wisconsin. The report identified the decay as brown rot caused by the fungus Gloeophyllum trabeum, which is commonly associated with decay in untreated window sash. Long-term protection against decay can be attained by immersing the wood in a water-repellent preservative.

A brief inspection of new exterior millwork on buildings 12 and 12A, along with that on buildings 8, 9, 10, 11, and 11A, suggests that the deteriorating shutters are part of a larger wood deterioration problem. Other millwork on these buildings that has required removal because of deterioration includes exterior porch floor material, snowboards, porch railing, and balusters. The two wood species most affected by brown rot are poplar and southern yellow pine.

To gain more knowledge about this problem, Mervin Knotts, a park maintenance worker, has started to record all millwork that has been replaced, noting what was replaced, where, wood species, type of preservative treatment (if any), type of primer, and type of finish paint. It is hoped that the park staff and designers will be able to use this information in the future specification and treatment of exterior millwork.

Based on the Forest Products Lab report, the National Capital Team has assumed that the brown rot was caused by improper preservative treatment or that the wood received no treatment at all, even though specified. To test this theory, the Branch of Cultural Resources, DSC-TNC, has modified their wood specifications to provide that all millwork requiring a preservative treatment be done by the immersion method. The specifications also call for an NPS representative to be present during the treatment process to ensure compliance, and as a final measure for the contractor to certify that he has complied with the treatment process. The Branch of Cultural Resources, DSC-TNC, will be able to informally judge the effect of these changes by monitoring work on Harpers Ferry building 3, which is currently being stabilized.

ADDITIONAL CONCERNS

The park staff stated that their prime concern with door hardware for buildings 12 and 12A was the long-handled (rat tail) surface bolts installed on the second-floor double doors between buildings 12 and 11. The park staff thinks that the long-handled bolts present a safety hazard because the handles protrude 3 to 4 inches away from the door or wall surface. The long-handled bolts were actually installed under the interior contract for buildings 8, 9, 10, 11, and 11A, and they were not a part of the restoration contract.

Improper sizing of gutters and downspouts results from the reuse of the historic gutters and downspouts, which overflow, especially in heavy downpours.

RECOMMENDATIONS

TIMELY BUILDING USE DETERMINATION

As previously discussed, the planning and design for buildings 12 and 12A proceeded on the basis that the facility would be used as a museum. Because the proposed museum usage was not fully defined, the design effort was "flexible" in order to accommodate variables in the final museum layout. Ultimately, the building was not used as a museum; instead the first floor is used as a bookstore and exhibit area, and the other floors are used as office and storage space. If the actual uses of buildings 12 and 12A had been known during design and construction, the following changes would presumably have been made:

- use of a competitively bid, formally advertized contracting approach instead of a cost plus fixed fee contract

- installation of insulation in the exterior walls and basement ceilings

- adaptation of lighting and lighting controls to current uses

- installation of a heating system that could maintain a 68° interior temperature, and provision of automatic setback thermostats

- design of building traffic patterns and use of hardware (doors, locks, etc.) adapted to present uses

- provision for air conditioning and ventilation to provide a more favorable environment for office work

- varying of room sizes and layouts to accommodate present uses

- provision of double glazing

- reduction of air losses at doors, etc.

Incorporating these changes would have had two highly favorable results: 1) space would have been better adapted to present uses, and 2) a more cost-effective long-term operation would have resulted.

Completion of design and restoration of buildings 12 and 12A without a firmly established facility usage plan has resulted in a facility that is not properly suited for its present use, and it is more costly to operate. As a part of this evaluation, energy usage was calculated for the present operation and for one incorporating insulation, double glazing, weatherstripping, and night/weekend thermostat setbacks. The annual heating energy cost for the present operation is estimated at \$4,936; with energy-saving modifications, the annual heating cost would be \$1,921. Payback for these modifications would be one to five years. Thus, the present heating energy cost for buildings 12 and 12A is approximately 2½ times higher than it would have been if the facility had been specifically adapted to its present use.

The "Cultural Resources Management Guidelines" (NPS-28) were reviewed to determine what is now required regarding the analysis of intended uses of historic structures. Chapter 3 of NPS-28 states that the general management plan is to include a strategy to provide for appropriate visitor use and interpretation of the resource, and the strategy should be in sufficient detail to direct (emphasis supplied) subsequent planning. A separate cultural resource management plan is to be prepared for parks having complex preservation and use needs. NPS-28 also states that the historic structure report should identify the planning document that proposes the treatment and use of a specific structure (appendix F).

According to these requirements of NPS-28, the use of the structure should be determined before the historic structure report is prepared and in any event before restoration is started. A practical problem with determining building use prior to the historic structure report is that information obtained during the study (such as structural carrying capacity) may preclude or influence the use of a particular facility.

It does not appear to be critical for the building use to be determined before the historic structure report is prepared, so long as the building use is determined before the design and restoration commences. NPS-28 should be modified to state specifically that final design and restoration shall not commence until the building use has been finalized.

