17795

# MARY LOCHER CABIN

## Historic Structures Report:

Physical History and Condition Assessment
HABS Drawings and Photographs

## Antietam National Battlefield

Sharpsburg, Maryland

**architrave p.c., architects**
420 10th Street, S.E.
Washington, D.C. 20003

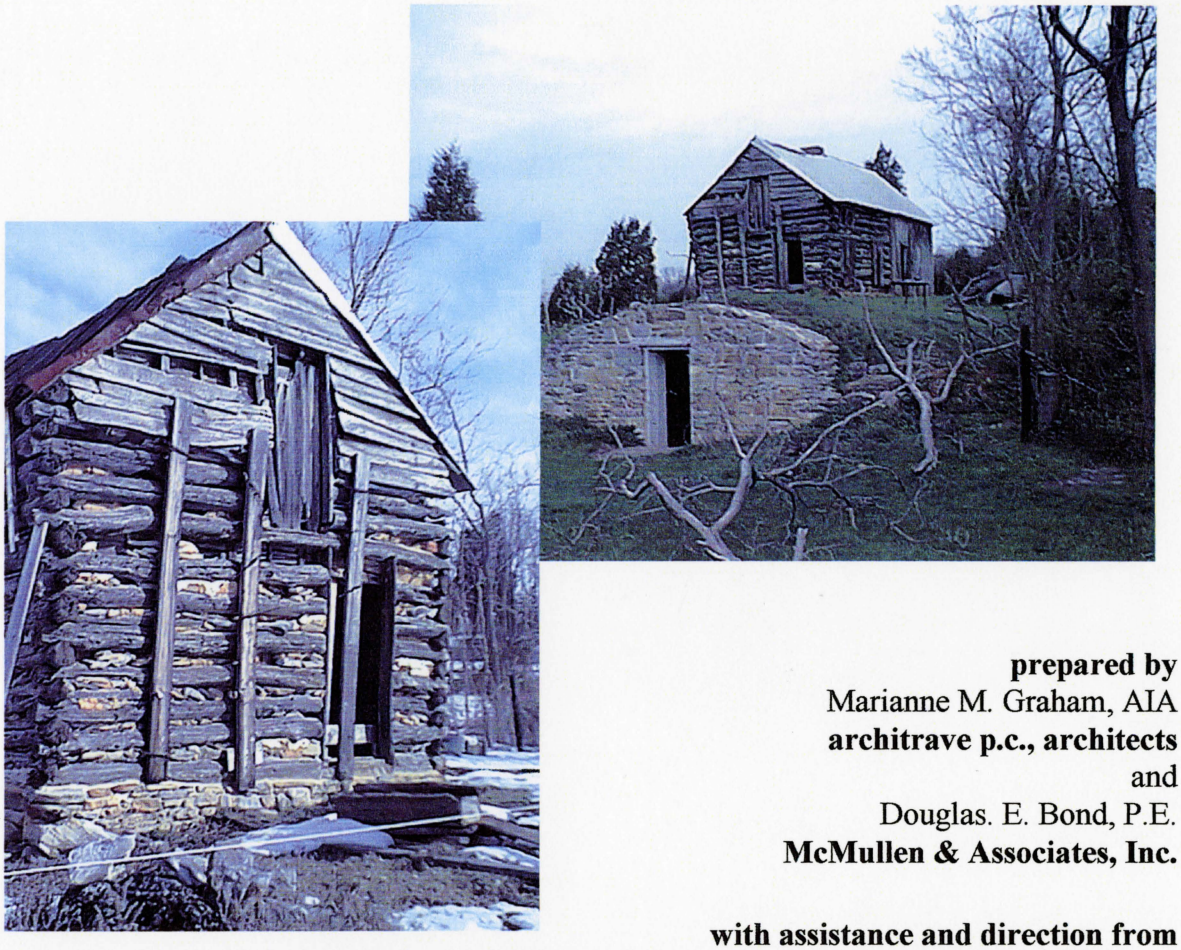
**15 January 2001**

17795

# MARY LOCHER CABIN

**Site also known as the Alfred Poffenberger Farm and Log House for it's Civil War era Tenant**

## Historic Structures Report

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**U.S. Department of the Interior**
**National Park Service**
**Washington, D.C.**

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**Project Team**

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# List of Abbreviations

| | |
|---|---|
| ADA | The Americans with Disabilities Act |
| aka | Also Known As . . . |
| ANTI | NPS designation for Antietam National Battlefield |
| COTR | Contracting Officer's Technical Representative |
| CRM | Cultural Resource Management |
| HABS/HAER | Historic American Buildings Survey/Historic American Engineering Record |
| HPTC | Historic Preservation Training Center – NPS |
| HSR | Historic Structures Report |
| NPS - NCR | National Capital Region |
| NPS | National Park Service |
| NRHP | National Register of Historic Places |
| SHPO | State Historic Preservation Officer |
| UFAS | Uniform Federal Accessibility Standard |

# Administrative Data

**Order of Administrative Events associated with Property arranged in Chronological Order**

1934 NPS Photographic Survey – Surviving Buildings/Farmsteads within Battlefield area.

1940 NPS Associate Architect Thomas T. Waterman undertook preliminary survey of early houses on the Antietam National Battlefield Site to locate suitable resources for full recordation by the Historic American Buildings Survey (HABS). Waterman photographed **Mary Locher Cabin** aka A. Poffenberger House and wrote his observations in a memorandum to the Acting Chief of Planning, but did not recommend a complete HABS recording at the time of the visit. The farm was under private ownership (Poffenberger family) at the time of the visit and remained so until 1990.

1989 **Mary Locher Cabin** aka A. Poffenberger Log House photographed by HABS Photographer Jack Boucher, additional large format photographs added to HABS Collection as addendum to the Waterman Photographs – HABS No. MD 90.
**Barn** aka A. Poffenberger Barn also photographed - HABS No. MD 90-A.

1990 Farmstead property was acquired by the National Park Service for inclusion in Antietam National Battlefield.

1996 Farmstead property (site and structures) deemed eligible for listing on the National Register of Historic Places by the Maryland State Historic Preservation Officer (SHPO) as a contributing resource to the **Antietam Battlefield Historic District**.

1997 List of Classified Structures (LCS) sheets for Farmstead, Antietam National Battlefield
**Mary Locher aka A. Poffenberger Farm Property (IDLCS 48217 ANTI):**

| | | |
|---|---|---|
| Log House | IDLCS: 48217 | Structure Number: 117 |
| Root Cellar | IDLCS: 48218 | Structure Number: 118 |
| Barn | IDLCS: 48219 | Structure Number: 119 |

Impact Level identified as *Moderate* (weather, structural deterioration, animal/pest infestation) and Condition identified as *Poor.*
Management Category identified as *Must be Preserved and Maintained* (approved 4/92).
Approved Ultimate Treatment identified as *Preservation* (approved 4/92).

1998 Temporary Shoring Members Added to Exterior of Cabin – Round Log Section (by NPS)
1999 Temporary Shoring Members Added to Interior – Round Log Section (by NPS)

1999-2000 Preparation of an Historic Structures Report of the **Mary Locher Cabin** undertaken by NPS to establish Maintenance Requirements/Treatment Options in accordance with The Secretary of the Interior's Standards for the Treatment to Historic Properties,* the standards and guidelines which govern the management of federally owned historically significant properties. **HABS Level Documentation** (Drawings and Photographs) to protect against catastrophic loss.

* These treatments were codified as 36 CFR Part 68 in the July 12, 1995 *Federal Register* (Vol. 60, No. 133).

# Executive Summary

**architrave p.c., architects** and associated consultants have researched this site and structure by:

- review of archival material held by the Library of Congress Prints & Photographs Collection; National Park Service (NPS), Antietam National Battlefield; and various repositories
- interviews with NPS staff – Antietam National Battlefield
- review of related scholarly works by other professionals, documenting history of region, site and structure; including investigation/analysis of built resources and archeological resources
- careful examination of physical fabric and monitoring of physical conditions
- structural inspection and analysis
- laboratory analysis of extant interior finishes and exterior daubing material
- documentation of existing conditions with measured drawings and photographs

From the information and insight gained through this process, the results of which are documented within this report, we have examined the implications of the "do nothing" treatment alternative and further presented and evaluated three alternative approaches to preservation treatment in accordance with *The Secretary of the Interior's Standards for the Treatment to Historic Properties*, the guidelines which govern the management of federally owned, historically significant properties: **Preservation** (for immediate stabilization and interim lay-away for future full restoration of the exterior appearance), **Restoration** (for exterior interpretation of the preserved structure only with no intended use), and **Restoration/Reconstruction** (for the reintroduction of the missing building section to accurately represent the Civil War era appearance of the historic resource). Each successive treatment alternative is designed to build upon the last, so that the treatment approach can respond to changing directives and availability of funds within the total restoration framework.

We have prepared schematics centered on specific preservation and interpretation goals and have developed corresponding construction cost estimates for the four alternatives outlined above. Part 2: Section C of this report contains a detailed analysis of the work required to achieve each preservation alternative. The estimate of probable construction cost associated with each alternative is summarized below:

**Alternative 1:**
Managing the Structure as a Ruin (No Significant Intervention) **$ 21,394**

**Alternative 2:**
Managing the Structure as a Stabilized Building (Slowing Deterioration) **$262,962**

**Alternative 3:**
Managing the Extant Structure as a Restored Building (c. 1940) **$455,257**

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# Part 1.

# Developmental History of Building and Site

# Statement of Significance

The domestic structure herein referred to as the *Mary Locher Cabin,* but also known as Alfred Poffenberger's Log House, is a good example of the quintessential American frontier dwelling. The rustic structure is part of an historic farmstead including a barn and other outbuildings located north of the town of Sharpsburg, Maryland. This property, privately owned for over 200 years, has recently been added to the federally protected *rural historic landscape* made infamous by the American Civil War: Antietam National Battlefield. The modest, multi-cell structure, that has in part endured the 20th century, not only predates the Civil War, but was originally built in the late 18th century to early 19th century sometime after Sharpsburg's settlement in 1763. The physical aspects of the combination log and timber frame structure, its construction, how it evolved and was used over time, all serve to characterize both the Old World heritage and New World class patterns both of the dwelling's owner/builder(s) and later tenant farmer occupants. The siting of the structure on a series of rocky outcroppings, inappropriate for agricultural development, and its broader relationship to the physical surroundings, reflect farming traditions in the rich agricultural region of Western Maryland.

Ultimately, this specific farmstead like many others in the Hagerstown Valley, were part of the innocent landscape that witnessed one of the most horrific, yet defining battles of the Civil War, the Battle of Antietam – occurring on September 17, 1862. The dwelling's proximity to the concentration of fighting at the *West Woods*, where the Union and Confederate armies clashed in the bloody morning phase of the battle, guaranteed the property's role in the battle as a field hospital. The farm was occupied by Confederate troops leading up to the battle, and was used as an encampment for weeks after. Fields of crops, primarily of corn, as later reported to the Federal government by the valley's victimized land owners, were wholly confiscated by soldiers who also raided and ransacked homes in search of goods to support the troop's pressing need for food, water, clothing and shelter. At the time of the battle, title to the farm property was held by Mary Grove Locher of a prominent Sharpsburg family. She shared ownership with her brother of the larger land holding speculatively held by her merchant father, Philip Grove, until his death in 1840. As an absentee owner who resided in Lancaster County, Pennsylvania, she entrusted its operation to a tenant farmer named Alfred Poffenberger of a local farming family. It was Alfred Poffenberger who filed property damage claims to the Federal Government following the battle, and thus, his name is identified with the property as the resident at the time of the Civil War. In the 1890s, Alfred's younger step-brother George Poffenberger purchased the property from Mary Locher's heirs, thus the official name *Locher-Poffenberger Farm*, representing the two prominent Washington County families associated with the farm during the 19th century.

The abandoned farm dwelling is historically significant as part of a farmstead that existed before and during the Battle of Antietam, and as a surviving structure in the *West Woods* landscape.

# Period of Significance

Important for its association with the nationally significant historical event, the Battle of Antietam, the recommended period of significance for this building, site and landscape is the time period immediately before, during and after the battle, September 1862.

# A. Methodology for Construction History

**Project team reviewed documents provided by National Park Service:**

Memorandum From: NPS Historic Architect Thomas T. Waterman to Acting Chief of Planning, dated March 30, 1940. Waterman visited and photographed site March 28, 1940.

Memorandum From: Chief Historian, NCR, Cultural Resource Services Division Gary Scott, to Superintendent Antietam and Monocacy National Battlefields. Subject: XXX form 630-95-04, dated February 23, 1995.

West Woods Cultural Landscape Report:

Joseph, Maureen DeLay. *Historic Woodlot Restoration: West Woods, Antietam National* Battlefield, Sharpsburg, Maryland, December 1994.

Archeological Investigation and Final Draft Reports:

Sterling, Elise H. Manning; Brown, Marvin A.; and Klein, Terry H. Progress Report – *First Phase of Archeological Investigations: West Woods, Antietam National Battlefield, Sharpsburg Maryland*, December 1995.

Sterling, Bruce B. and Manning-Sterling, Elise H. Article – "Battlefield and Farmstead, The West Woods Survey, Antietam," presented at Conference of the Society for Historical Archaeology, Cinncinnati, Ohio, January 4, 1996.