A preliminary design stage should be performed for historic structures. More complex adaptive use projects make this phase of design absolutely critical. A comprehensive design stage should then include preservation and restoration recommendations, a building usage analysis, a functional analysis, a design alternatives analysis, an energy analysis, and design development.

BETTER COORDINATION BETWEEN THE DENVER SERVICE CENTER AND THE HARPERS FERRY CENTER

The Denver Service Center and the Harpers Ferry Center are frequently required to closely coordinate their activities in the planning, design, and construction of facilities that include exhibits. Generally, the Denver Service Center is responsible for the facility itself while the Harpers Ferry Center is responsible for exhibits. Close coordination and consultation between the two centers is critical to successful project completion, especially in the facility planning and design stages. Neither center can fulfill its responsibilities without timely input from the other.

An exhibit designed by the Harpers Ferry Center is included on the first floor of building 12. The exhibit depicts conditions at Harpers Ferry before and after the Civil War and summarizes changes in military control of Harpers Ferry during the Civil War. Although the Denver Service Center made a number of attempts to involve HFC staff during the design phase, planning for the exhibit was not completed until restoration of buildings 12 and 12A was well underway. Changes were made to the restoration contract to add electrical lighting for the exhibits. In this particular case the changes did not have much impact upon the restoration contract because the restoration was done under a cost

reimbursable contract, which provides for high flexibility in handling changes.

The evaluation team met with Robert Johnson, chief of exhibit planning and design for the Harpers Ferry Center, to discuss potential means of improving the overall coordination between the two centers for future activities. A major cause of lack of coordination between the two centers appears to be a failure to fully consider the role of Harpers Ferry during the programming of projects. Projects are frequently programmed for design and construction without also being programmed for exhibit design. HFC staff are now periodically reviewing the DSC program to determine where they might be involved, but this approach has not been very effective. Mr. Johnson stated that the Harpers Ferry Center has both line item project work and lump sum annual appropriations. Thus, if insufficient notice is received for line item project work, Harpers Ferry may be fully committed to performing the lump sum work. Because the Harpers Ferry Center is often not aware of line item work that will be required during the fiscal year, it is sometimes difficult for activities to be programmed in a timely manner.

Several options for improving coordination between the Harpers Ferry Center and the Denver Service Center were discussed with Mr. Johnson, including the following:

- In accordance with the work load analysis system being used by the Denver Service Center, the regional programming officer should be notified when the services of the Harpers Ferry Center or an archeological center will be required (task 5 of the "Work Load Analysis").

- An HFC representative should be directly involved in programming meetings.

- Interpretive prospectuses should be made current for all packages shown on the national priority list.

- HFC staff should be involved in the preparation of general management plans and development concept plans to help establish continuity between design and construction.

- DSC designers should visit Harpers Ferry at early stages of facility planning/design to obtain timely exhibit design input (this has been highly beneficial in past instances).

- DSC staff should inform the Harpers Ferry Center where they anticipate exhibit design will be required. Regional programming officials should also be informed.

- The Harpers Ferry Center should make a greater effort to anticipate the need for exhibit design by periodically reviewing the national priority list.

One other means of improving coordination came to light after discussions with Mr. Johnson. The Alaska/Pacific Northwest/Western Team has

designated Bonnie Campbell as coordinator for team activities involving the Harpers Ferry Center. This has facilitated design projects where Harpers Ferry has been involved.

One or more of these options may be beneficial in improving DSC/HFC coordination. We suggest that each team implement those options that will be most beneficial to their procedures.

MODIFICATION OF DOOR HARDWARE

The reproduction of antique hardware for buildings 12 and 12A was supplied by Ball and Ball, Exton, Pennsylvania. The park staff view the long-handled bolts as a safety hazard, and it is recommended that the bolts be modified to remove the tail. The park has the blacksmith facilities to accomplish this with minimal funds and time. If the park does not want to modify the existing bolts but would rather replace them, a satisfactory bolt (model 1501) can be purchased from Ball and Ball. Monroe Coldren, West Chester, Pennsylvania, or Renovator's Supply, Millers Falls, Massachusetts, also manufacture satisfactory replacement bolts.

The reproduction box locks specified for the project incorporate either a modern key system operation within the box or an antique-type key system. Large antique keys to operate the locks are burdensome to carry and are a potential hazard for employees entering and leaving quickly when an emergency arises. It is recommended that the antique hardware remain partially functional (i.e., the knob operation) and that the dead bolt be set back into the lock and made nonfunctional. To provide any required security the door could be fitted with a tubular lock placed below the antique hardware and keyed to the park's system. The tubular lock could be painted out with the door if deemed necessary. This approach would provide the necessary historic hardware and would also provide for the more modern and functional hardware required for present use.

INVESTIGATION OF CEILING CRACKING

As noted before, the precise cause of ceiling cracking in buildings 12 and 12A has not yet been determined. Before a decision is made to specify other embedded heating cable systems, the cause or causes of ceiling cracking should be further investigated. A factory representative of the cable system should be present to witness the installation and start-up of the system.

INSTALLATION OF ENERGY-SAVING RETROFITS

The park staff should weatherstrip exterior doors in buildings 12 and 12A. Literature for a variety of materials that could be applied with little or no visual impact and that would diminish energy losses have been separately furnished to the park. These materials may also be used for other Harpers Ferry structures.

SUMMARY OF COST DATA

Project cost data for buildings 12 and 12A are as follows:

Structural analysis - Beach-Hanson Associates (estimate)	\$ 8,000
Field research and documentation for the design, and the design (estimate)	60,000
Original construction contract amount	487,200
Construction contract modifications	32,915
Project supervision costs (estimate)	40,000

Records of actual costs do not exist for the estimated costs.

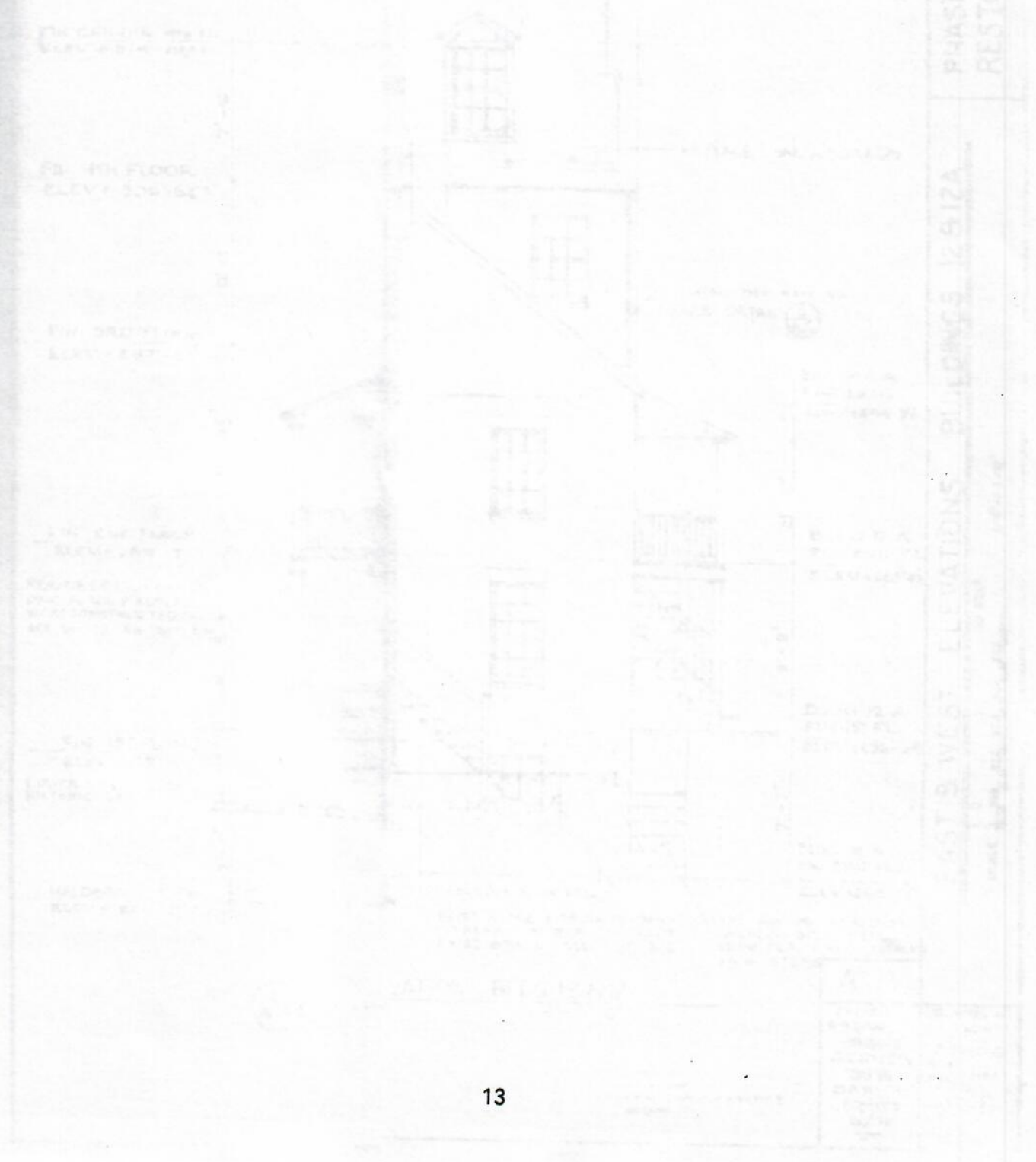
APPENDIX: CONSTRUCTION DRAWINGS
BUILDINGS 12 and 12A