Sterling, Bruce B. and Manning-Sterling, Elise H. Draft Report - *Antietam Battle on an Agrarian Landscape: A Study in Archeology*, May 2000.

National Register of Historic Places nomination update (Draft):

Reed, Paula S. National Register Nomination Update. Antietam National Battlefield, Sharpsburg, Maryland RQ # 1443RQ300098027, August 1999.

**Project team reviewed the List of Classified Structures (LCS) sheets for Antietam National Battlefield properties: M. Locher / A. Poffenberger Log House, Root Cellar and Barn.**

**Project team reviewed archival documents (primary sources) and reviewed related publications and documents (secondary sources):** Refer to Bibliography for complete listing

**Project team interviewed Antietam National Battlefied staff, knowledgeable about regional history, the site, the building's history, and related topics:**

Ted Alexander, Historian; Richard Brown, Chief - Cultural Resources Management; Mike Weinstein – leads focused interpretive trail walks in West Woods and other sites

**Project team examined Physical Fabric of the structure known as "Mary Locher Cabin:"**

We visited the site numerous times, inspecting and recording the structure, and making seasonal observations from July 1999 to the present. Measured drawings of floor plans, sections, details, and framing have been prepared from extensive field notes and photographs. Temporary stabilization by the National Park Service - exterior shoring members added in 1998 and interior shoring members in 1999 – will be located and identified on the drawings as the most recent episode in the evolution of the building's physical history.

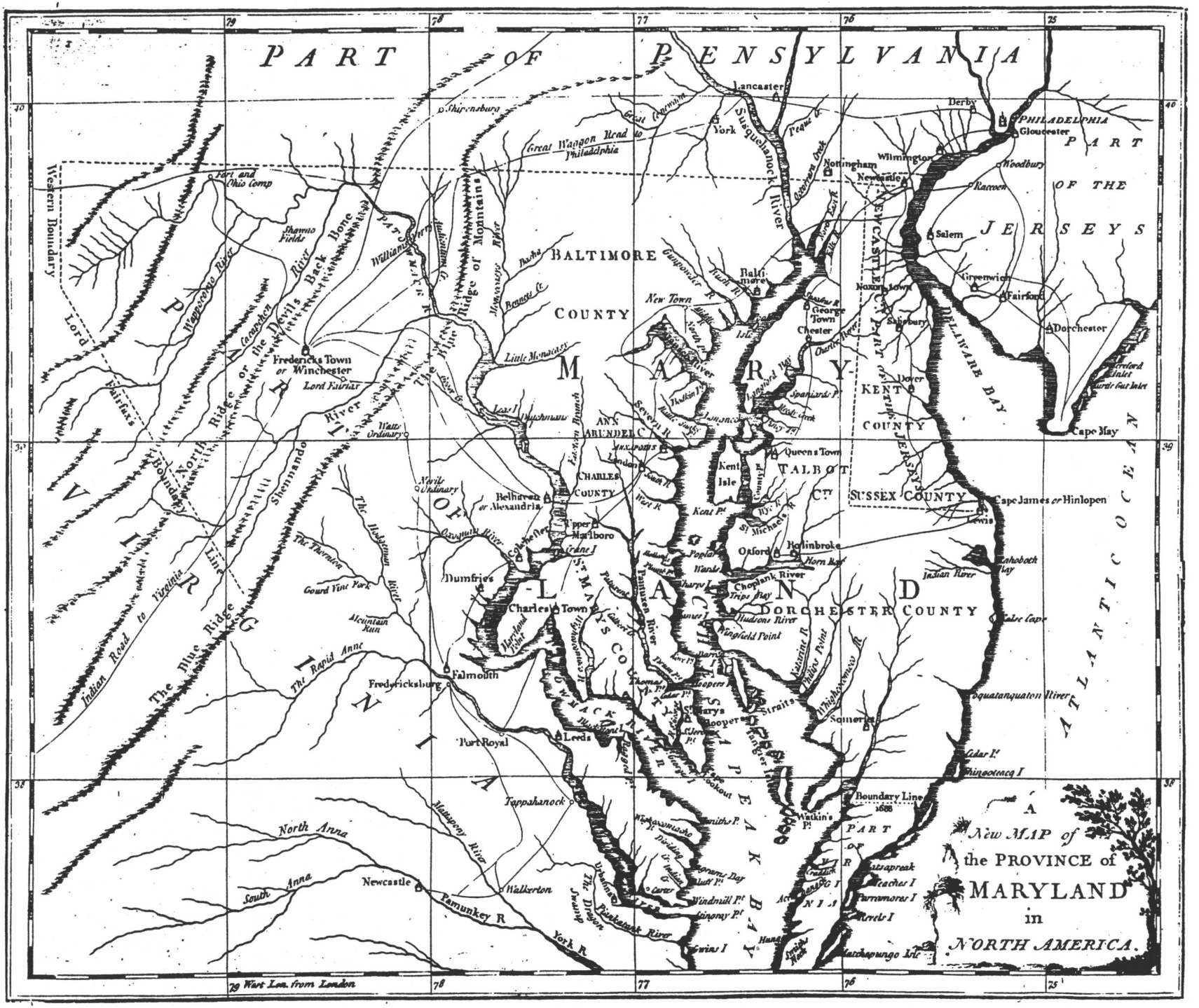



Figure 49. John Hinton, *A New Map of the Province of Maryland in North America*, from *Universal Magazine* 66 (1780), Maryland Hall of Records, MdHR G 1213–60.

Figure 1. *John Hinton, A New Map of the Province of Maryland in North America, from Universal Magazine 66 (1780), Maryland Hall of Records, MdHR G 1213-60, reprinted in Atlas of Historical Maps of Maryland, 1608-1908 by Edward C. Papenfuse and Joseph M. Coale III.*

# B. Historical Background and Context

## Regional Development: Hagerstown Valley, Western Maryland

When permanent settlement began in Western Maryland following the French and Indian War, a hundred years after the founding of the colony in 1634, the land still held the challenges of a true frontier. The pioneers were moving westward in search of free, fertile land above the falls of the Potomac, and found here good springs of mountain water, soil made rich with limestone deposits, and tall stands of timber. These favorable qualities continued to resemble the observations made in 1634 by the English Captain Henry Fleet who explored the Potomac River by canoe. The writings that documented his travels through the region spoke of witnessing plentiful fish, especially sturgeon, and mature woods populated with deer, buffalo, bear and turkey.

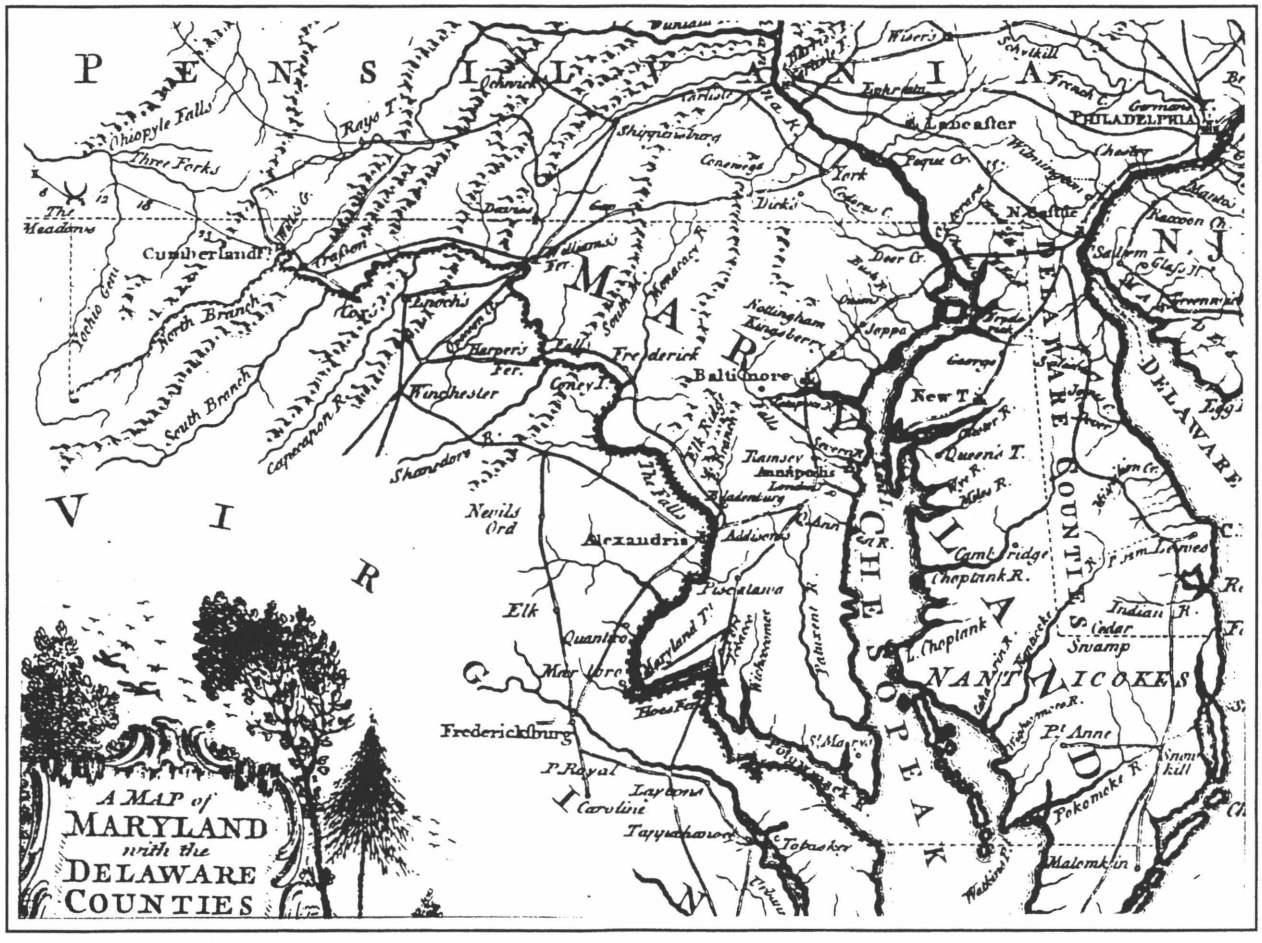



Figure 2. *Detail from Thomas Kitchin, A Map of Maryland with the Delaware Counties . . ., from London Magazine 26 (August 1757), Maryland Hall of Records, MdHR G 1213-437, reprinted in Atlas of Historical Maps of Maryland, 1608-1908 by Edward C. Papenfuse and Joseph M. Coale III.*

Despite these advantages, the area was 50 miles beyond tidewater navigation at Georgetown and Baltimore, the rugged roads were fashioned from early animal or Indian trails, and the local Delaware and Catawba Indian Tribes (who continued in tribal wars), were angered by the permanent European intrusion into their traditional hunting grounds. In the mid-1700s, military regiments were still being called in to protect settlers from periodic Indian outrages.

As soon as the western region of the Maryland Province was opened for settlement by Lord Baltimore in the latter first half of the 18th century, wealthy English and Scotch/Irish speculators, many tobacco growers from eastern portions of Maryland, began to acquire large grants of land for investment purposes. Initially, pioneer farmers acted as tenants on these large land tracts. These early farmers took over the corn culture practically intact from the Indians, and cleared fertile fields of timber, using the felled logs for the construction of houses, many intended at first as impermanent dwellings. Tobacco was experimentally grown in the region due to its domination of the colonial trade market, but the mountainous, rocky soils and cooler climate did not prove as suitable to the crop as the eastern Maryland and Virginia tidewater plantations that also boasted direct shipping access to foreign markets. However, an economic depression was peaking around 1730, when tobacco production in the colonies was far in excess of British and European demands. The speculative landholders thinking that the agricultural potential for western Maryland was low, began to subdivide their property into smaller lots of 100 to 300 acres, selling frequently to former tenant farmers. This division of land ultimately created a patchwork of family farms that dotted the rural landscape. Individual farms were divided into fields of 20 to 40 acres planted with corn and clover with remaining land, where rock outcrops prevented cultivation, left in pasture and woodlots.[1] The management of woodlots became more critical for use to the farms and as a product for sale as the standing timber, "so omnipresent on the land in the 18th century," began to slowly disappear.[2]

## The Diverse Citizens of Sharpsburg

The town of Sharpsburg, upon settlement in 1763, was home to both English and German families. Many German settlers migrated to the area from Philadelphia and the lower Delaware Valley of Pennsylvania during the 18th century by way of the Great Wagon Road running westward through Lancaster County and down into the Appalachians. Many of these families had fled persecution in the Old World, had emigrated to America by way of the lower Delaware Valley, and were moving West seeking land and opportunities. At first, English speaking people were not sure how to react to the large number of Germans who were settling in the valley. The German speaking people, who maintained Old World social and religious traditions, remained a distinct and close-knit group reluctant to blend with their neighbors.[3] Some of the prominent German family names in Sharpsburg at this time were Cruse, Needs, Hawkers, Flicks, Groffs (Grove), Schmidts (Smith), Bardoon (Barton), Kretzer, Miller, Piper, Hayberger (Highberger), Breckleys, Kieffer, and Orndorff. The first town church, established in 1768, was Lutheran, and German was the language spoken there up until 1831. In comparison, the first English church

[1] Paula S. Reed, *National Register Nomination Update Draft, Antietam National Battlefield*, 1999, Section 8/Page 2.
[2] Reed, Section 8/Page 18.
[3] Reed, Section 8/Page 9.

was Methodist, established as late as 1811, with the Protestant Episcopal church to follow in 1818. By 1808, German was taught in one of the town's schools, and English in the other. A local newspaper printed in German also lasted to the mid-1800s. Over time the distinct lines between these factions of people softened and changes began due to the English influence. However, by 1861 and the onset of the Civil War, the lives of all people in Sharpsburg began to change. Rather than English and German divisions, the lines were between Republicans, "good Union men," and Democrats, thought to be southern sympathizers.[4]

**Transformation of the Wilderness**

Despite the early English resistance to the influx of "foreigners," the industrious, hard working German farmers brought the small grain culture from Pennsylvania, primarily wheat, to the lower Potomac Valley, with potato, flax, oats and rye later attributed to peasant farmers. Ironically, the prosperity of the region from the mid-1700s to the mid-1800s is directly traced to the success of those small grain crops brought to the region by the Germans. Many grist mills and flour mills that required a water source for power, were constructed by enterprising Germans at crucial points along Antietam Creek and other well suited streams in the valley. The work of the mills allowed the processed grain to be efficiently transported over land routes to large market centers in the form of flour or meal. Some grain was also distilled into whiskey. The resourceful mill owners expanded their services to include general stores serving their farming clientele. These epicenters frequently grew into villages or small towns.