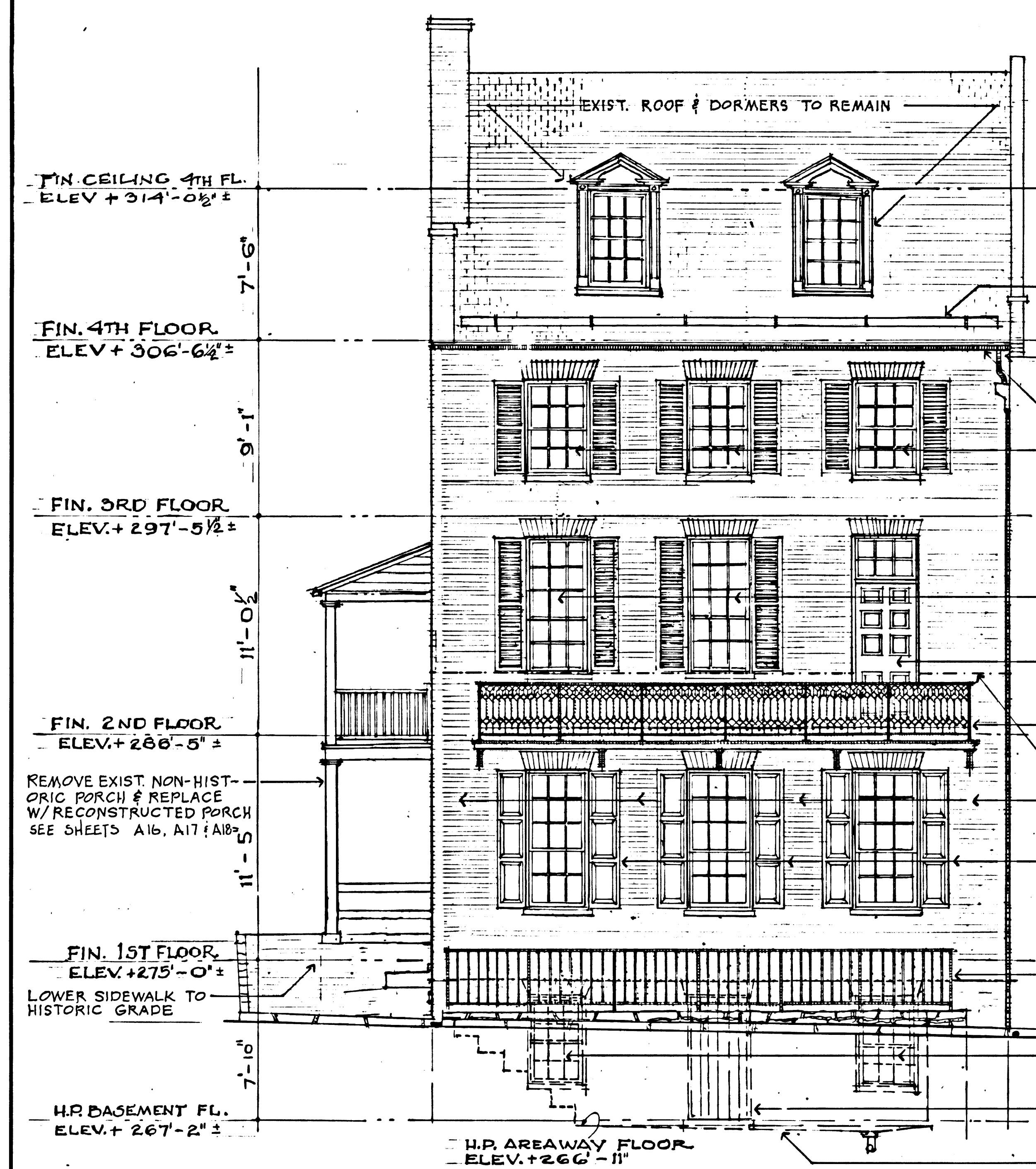
East and West Elevations (sheet A-8)

South Elevations (sheet A-9)

Longitudinal Section (sheet A-10)

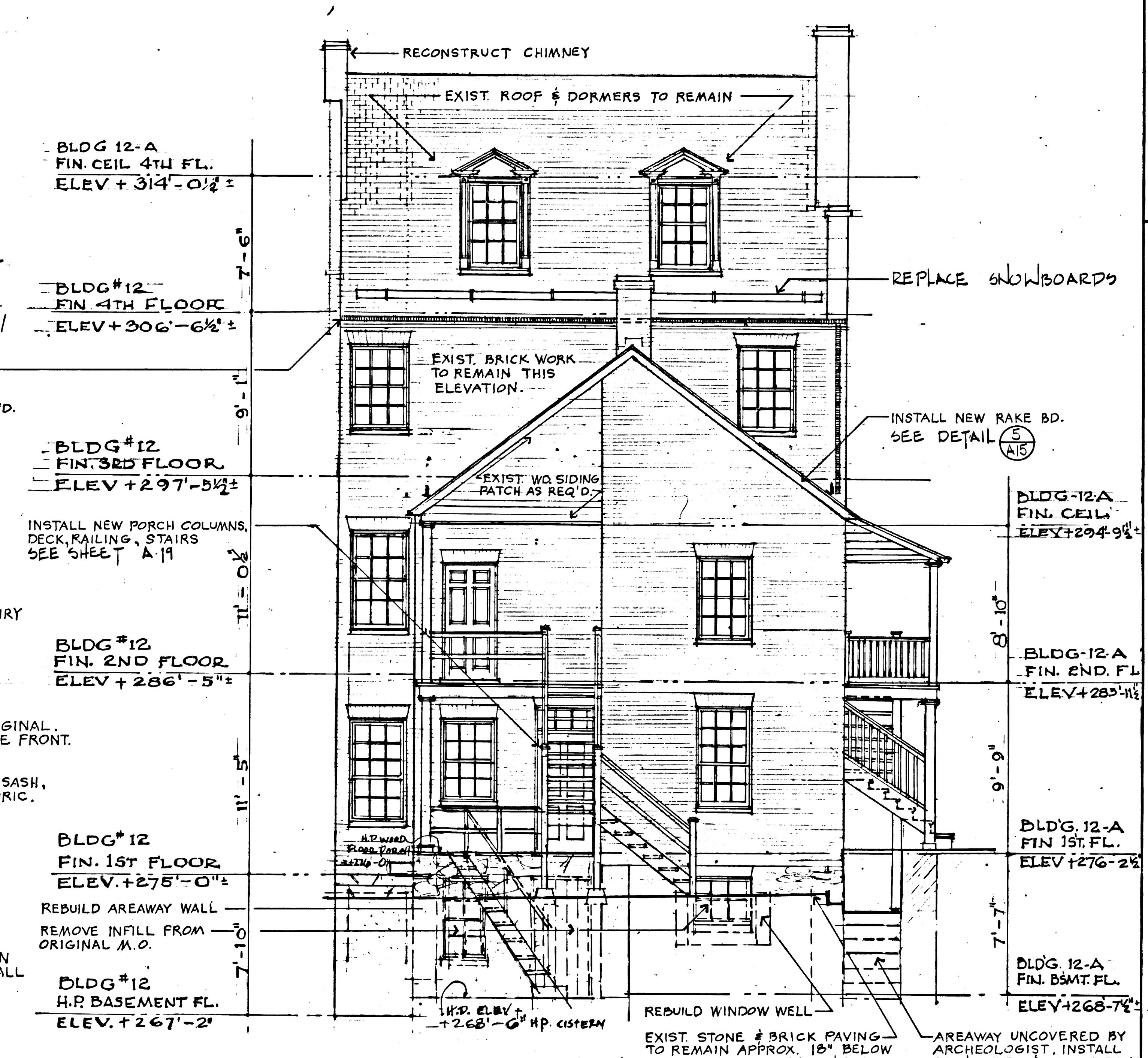
Section (sheet A-11)





1
A-8
EAST ELEVATION BLDG 12 & 12A

- REPLACE EXISTING SNOW-BOARDS - BRACKETS TO REMAIN
- NEW GUTTER TO ATTACH W/ BLDG #11 EXIST. DOWNSPOUT
- NEW GUTTERS & DOWNSPOUTS
- REPAIR EXIST. WINDOWS AS REQ'D. INSTALL NEW SHUTTERS
- INSTALL NEW SASH & SHUTTERS IN ORIGINAL MASONRY OPENINGS TO MATCH HISTORIC.
- REPAIR EXIST. HISTORIC DOOR & TRANSOM IN ORIGINAL MASONRY OPENING.
- NEW CAST IRON BALCONY SEE SHEETS A-20 & A-21
- NEW BRICK WORK TO MATCH ORIGINAL. REPLACES NON-HISTORIC STORE FRONT. (OUTLINED AREA ONLY)
- INSTALL NEW WINDOW FRAMES, SASH, AND SHUTTERS TO MATCH HISTORIC.
- NEW MILD STEEL RAILING
- REMOVE EXIST. BRICK INFILL IN STONE BASEMENT WALL. INSTALL NEW WINDOWS, FRAMES & SASH.
- REMOVE EXIST. BRICK INFILL. INSTALL NEW DOOR & FRAME
- AREAWAY UNCOVERED BY ARCHEOLOGIST. INSTALL NEW STONE FLOOR. EXIST. STONE & BRICK STEPS TO REMAIN.