Roads and ferry service were subsequently improved. By the early 19th century, a turnpike system, and a canal and railroad line located along the Potomac corridor were being constructed, serving to connect this remote region to the Country beyond. These new modes of transportation brought visitors as far away as Baltimore City because of the special healing qualities of the springs in the area – one was limestone, and the other was sulfur, iron and magnesia.[5]

The 1939 newspaper article (see Figure 3.) recounting the landowner's desire in 1790 to lure the "Nation's Capitol" to Sharpsburg with a generous donation of land, attests to the global thinking of the citizens. Highlighting of the local attributes – namely good springs, productive mills along Antietam Creek and the town's proximity to the ferry crossing at the Potomac River – provides some insight into their community pride.

[4] Reed, Section 8/Page 25.
[5] Thomas J. Scharf, *History of Western Maryland*, Vol. II, Philadelphia: Louis H. Everts Co., 1882, pp 1205-1211.

**THE INDEPENDENT, SHEPHERDSTOWN, WEST VIRGINIA, WEDNESDAY, SEPTEMBER 6, 1939**

# Map Showing Donations of Land Offered As Inducement To Locate Captiol Here

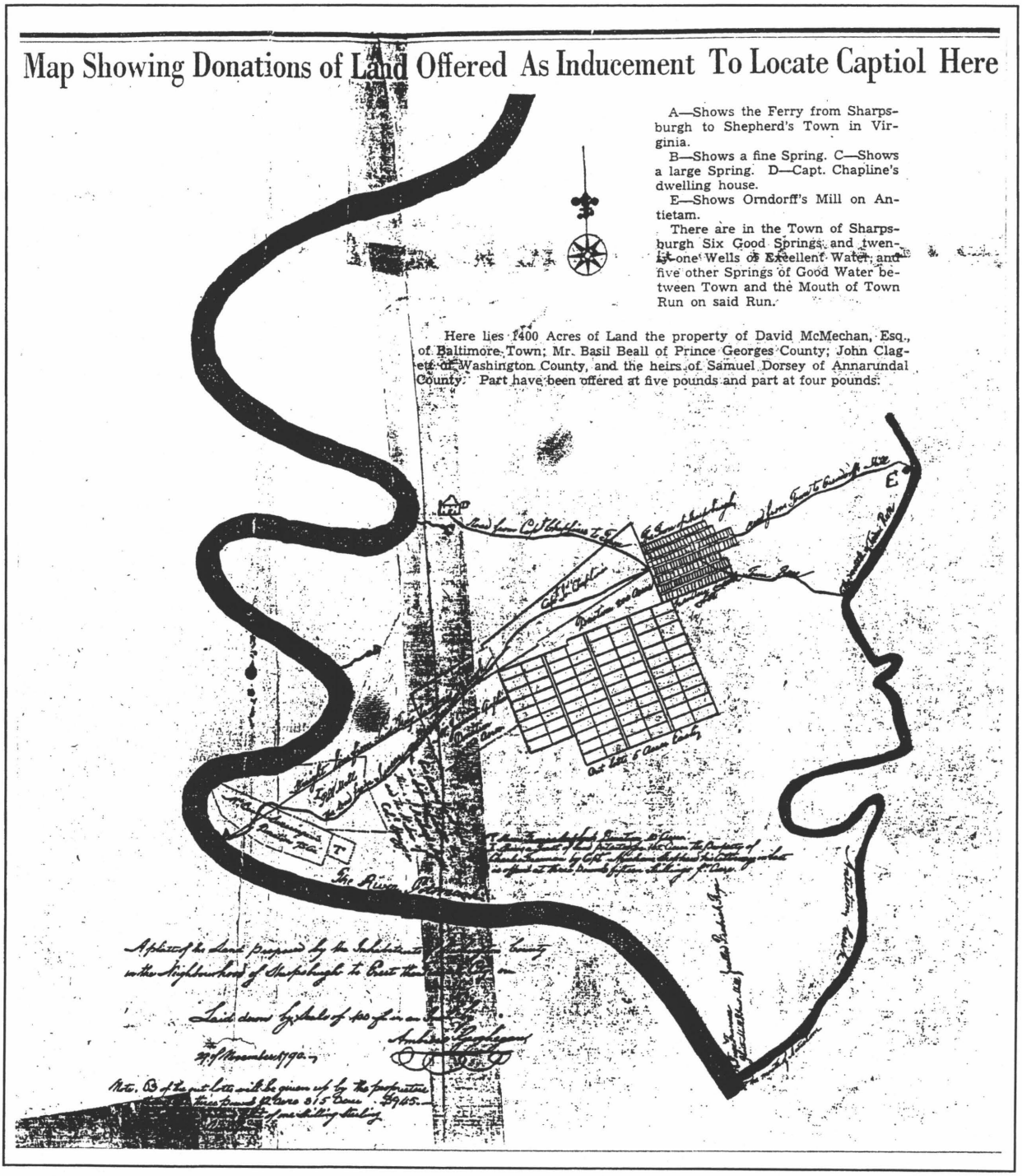



Figure 3. *Map from article titled "Shepherd's Town and Sharpsburgh Wanted National Capitol in 1790" by C. S. Musser for THE INDEPENDENT.*

*This map shows the extent of development to the West, natural features of the land, and the established towns in Western Maryland by the early 1800s. By this time, Sharpsburg has become a settlement situated along the North-South road from Pennsylvania to Hagerstown and across the Potomac River to Charleston, Virginia (now West Virginia).*

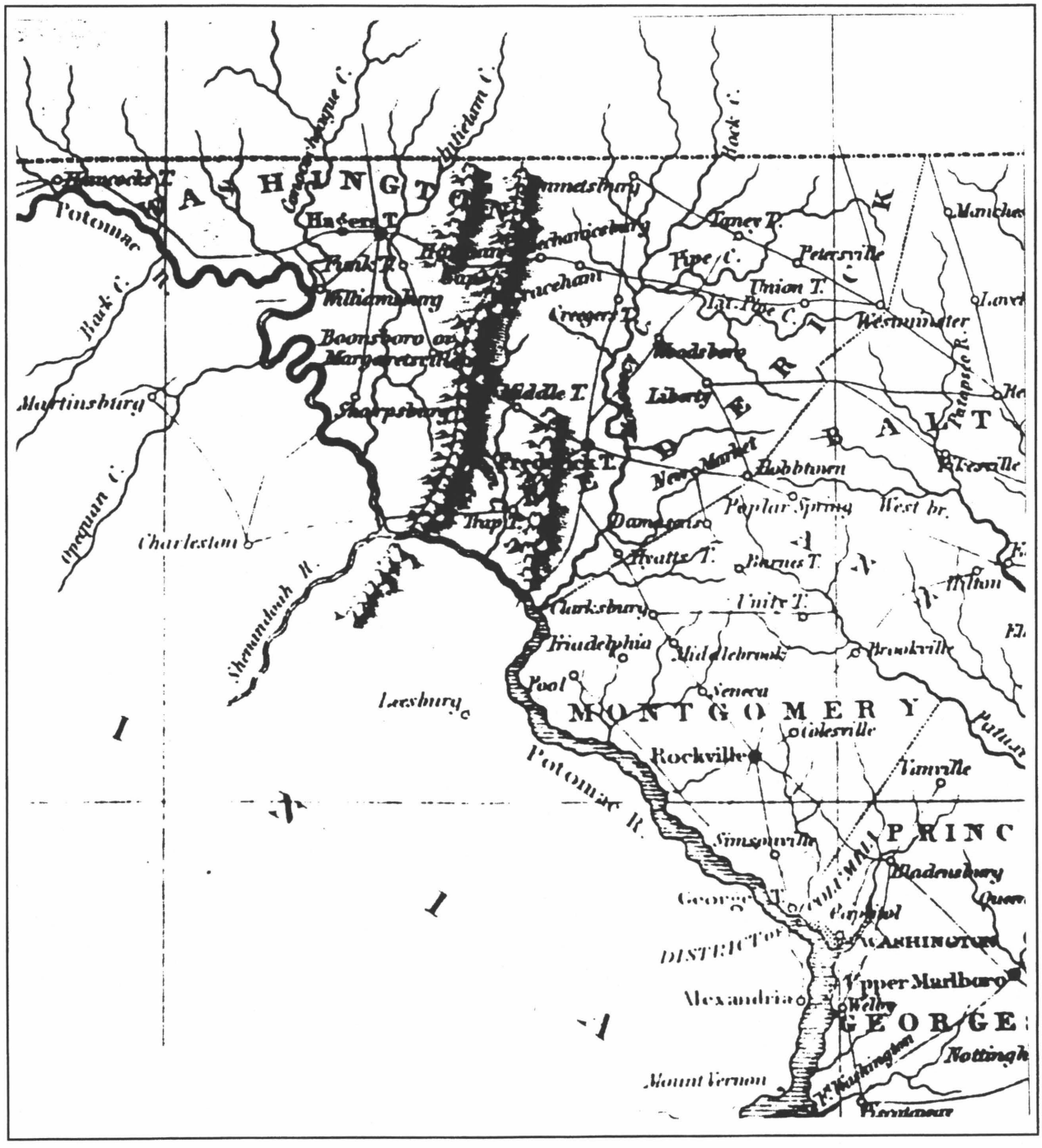



Figure 4. *Anthony Finley, Maryland (1824), Maryland Hall of Records, MdHR G 1213-414, reprinted in Atlas of Historical Maps of Maryland, 1608-1908 by Edward C. Papenfuse and Joseph M. Coale III.*

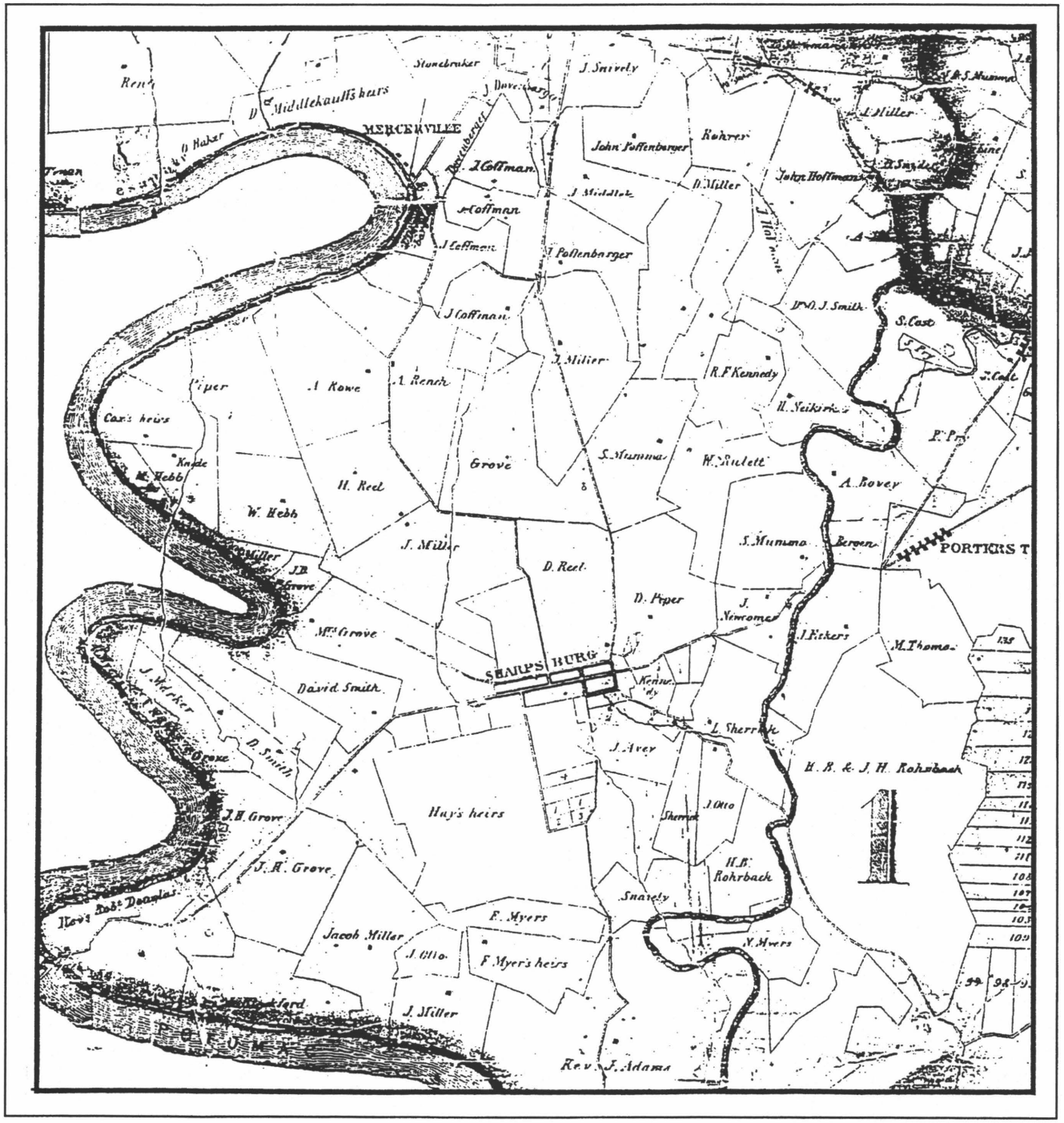



Figure 5. *Thomas Taggart's 1859 Map of Washington County and the Sharpsburg Election District showing the division of land parcels and identification of landowners prior to The Civil War. Farmhouse locations are also shown.*