2
A-8
WEST ELEVATION BLDG 12 & 12A
SCALE 1/4" = 1'-0"

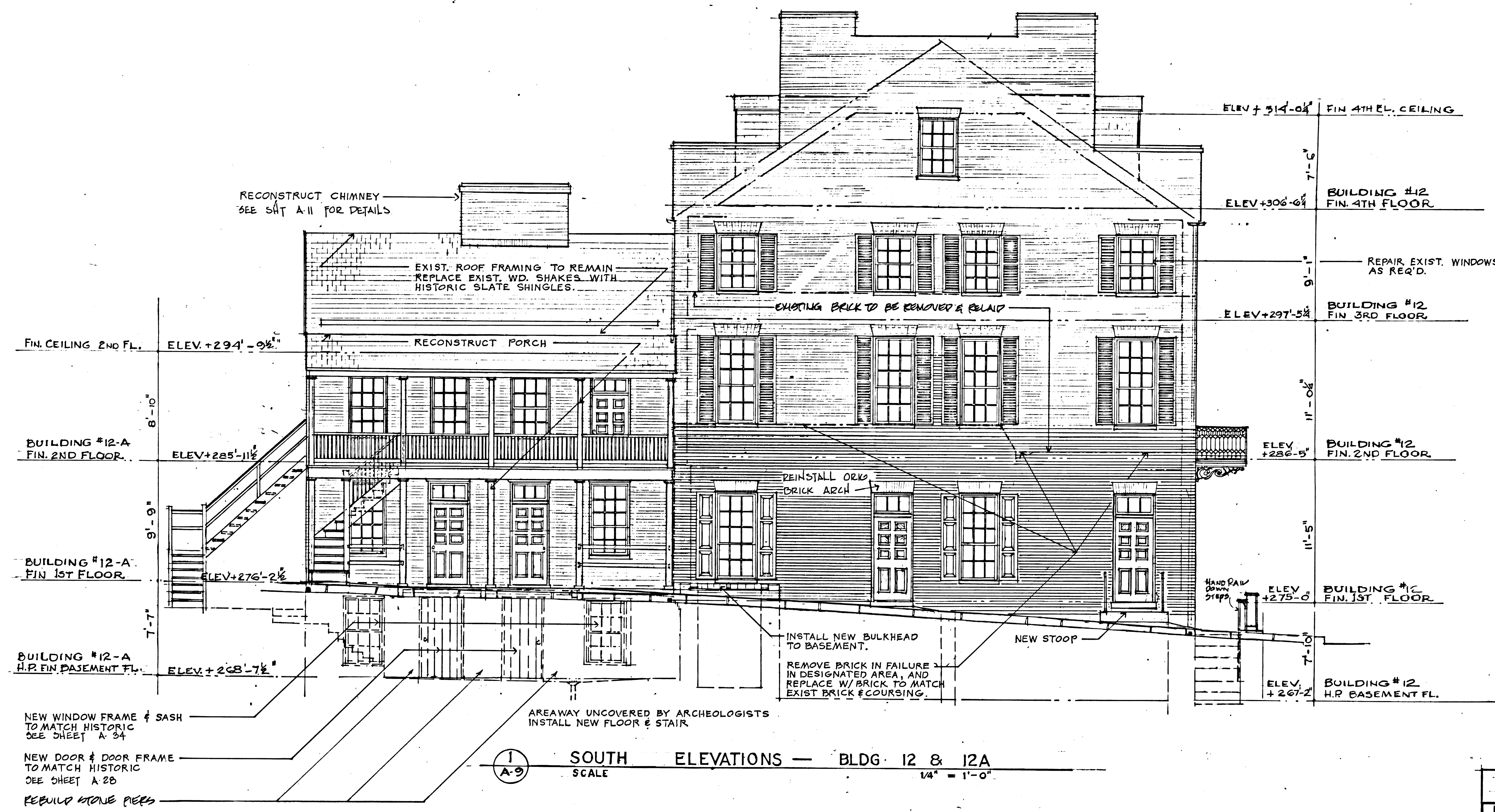
- BLDG #12-A FIN. CEIL. 4TH FL. ELEV. + 314'-0 1/2"
- BLDG #12-A FIN. 4TH FLOOR ELEV. + 306'-6 1/2"
- BLDG #12-A FIN. 3RD FLOOR ELEV. + 297'-5 1/2"
- BLDG #12-A FIN. 2ND FLOOR ELEV. + 286'-5"
- BLDG #12-A FIN. 1ST FLOOR ELEV. + 275'-0"
- BLDG #12-A FIN. 1ST FL. ELEV. + 276'-2"
- BLDG #12-A FIN. BSMT. FL. ELEV. + 268'-7"
- BLDG #12-A FIN. BSMT. FL. ELEV. + 267'-2"
- REBUILD AREAWAY WALL. REMOVE INFILL FROM ORIGINAL M.O.
- REBUILD WINDOW WELL
- EXIST. STONE & BRICK PAVING TO REMAIN APPROX. 18" BELOW EXIST. GRADE - SEE DET. A-2
- AREAWAY UNCOVERED BY ARCHEOLOGIST. INSTALL STONE FLR. & RECONSTRUCT STONE STEPS

PHASE II B
RESTORATION

EAST & WEST ELEVATIONS BUILDINGS 12 & 12A
SCALE 1/4" = 1'-0"