The rapid growth and development created by the arrival of a new populous and the prosperous agricultural conditions that they experienced during this time, resulted in an aggressive building campaign both in towns and especially on the countryside. Land was cleared of native growth and more permanent structures were built both in support of the individualized farming families' living needs and farming functions that were general in nature. These buildings ranged from rustic dwellings and outbuildings such as the bank barn to the quite refined farmhouses and townhouses built by a new generation of prominent landowners, whose wealth was derived more from farm production and commerce than from huge grants of land. In the Sharpsburg area, these affluent citizens included Philip Grove, Jacob Miller, and Jacob Mumma.[6]

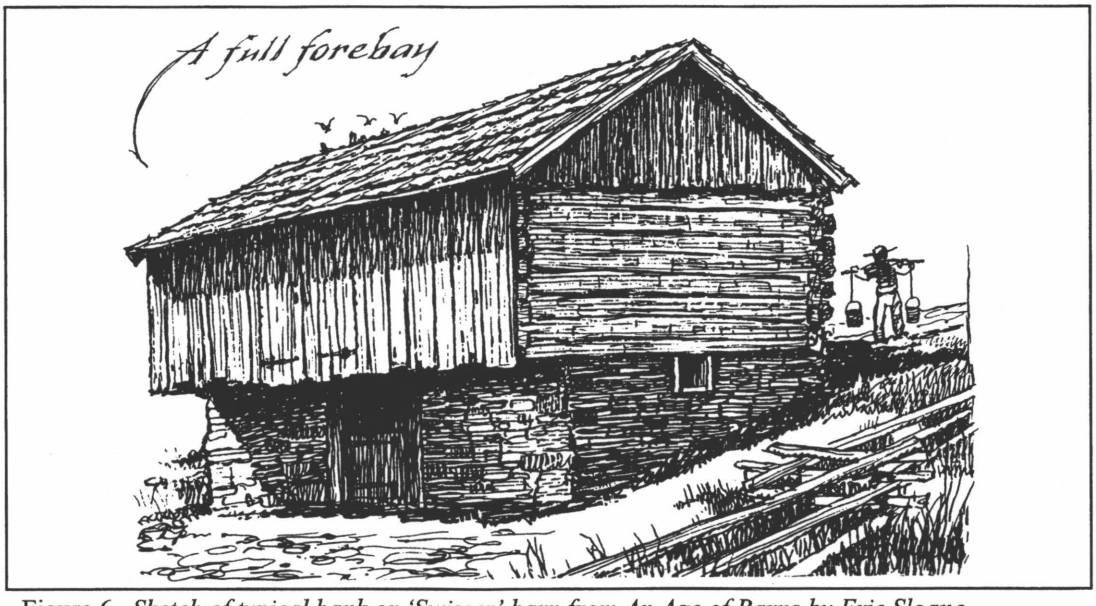



Figure 6. *Sketch of typical bank or 'Swisser' barn from An Age of Barns by Eric Sloane.*

*Most of the substantial farmhouses and 'Swisser' barns common to the region were constructed between 1790 and 1850. Favored building materials for houses were log (nearly always covered with siding or stucco), native limestone, or brick (most brick farmhouses in the area date from after 1820). The earliest barns were log or limestone with brick or timber framing favored after the 1830s.*[7]

The "back-country" landscape, as known to the Indians just a few years hence, was thus completely transformed by this explosion of activity in the valley. This agrarian focused economy continued to dominate Washington County and Western Maryland, supplying regions well beyond its boundary. In fact, "when the first quarter of the nineteenth century had passed, Maryland and Virginia were growing more than half the wheat produced on this continent, and their control of the wheat market continued to the eve of the Civil War."[8]

[6] Reed, Section 8/Page 17.
[7] Reed, Section 8/Page 2.
[8] Dorothy U. Strarthern, *Barry-Berlin-Brunswick: A Brief History*, The Brunswick Potomac Foundation, 1964; reprinted., 1970, p. 2.

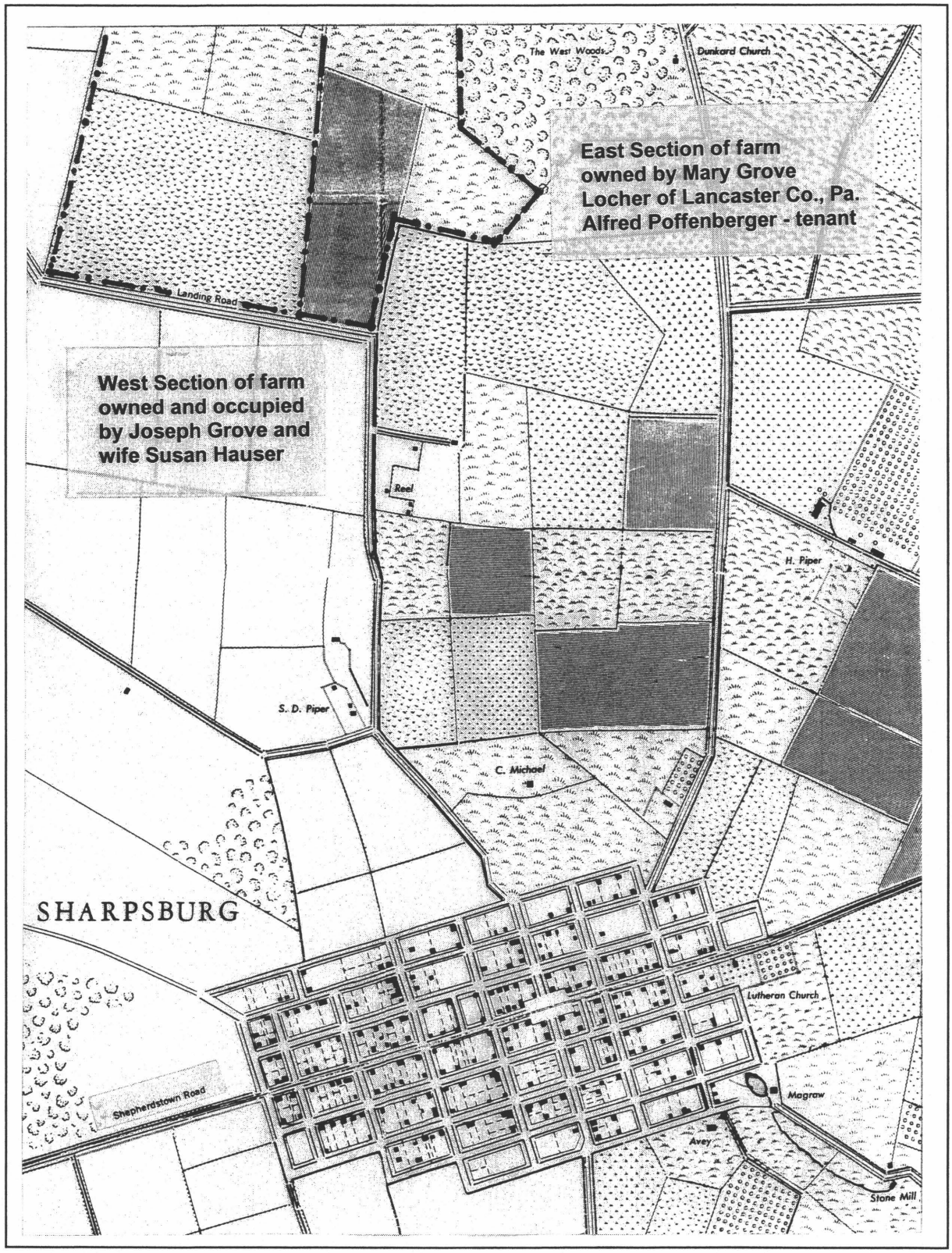



Figure 7. *Map of Sharpsburg, Maryland showing town and outskirts on 17 September, 1862 taken from 1963 Printed Map by James D. Bowlby: SITE of the BATTLE of ANTIETAM CREEK Reprinted by Kirby Lithographic Co., Inc., Wash., D.C. for the Parks and History Association, 1972.*

**The following important events marked the development of Western Maryland and the historic context for the property containing the Mary Locher Cabin[9]:**

| | |
|---|---|
| 1634 | Maryland colony founded. |
| 1681 | Pennsylvania established as a colony by William Penn. |
| 1730/36 | Delaware and Catawba Tribes reportedly battled at mouth of Antietam Creek. |
| 1732 | Charles Calvert, Fifth Lord Baltimore, issued a proclamation opening Maryland's western frontier for settlement in effort to increase income from "back country." |
| 1737 | First white settlement in present day Washington County (then Prince George's County) established by British pioneer Charles Friend at Conococheague Creek - an outpost for trading, then a mill. Fredericktown, Maryland was the nearest settlement. |
| 1739 | First German settler to obtain land patent of 200 acres, Captain Jonathan Hager, plotted town called "Elizabeth Town" in 1762, later known as Hagerstown - became county seat. Hagerstown officially incorporated in 1763. |
| 1739 | Joseph Chapline, an Englishman, received "manorial" grant of 2,000 acres from Charles Calvert, in turn for living on his plantation ("Mount Pleasant") and bringing English civilization to the wilderness. His land was to become site for town of Sharpsburg. |
| 1740s | Granting of large land patents to speculative investors continued, primarily to prominent individuals of English and Scotch/Irish descent. |
| 1748 | Antietam area became part of newly created Frederick County. |
| 1756 | Fort Cumberland and Fort Frederick established by Provincial Governor Sharpe. |
| 1758 | Colonel Joseph Chapline with regiment defended early settlers from Indian outrages near Antietam Creek in lower Potomac Valley. |
| 1763 | End of the French and Indian War. Settlement began to accelerate as supplies and provisions began to be traded eastward. |
| 1763 | Chapline obtained charter and laid out second town in present day Washington County called Sharpsburg after friend, the honorable Maryland provincial governor, Horatio Sharpe. The site of the incorporated town lays between the Potomac River and Antietam Creek. Shepherdstown, across the Potomac in Virginia, was also incorporated this year. |

[9] Much of this historic information is adapted from Reed, National Register Nomination Update, 1999.

| | |
|---|---|
| 1765 | Charles Mason and Jeremiah Dixon began the survey to establish a line between the colonies of Maryland and Pennsylvania, to settle an ongoing dispute. |
| 1765 | Chapline and three other investors established the Antietam Iron Works, near the mouth of the Antietam Creek. |
| 1765 | Thomas Van Swearingen given permission to run ferry across the Potomac River three miles west of Sharpsburg to Shepherdstown, Virginia. |
| 1768 | Establishment of the first German Lutheran Church in Sharpsburg, then the German Reformed Church. |
| 1776 | Washington County created from part of Frederick County, Maryland. |
| 1787 | General George Washington passed through Sharpsburg and began to consider the advantages of a water based transportation route to the West by way of a canal. |
| 1790 | Movement by towns of "Sharpsburgh" and "Shepherds Town" (Virginia) to establish the capitol city (Federal City) on the banks of the Potomac between the two. Land was offered with assets listed as many fine springs and location on the crossroads between North and South, East and West. A ferry crossing at the Potomac connected the two towns and both settlements to established roads beyond. Captain Chapline's dwelling house is shown on the submitted plat map, sited west of Sharpsburg on a cliff overlooking the Potomac River. Frye Furnace is shown at the mouth of the Antietam with a Grist and Flour Mill, and Orndorff's Mill is northeast of Sharpsburg at Antietam Creek. |
| 1780s-90s | Aggressive sell off of land from landowners to tenants, to create individual farms. |
| 1780s | Maryland actively promoted turnpike development – overland toll routes for freight hauling from and to the region – many privately funded and built. |
| 1792 | "Resurvey of Addition to Piles Delight," property of *Mary Locher Cabin* was up for sale – advertisement states that land is under cultivation by renters or leasees. By 1803, the land had been divided into parcels held by fourteen owners. |
| 1813 | 73 men from Sharpsburg bring cannon to town from Bladensburg. |
| 1828 | Chesapeake and Ohio Canal Company chartered – canal completed by 1850. |
| 1842 | Railroad reached Hagerstown with new means of transport/shipping to region. |
| 1850 | Potomac River bridge built at site of old Blackford's Ferry, near Sharpsburg. |
| 1861 – 65 | The Civil War dramatically affected the property and people of the region, both directly and indirectly. The pivotal Battle of Antietam - September 17, 1862. |

# Origins/Migration of American Log & Timber Frame Houses

During the late 18th c. settlement period of Sharpsburg and the outlying western regions, the log house was the construction method of both choice and necessity. These simple structures fashioned of logs became quite common on the landscape and in towns, adequately meeting the practical housing needs of thousands of settlers. The following factors contributed to the popularity of this building type in the region:

- The roads from major towns and ports were poor for transport of materials by wagon, and Sharpsburg's location beyond the fall line of the nearby Potomac River prohibited the water based transport that facilitated land development during this time in the tidewater regions of Maryland and Virginia.
- The materials required to construct a log house were typically found within a short distance of the site, and furthermore, the special tools and skills needed to erect the structure were minimal.
- The heavily wooded landscape of the Appalachian foothills required an initial clearing for agricultural development, so that a mass of fallen timber was readily available to the builder, and the prevalent rocky soils provided stone suited for building foundations.

European emigrants brought with them to America the traditional architecture of the homeland. Sweden, Finland, Germany, and Switzerland had long traditions of building with logs; however large forests with timbers for building had long since disappeared from the British landscape. All groups used round log, hewn log and plank log construction techniques, but corner notching methods varied from region to region.[10] (see Figure 13.)

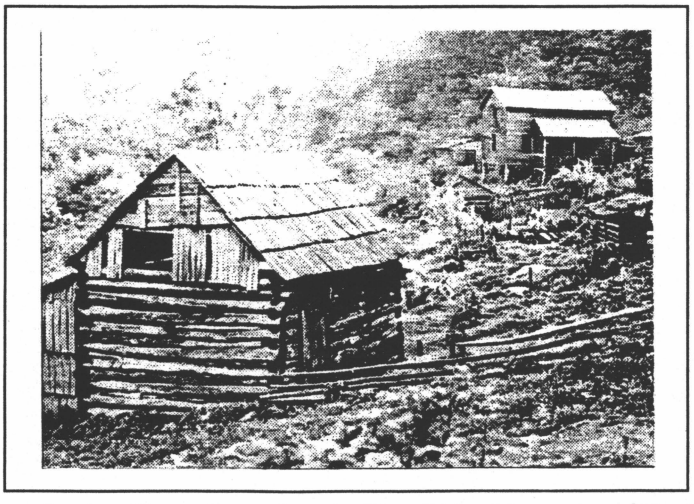


Figure 8. *Log House located in the Blue Ridge Mountains of Virginia.*

[10] Carl R. Lounsbury, ed., *An Illustrated Glossary of Early Southern Architecture and Landscape*, Charlottesville, Va.: The University Press of Virginia, 1994, pp. 216-217.

The log house was prevalent in the Hagerstown Valley due to the dominance of German settlers in the area, who were familiar with the construction methods. However, it is likely that all early settlers, whether of English, Scotch/Irish or German descent, adapted themselves and their respective traditions to this building type due to the ease of erection as previously outlined. Surprisingly, most log houses were well-built as permanent dwellings rather than as crudely constructed rustic cabins. On the Western frontier, the term "cabin" referred to the temporary shelters first built by the settlers and some structures associated with the native population. The following description is written by a frontier traveler, taken from the *Journal of a Tour into the Territory Northwest of the Alleghany Mountains* by Harris:

> *Cabins are built with unhewn logs, the interstices between which are stopped with rails, calked with moss or straw, and daubed with mud. The roof is covered with a sort of thin staves split out of oak or ash, about four feet long and five inches wide, fastened on by heavy poles being laid upon them. . . . If the logs be hewed; if the interstices be stopped with stone, and neatly plastered; and the roof composed of shingles nicely laid on, it is called a log house.*[11]

The typical log dwelling in the town and environs of Sharpsburg more closely resembled the description of "log house," consisting of the hewn log type construction, frequently with full masonry chimneys. Some finely crafted hewn log structures had interstices so tight that chinking and daubing materials were not required to make the building weathertight. It was also usual to find these structures completely clad with whitewashed weatherboard, totally disguising the log construction underneath. This treatment symbolized the social status of the occupants. In the rural setting where social conscience did not rule, the log construction was not so "dressed up."

Internal arrangements of rooms within the typical dwelling and how the rooms were used by the family followed similar patterns in all dwelling types in the region, whether log, half-timbered, frame or stone. The most prestigious material was stone, and these dwellings sometimes departed from the basic plan due to the financial resources of the occupants. The continental German plan that remained popular in the northern colonies contained 2, 3 or 4 rooms clustered around a central chimney and/or stove. Some of the most substantial, early farmhouses near Sharpsburg possess the characteristics of this form.

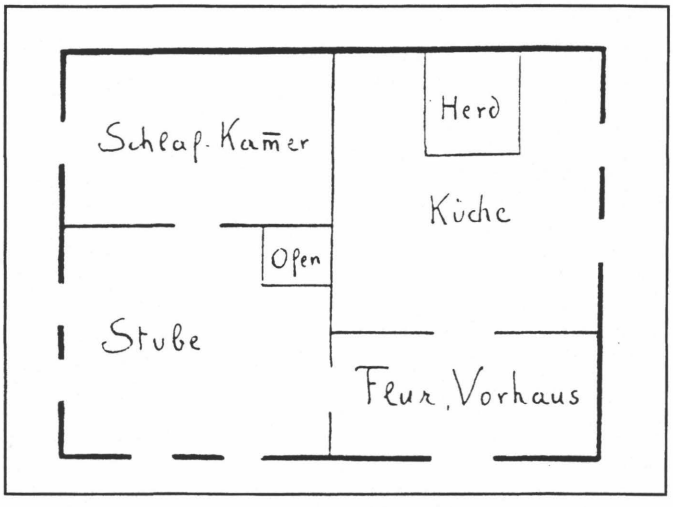



Figure 9. *Plan sketch of German 4 room plan* from "The Pennsylvania German House" by Weaver.

[11] Lounsbury, pp. 55-56.

In the log structure, the room or "pen" size was limited due to the straight length of logs available to form the walls. Many began as structures with one single room or pen, and grew as required with the addition of new cells, still adhering to traditional building forms. This staged construction may not have been recognizable if care was taken to cover the differing sections with a unified covering or cladding material such as clapboards or weatherboarding. A traditional 2 room plan, arranged in a simple linear pattern also originated in southern Germany, where many of the early settlers of Sharpsburg were from. Traditionally, one room acted as the Stube (stove room) and the other, the Kuche (hearth room). The cooking hearth and the stove room were always situated back to back. The Germans were heavy users of the stove, and also adapted ovens to be inserted in the back of the hearth for baking. The Kammer or chamber developed from the Stube, acted as an all-purpose living room including sleeping.

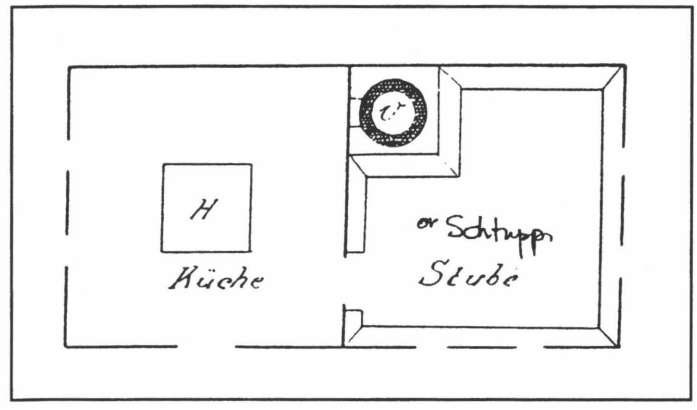



Figure 10. *Plan sketch of German 2 room plan from "The Pennsylvania German House" by Weaver.*

The 2 room plan type also has strong precedence in Britain and France with the variant hall and parlor plan. The separate rooms were connected in a linear pattern, and any additional supporting structures required by the residents were scattered near the dwelling, somewhat resembling former Medieval patterns. This became the southern style of rural development in the colonies and new union because it best suited the hot, humid climate. In the open landscape of the Sharpsburg area, 19th c. maps attest to the fact that farms grew in a planned, orderly fashion, primarily influenced by the natural features of the land. Rocky outcroppings and the resulting rough, undulating topography were prime factors in arranging field locations and homesites. Many dwellings like the *Mary Locher Cabin* utilized the natural rock outcrops for firm building foundations. Bank barns and other minor outbuildings such as the property's root cellar used the natural topography to accomplish functional goals. (see also Figure 6.)

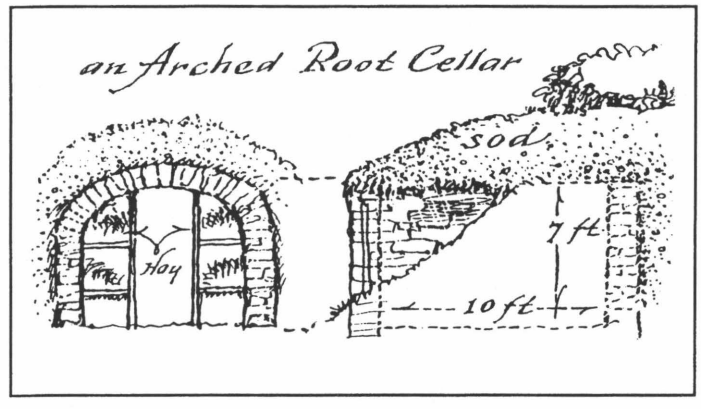



Figure 11. *Sketch of typical Root Cellar from An Age of Barns by Sloane.*

*Made of stone with plaster on the inside, the root cellar of the 1700's was not dug down into the earth; instead, it was placed partly in a bank and then earth was piled around it. The floor was directly at ground level or a few inches above, and the door was wide enough for a wheelbarrow to be rolled through. Just before frost, potatoes, turnips, cabbages, and carrots were taken to the root cellar and put in racks of dry hay. There, with the door toward the west, the greater bank to the north, and a building overhead to protect the cellar from the sun during warmer days, the effect was a comparatively even and mild temperature all year round. Being above ground, it was very dry.*[12]

The pristine appearance of Sharpsburg's farmsteads with a dominant farmhouse and concentrated, but scattered support structures, contrasts with Old World Germany where conditions forced the connection of dwelling units with support structures. Restricted availability of land and harsh climatic conditions lead to the pattern of connecting all buildings into a cluster or line. A tripartite farmhouse is a southern German house-and barn arrangement where all functions were housed under one common roof in a linear arrangement and/or one single summer bean running gable end to gable end. Some of these multi-purpose structures were built in the colonies, and a few reportedly have survived in rural Pennsylvania. This Old World combination (house, barn, stable) building type known as the *Einhaus* in Palatinate Germany, did not remain popular in America where limited land was not a confining factor. [13] However, the efficient pattern of adding additional structures over time as needed in a connected, linear pattern, accommodating needs for storage and increased living and working space was practiced, and is evident at the *Mary Locher Cabin*. This practice of "continuous architecture" became more prevalent in the New England States where the conditions most resembled its European precedent.[14]

Figure 12. *Sketch of Unruh House, Germantown, Pa. Built 1700; demolished – from article by Weaver.*

[12] Eric Sloane, *An Age of Barns*, New York: Ballantine Books, 1974, p. 72.
[13] William Woys Weaver, "The Pennsylvania German House, European Antecedents and New World Forms," *Winterthur Portfolio*, 1986, pp. 250, 257.
[14] Sloane, p. 48.

As the log house migrated in America from the heavily forested lower Delaware Valley across the "high road" through Lancaster to Western Maryland and down through the backcountry of the Shenandoah Valley to Kentucky and the Carolinas and later to the mountainous regions of the West, its typical qualities of construction and materials became more rustic through time. Identification of corner notch treatments is a useful way to identify the prevailing characteristics of the region and the level of refinement of the individual structure.

At the *Mary Locher Cabin*, the National Register Nomination Update suggests that the corner notch pattern is an extremely steep pitched V-notch, generally associated with early settlement (mid 18th century) construction. Riven weatherboard covering the south gable (also extant at the north gable but covered by the timber framed addition) also indicates an early construction.[15] Some boards retain the original bark surface along the thick bottom edge of the clapboard. The prevalence of oak riven lath and use of wrought nails also support the late 18th century construction date for the earliest built log section.