A-8		DRAWING NO.	25006A
PREPARED	RSJ/WLB	DESIGNED	GERNER
DRAWN	BARLOW	CHECKED	6/78
DATE			

100 OF 65



1 SOUTH ELEVATIONS — BLDG 12 & 12A
A-9 SCALE 1/4" = 1'-0"

PHASE II, B
RESTORATION

SOUTH ELEVATIONS BUILDINGS 12 & 12A

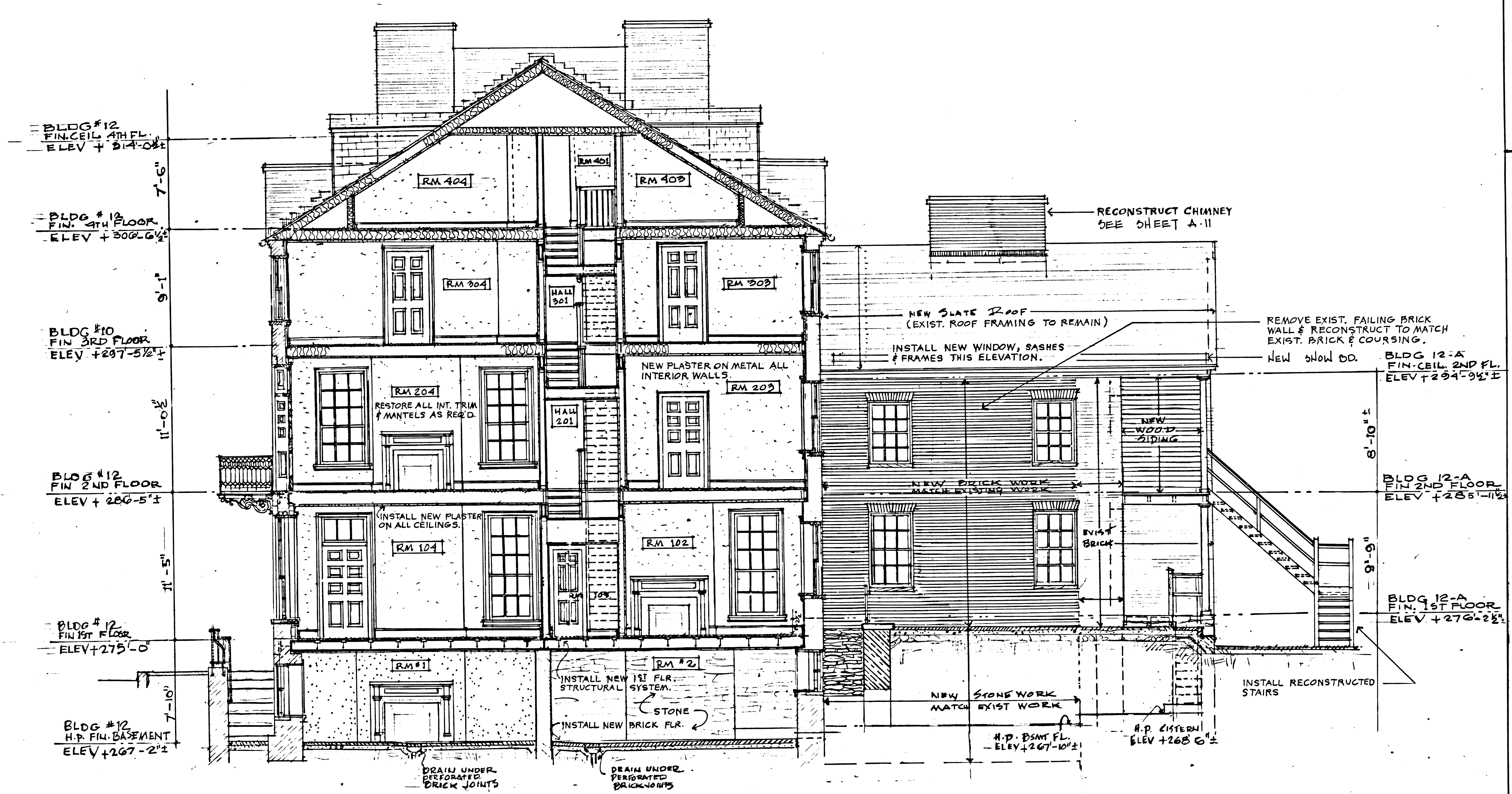
SCALE 1" = 10 FEET 1/4" = 1'-0"

A-9

PREPARED
R3J/WLB
DESIGNED
GERNER
DRAWN
BARLOW
CHECKED
6/78
DATE

DRAWING NO.
1385
25006
SHEET
9
OF 65

Contractor shall verify all dimensions and take own measurements in the field before commencing work. Assume all error of discrepancy.