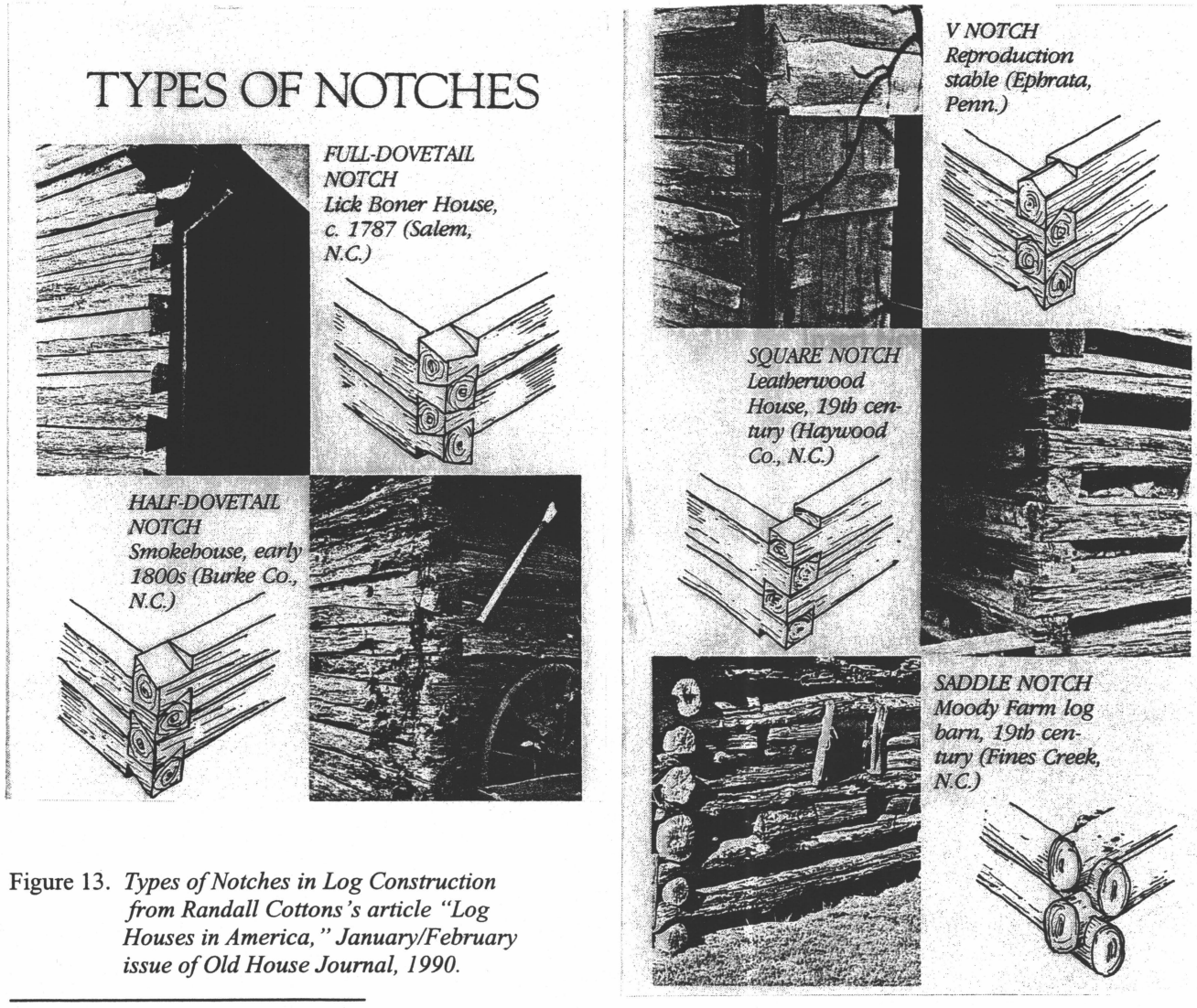
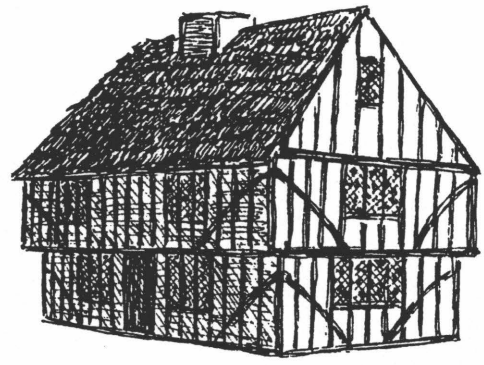



Figure 13. *Types of Notches in Log Construction from Randall Cottons's article "Log Houses in America," January/February issue of Old House Journal, 1990.*

[15] Reed, Section 7/Page 12.

Timber framed buildings, a method of construction with early British origins, were built in the Hagerstown Valley somewhat later than the log and stone buildings that both dated to the settlement period of Western Maryland.



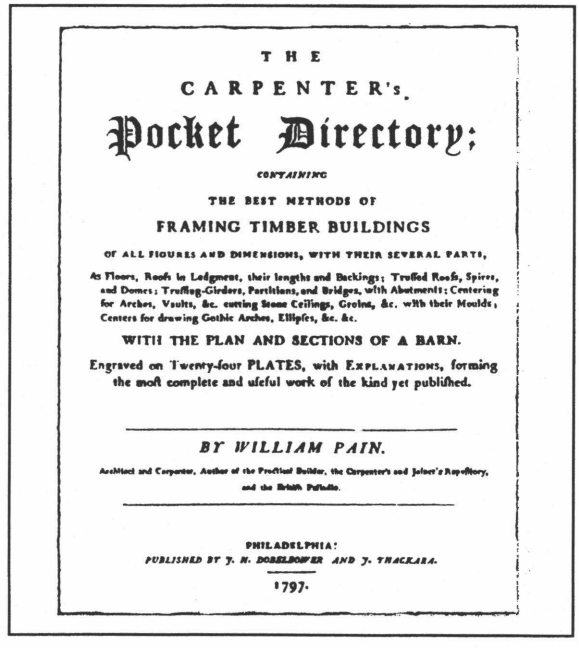
SEVENTEENTH CENTURY HALF-TIMBERED ENGLISH HOUSE WITH THATCHED ROOF

Figure 14. *Sketch of half-timbered English house from Homebuilding and Woodworking in Colonial America by Wilbur.*

> *The half timbered English house had real transplanting problems on this side of the Atlantic. The driving storms had underscored the need for sturdy wooden shingles rather than the traditional thatch (roof). The clay and chopped straw filling between the supporting timber fared no better. The elements soon cracked and otherwise tormented the filler until it was clear that an outer protective covering was a must.*[16]

These problems were solved quickly in the colonies because of the "wealth of wood" available in the virgin forests. Building details were adapted and wood working methods developed that suited the American climate. However, the adapted English timber framed building was only prevalent in the northern regions at this time.

Later, with the publication of building manuals such as William Pain's *The Carpenter's Pocket Directory; containing the best methods of Framing Timber Buildings (with the Plan and Sections of a Barn)* (1797), the "strength and convenience" of this building type began to be popularized in middle America for the "common house," barns, and other outbuildings.



THE
CARPENTER's
Pocket Directory;
CONTAINING
THE BEST METHODS OF
FRAMING TIMBER BUILDINGS
OF ALL FIGURES AND DIMENSIONS, WITH THEIR SEVERAL PARTS,
As Floors, Roofs in Lodgment, their lengths and Backings; Trufled Roofs, Spires, and Domes; Trufling-Girders, Partitions, and Bridges, with Abutments; Centering for Arches, Vaults, &c. cutting Stone Ceilings, Groins, &c. with their Moulds; Centers for drawing Gothic Arches, Ellipfes, &c. &c.
WITH THE PLAN AND SECTIONS OF A BARN.
Engraved on Twenty-four PLATES, with EXPLANATIONS, forming the moft complete and ufeful work of the kind yet publifhed.
BY WILLIAM PAIN.
Architect and Carpenter, Author of the Practical Builder, the Carpenter's and Joiner's Repofitory, and the British Palladio.
PHILADELPHIA:
PUBLISHED BY J. H. DOBELBOWER AND J. THACKARA.
1797.

Figure 15. *Title plate of builder's manual reprinted in An Age of Barns by Sloane.*

[16] Wilbur, C. Keith, *Homebuilding and Woodworking in Colonial America*, Old Saybrook, Connecticut: The Globe Pequot Press, 1992, p. 46.

The same craft and tools that were utilized for preparing logs for hewn log construction were used to dress the timber from logs in a timber frame – the felling axe, the broadaxe, the adze and the drawknife. However, the structure's wall gained its strength from the open post and beam combination, as opposed to the solid, load bearing qualities of the composition log wall.

The basic elements of a typical timber frame include sills, posts, studs, girts, braces, plates, collars and rafters. As in log construction, the type of wood used for the timbers varied depending on what was available locally, but oak, chestnut, poplar and pine were most widely used in the region. When constructed after the advent of lumber mills, sawn members began replacing hewn members in creation of the frame. Interim members to the frame such as studs and joists were typically sawn. Joinery methods followed carpentry traditions and the skill level of the joiner. The most commonly found joints utilized in an average timber frame included mortise and tenon, lap, and bridle joints. Most houses were assembled wall by wall, while barns were usually constructed by raising bents.[17]

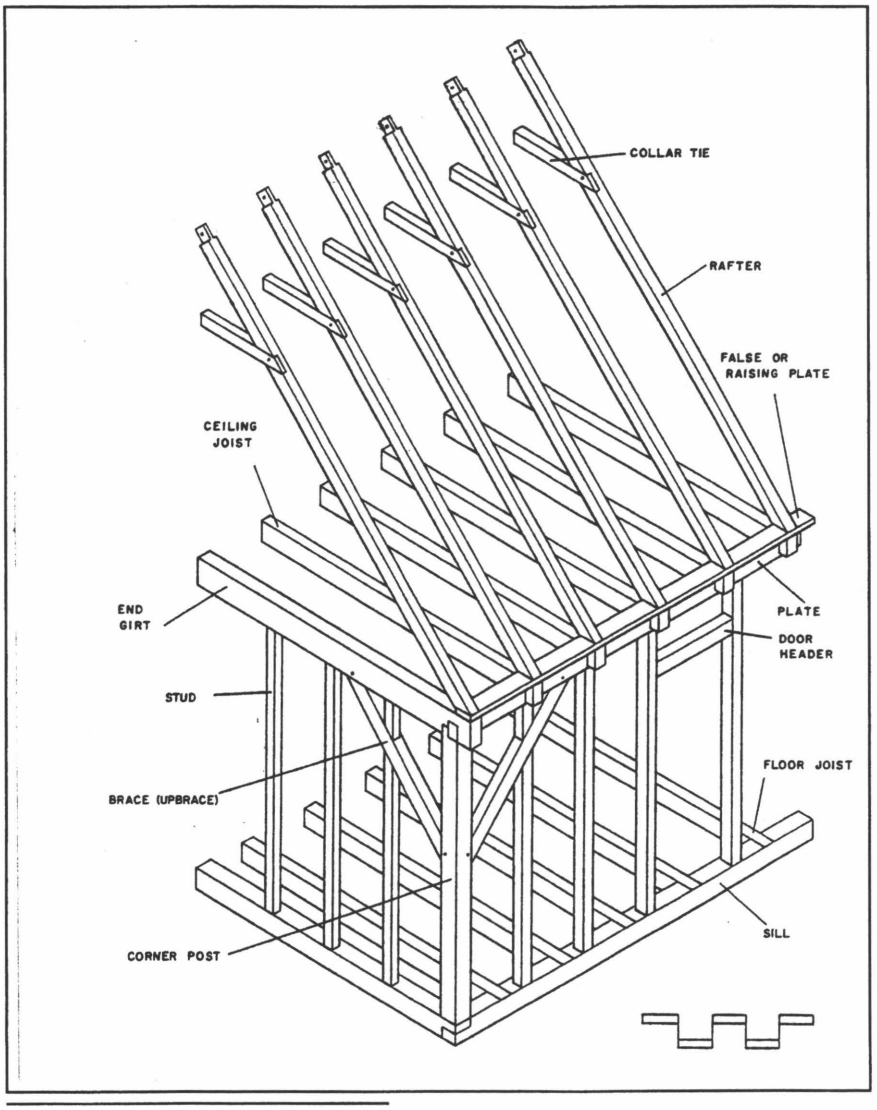


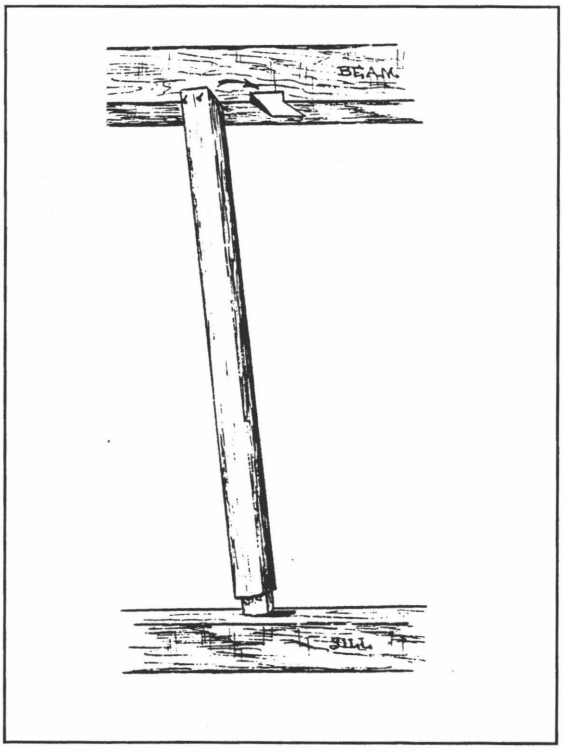

Figure 16. *Diagram taken from Lanier's Everyday Architecture of the Mid-Atlantic.*

[17] Gabrielle M. Lanier and Bernard L. Herman, *Everyday Architecture of the Mid-Atlantic, Looking at Buildings and Landscapes*, Baltimore, Md.: The Johns Hopkins University Press, 1997, pp. 77-79.

Between the major framing post and beam members, studs were regularly placed vertically to provide a nailing surface. Studs were non-weight bearing and were inserted between the sill and beam (or girt) with simple joints. Each had to be flush with the outer timber faces of the frame.[18]

*First, the tenon of the stud was inserted into a sill mortise. Then the beveled top was snugged into a wedge-shaped slot in the beam. The sides of this mortise lap were sawn aslant to match the angle of the beveled stud end, then the wood between chiseled free. A nail or two at the top secured it and the other studs for the outside boards and the inside plaster lathing.*[19]

Figure 17. *Sketch from Home Building and Woodworking in Colonial America by Wilbur.* (on right)



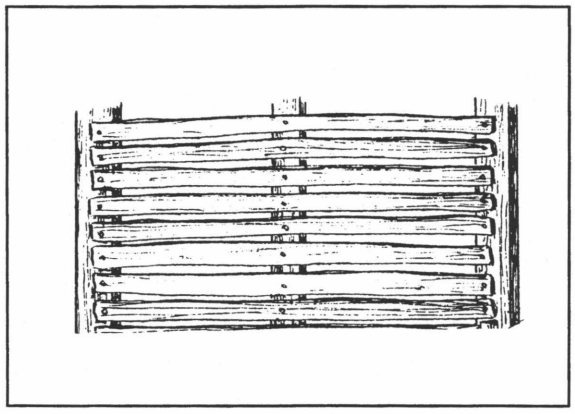



Figure 18. *Sketch of oak plaster lath from Home Building and Woodworking in Colonial America by Wilbur.* (above)

The exterior of the structural timber frame in colonial America was clad either with weatherboards or clapboard, secured at each of the vertical posts or studs. Later alternatives were larger planks spanning vertically between sill and beam, as at many utilitarian structures. At the *Mary Locher Cabin*, a later variation of this is used for the siding material in the form of boards and battens. Clay or brick nogging were the earliest colonial methods of filling the open cavities left between the timber members, but by the 19th century, the gaps were either left empty or stuffed with straw. Evidence of straw stuffing remains at the "cabin." The roof of the timber framed building was typically finished with wood shingles, nailed to (1 by 3) purlins spanning across the rafters, as at the "cabin." The shingles have disappeared, but the purlins remain there.

Interior walls of the timber frame were normally finished with plaster over lath, which provided the insulating qualities that the timber frame did not. Ceilings were not always finished, leaving the floor framing or roof framing above exposed to view. Early riven oak lath was replaced with sawn lath as saw mills were established. At the "cabin," riven oak lath is extant on the walls, with sawn lath later finishing the ceilings. The ability to produce lime mortar and plaster in Western Maryland was aided by the extensive natural limestone deposits in the region.

[18] Wilbur, p. 50.
[19] Wilbur.

# People and Events Associated with the Property and Structure

**Ownership by Speculative Landowners 1736 - 1814**

**Grove-Locher Family Ownership 1814 - 1898**

The migration of the early Groff (Grove) Family through Europe, fleeing from Switzerland to the Alsace Region of France during the persecution of the Mennonites, then to Philadelphia in the Delaware Valley and westward into Appalachia, followed the traditional migratory path of the log dwelling. The parcel north of Sharpsburg – part of "Resurvey of Addition to Piles Delight" that included the *Mary Locher Cabin* was purchased by Philip Grove, a prominent merchant of Sharpsburg, in 1814. His father, Jacob Groff (Grove), was the first of the family to settle in Sharpsburg (1765), just two years after its charter. Philip inherited property in town from his father upon his death in 1819, and continued to add to his holdings around the vicinity of Sharpsburg. Philip may have lived on this parcel north of town, but he bought or built a mansion just west of town in 1821 ("Mt. Airy"), later inherited by his eldest merchant son. Two children, Joseph and Mary, later divided the parcel north of town. Joseph appears to be the first owner-resident of the property who also farmed. Mary Grove Locher, residing in Lancaster County, Pennsylvania, became the new owner of the "cabin," and continued to lease to tenants.

**Poffenberger Family Occupancy and Ownership c. 1840 - 1991**

Because Mary Grove Locher was an absentee owner, she enlisted Alfred Poffenberger, the son of a prominent local farming family, to act as a tenant farmer for her property. Alfred remained the resident tenant through the period of the Civil War and its aftermath. Moving westward after the war (between 1870 and 1877), his younger step-brother George purchased the parcel to add to his property located across the road – then Confederate Avenue. He and his family may have lived in and improved the "cabin" prior to building a well-appointed house sometime around 1900. The property and dwelling remained in the Poffenberger family until purchased for conservation.

**The Civil War: Battle of Antietam Creek of Sharpsburg, Maryland, 1862 and Aftermath**

This defining event in the Civil War and thus, the history of the United States of America took place on ground surrounding the property and the *Mary Locher Cabin*. Many accounts of the battle include descriptions of the then abandoned farmhouse, and the role it played as the day's battle unfolded. Jackson's field hospital was reportedly located on the property in the aftermath. Alfred Poffenberger successfully submitted war claims to the Federal Government seeking funds to compensate for damages to personal property and field crops.

**NPS Ownership and Conservation 1991 - present**

During the decade of NPS ownership, steps have been taken by Antietam National Battlefield staff to stabilize the building known as the *Mary Locher Cabin*, which currently stands in a ruinous state. The stone root cellar has been partly restored, and the altered bank barn and other outbuildings remain along the old road trace. The property has not yet been incorporated into the interpretation plan of the historic Battlefield site due in part to its peripheral location across Maryland Route 65 and unstable condition. Numerous research projects and investigations undertaken by the NPS have continued to add to the understanding of the historic farm property and dwelling, and its comparative role within the greater context of the settlement of the valley.

# Grove-Locher/Poffenberger Farmstead: Ownership and Occupancy

*With information adapted from West Woods Cultural Landscape Report by Joseph, 1994 and National Register Nomination Update for Antietam Battlefield by Reed, Section 8, 1999.*

**Chain of Title:** Property of 225 acres described in Washington County land records as Portion of "Resurvey of Addition to Piles Delight" *(West Woods Report - Property #1 & #5/A)*

1736 First survey/patent called "Piles Grove" or "Piles Delight" granted to Richard Sprigg.
1747 Land patent "Resurvey of Addition to Piles Delight" to Col. Edward Sprigg – 2617 acres
1792 Land advertised for sale – advertisement indicates that land is under cultivation by renters or leasees. Apx. 2000 acres sold to David McMechen, from Baltimore and possibly a number of other investors (1803 tax assessment lists 14 owners indicating another subdivision. This may not have included the property in question.)
1811 David McMechan purchased remaining 600 acre parcel from Col. Sprigg's widow – "200 acres are cleared and the residue covered with the best of timber." This may have been property containing the *Mary Locher Cabin*, and remaining timber the later *West Woods*.
1811 Deed of sale W/606 David McMechan, grantor to John McPherson and John Brien, grantees ("McPherson & Brien Antietam Iron Works" and "Merchant Mill" were going concerns by 1820.) This deed indicated that the property "may have tenants."
1814 Deed of sale AA/80 - John McPherson and John Brien, grantors to Philip Grove

**Division of Property:** *(West Woods Report - Property #1 or A1)*

1840 Last will and testament D/411 by Philip Grove divided property into two parcels: East parcel of 112 ½ acres inherited by Philip Grove's eldest daughter, Mary Grove Locher – married to Jacob Locher (1822) who resided in Lancaster Co., Pennsylvania. This parcel fronted on a farm lane (current Route 65) running north of the town of Sharpsburg and west of the 1840 alignment of Hagerstown and Sharpsburg Turnpike. Currently contains standing structures - *Mary Locher Cabin*, Root Cellar and Barn. During Mary Grove Locher's period of ownership during the Civil War, the farm complex was leased to Alfred Poffenberger who acted as a resident tenant farmer.
1898 Deed of sale 108/162 Philip/Mary Grove heirs, grantors to George Poffenberger, grantee
1991 George H. Poffenberger heirs, grantors to Conservation Fund

**Division of Property:** *(West Woods Report - Property #5 or A2)*

1840 Last will and testament D/411 by Philip Grove divided property into two parcels: West parcel of 112 ½ acres inherited by Philip Grove's youngest son, Joseph Grove – married to Susan Hauser (1836). This parcel, containing buildings forming a farm complex, fronted on a farm lane perpendicular to Taylors Landing Road which ran in a northwesterly direction from Sharpsburg towards the Potomac River. During the period of the Civil War this property was known as the Hauser Farm and contained a strategic high point known as Hauser Ridge.
1868 Deed of sale LBN2/658 Francis Grove, grantor to George Burgan, grantee
1879 Deed of sale 77/662 George Burgan, grantor to William Roulette, grantee
1880 R/W easement of 1.6 acres 79/71 William Roulette to Valley Railroad Company
1970 Deed of sale - 110.9 acres 502/281 William Roulette, grantor to Leon Price, grantee

# Family of Philip Grove

## Citizen of Sharpsburg, Maryland

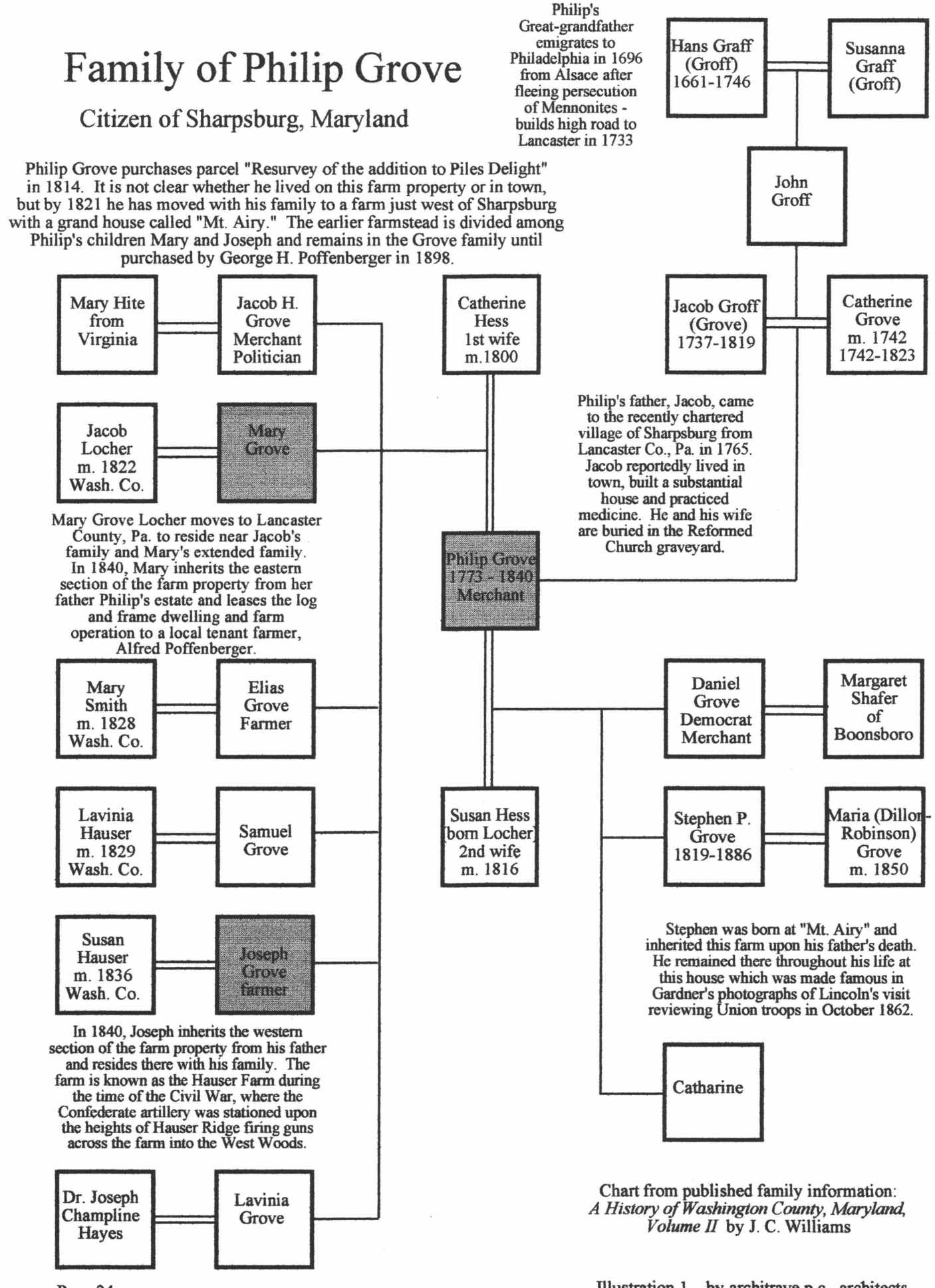



Chart from published family information:
*A History of Washington County, Maryland, Volume II* by J. C. Williams