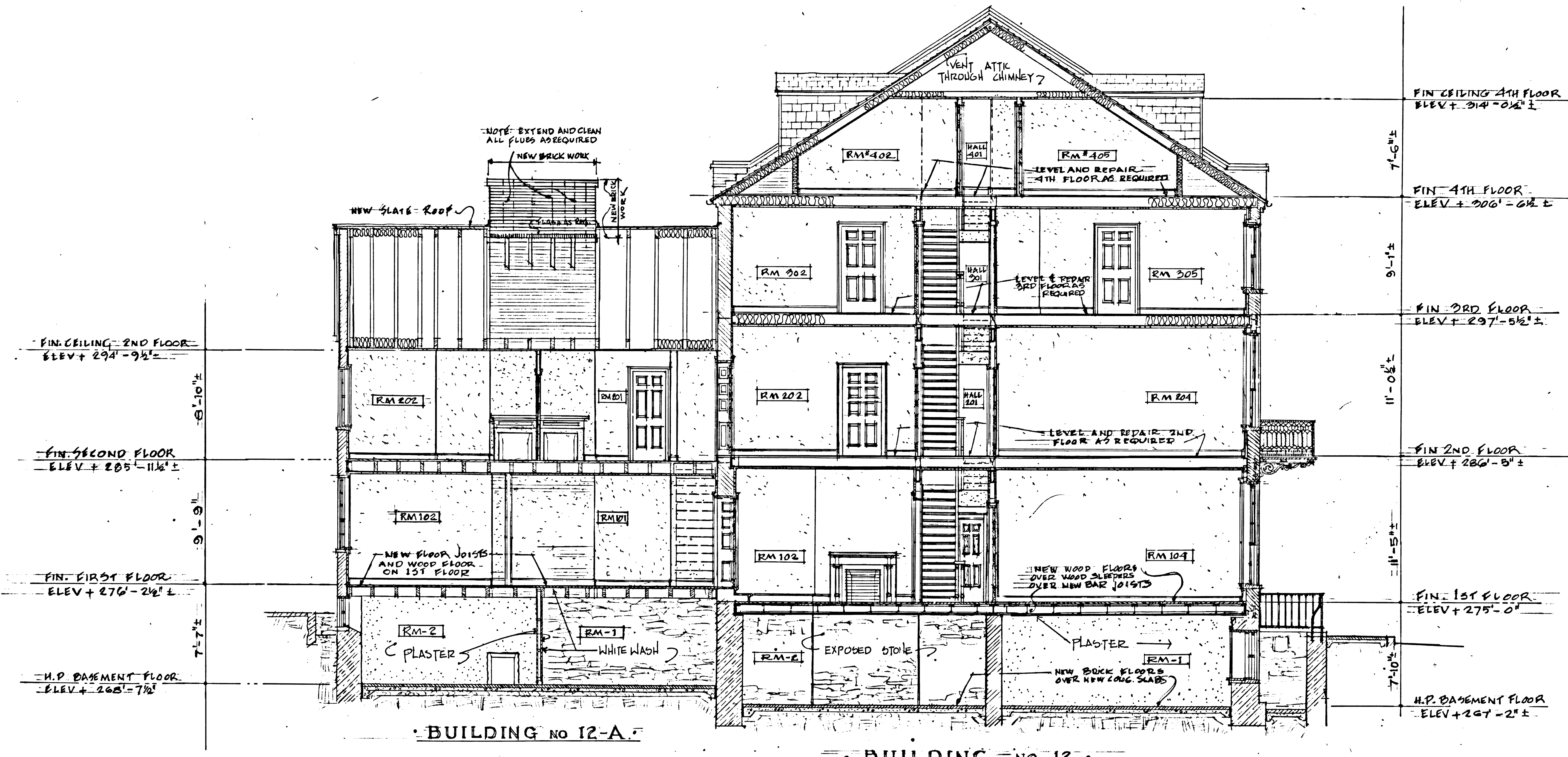
SECTION
SCALE = 1/4" = 1' - 0"

PHASE - II-B
RESTORATION

LONGITUDINAL SECT. BLDG 12 NORTH ELEV BLDG 12-A
SCALE : 1/4" = 1' - 0"

A-10	DRAWING NO. 385
PREPARED R53/WLB	2500GA
DESIGNED GERNER	PKG SHEET
DRAWN BARLOW	10
CHECKED 6/78	OF 65
DATE	

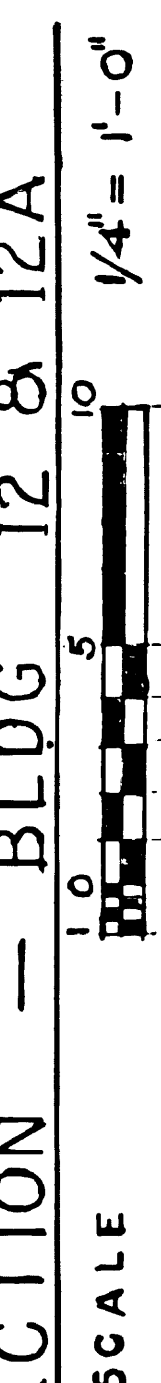
Contractor shall verify all dimensions and take own measurements at the job site before commencing work. Advise of any error in discrepancy.



SECTION
SCALE = 1/4" = 1'-0"

PHASE - II-B
RESTORATION

SECTION - BLDG 12 & 12A



A-II	DRAWING NO. 385
PREPARED RSJ/WLB	25006A
DESIGNED CERNER	PCIP
DRAWN BARLOW	SHEET
CHECKED 6/78	11
DATE	OF 65

Contractor shall verify all dimensions and take own measurements at the job site before commencing work. Adjust all dimensions as indicated.

PLANNING, DESIGN, AND EVALUATION TEAMS

Principal individuals involved in the design and restoration of buildings 12 and 12A are as follows:

Manus J. Fish, Jr.	Regional Director, National Capital Region
Donald W. Campbell	Superintendent, Harpers Ferry (1979-present)
W. Lewis Barlow, IV	Project Manager, DSC
Scott Jacobs	Team Captain for Historic Structure Report, DSC
Frank Gerner	Construction Drawings, DSC
Richard Geiser	Construction Drawings, DSC
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As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities to protect and conserve our land and water, energy and minerals, fish and wildlife, parks and recreation areas, and to ensure the wise use of all these resources. The Department also has major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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