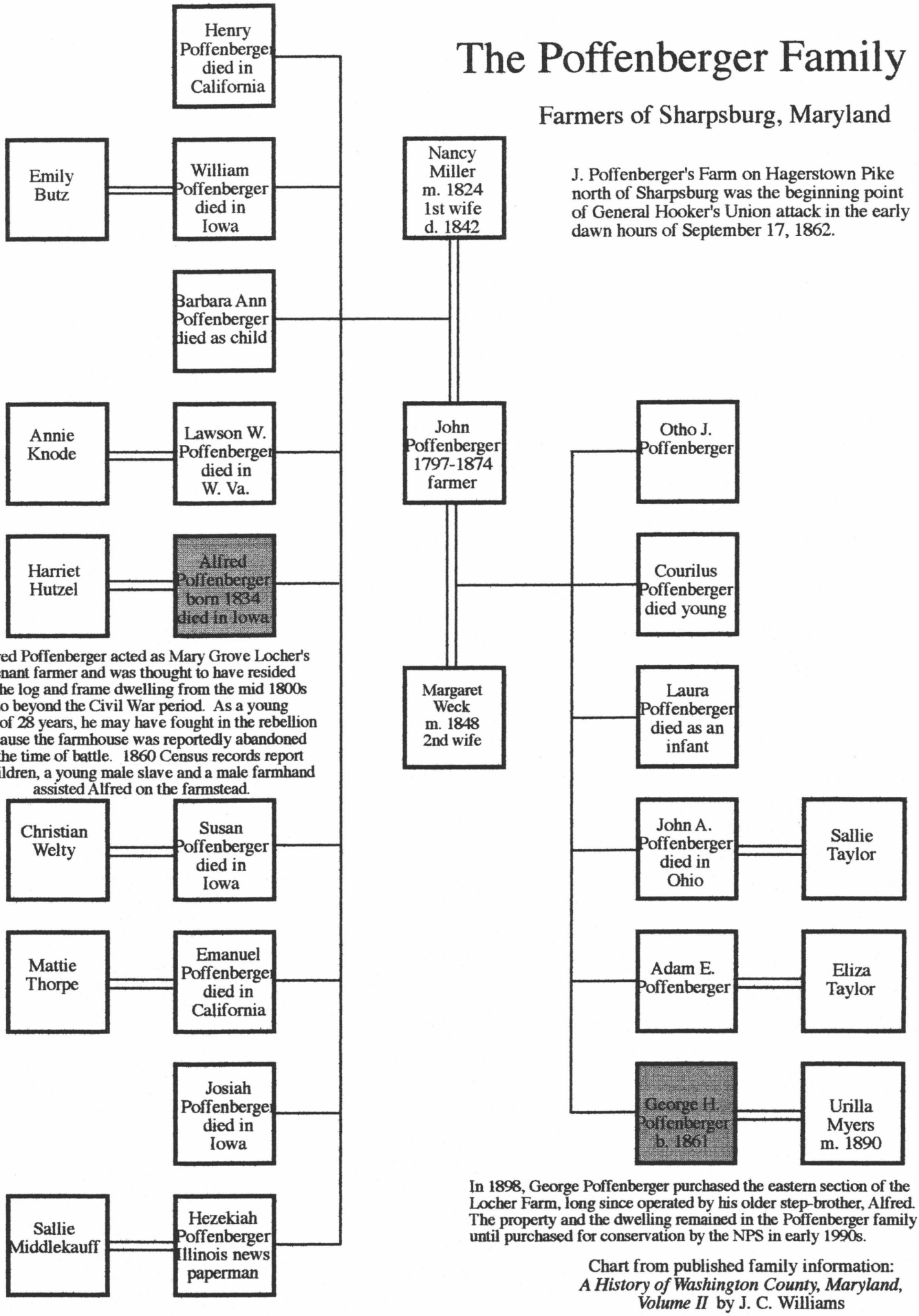


Illustration 1. by architrave p.c., architects

# The Poffenberger Family

## Farmers of Sharpsburg, Maryland

J. Poffenberger's Farm on Hagerstown Pike north of Sharpsburg was the beginning point of General Hooker's Union attack in the early dawn hours of September 17, 1862.




Alfred Poffenberger acted as Mary Grove Locher's tenant farmer and was thought to have resided in the log and frame dwelling from the mid 1800s to beyond the Civil War period. As a young man of 28 years, he may have fought in the rebellion because the farmhouse was reportedly abandoned at the time of battle. 1860 Census records report 2 children, a young male slave and a male farmhand assisted Alfred on the farmstead.

In 1898, George Poffenberger purchased the eastern section of the Locher Farm, long since operated by his older step-brother, Alfred. The property and the dwelling remained in the Poffenberger family until purchased for conservation by the NPS in early 1990s.

Chart from published family information:
*A History of Washington County, Maryland, Volume II* by J. C. Williams

Illustration 2. by architrave p.c., architects

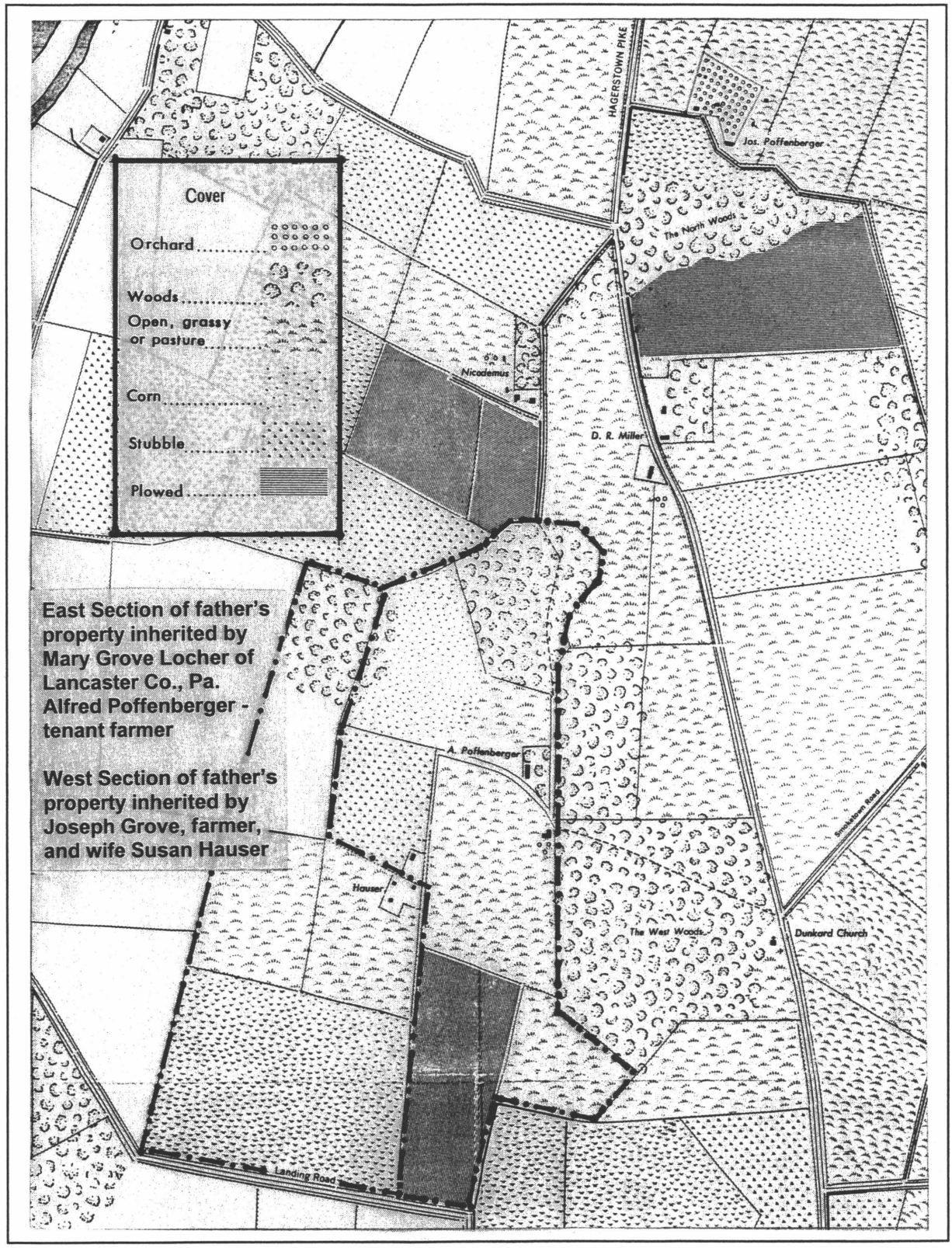
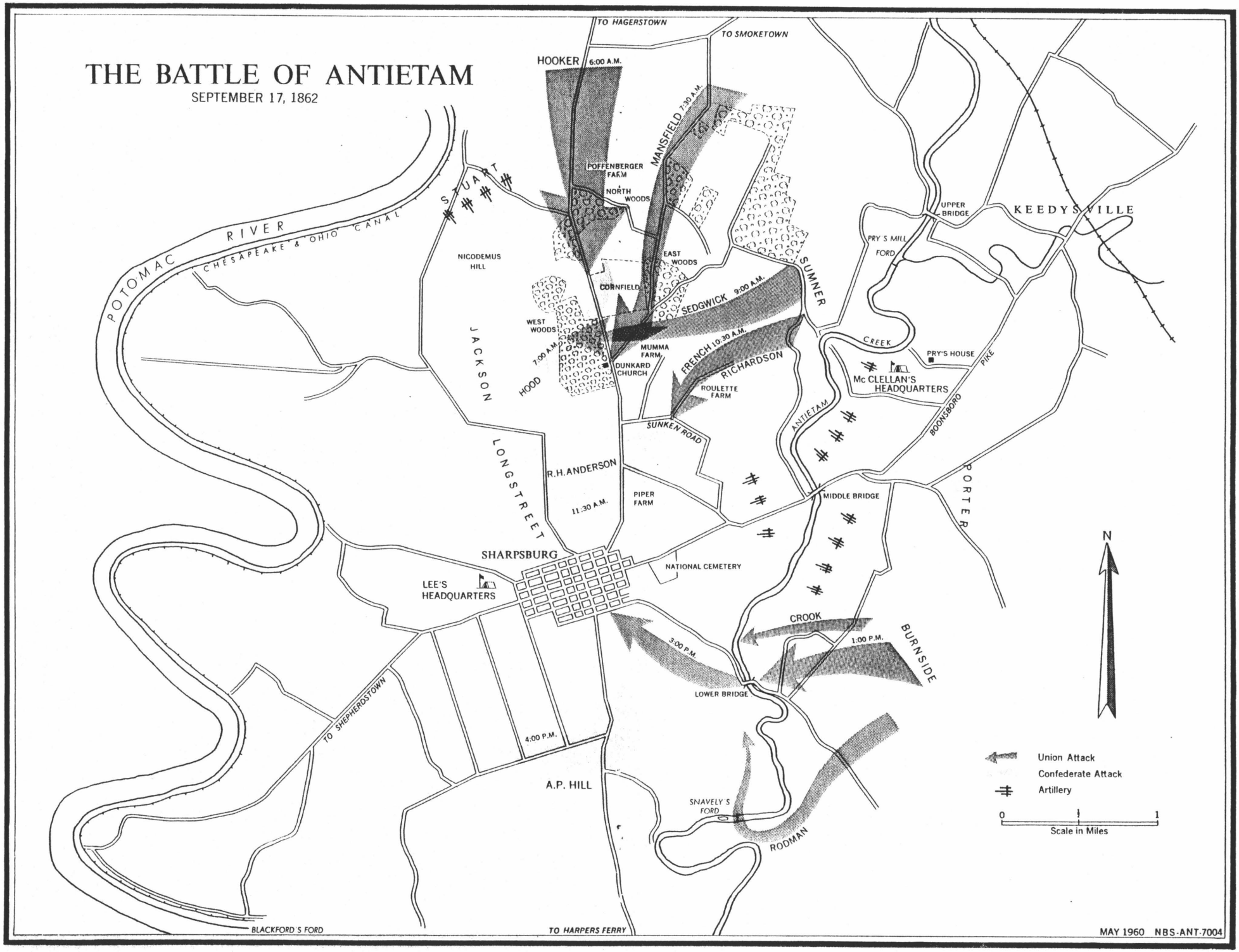



Figure 19. *Map north of Sharpsburg, Maryland showing farm properties on 17 September, 1862 taken from 1963 Printed Map by James D. Bowlby: SITE of the BATTLE of ANTIETAM CREEK Reprinted by Kirby Lithographic Co., Inc., Wash., D.C. for the Parks and History Association, 1972.*


THE BATTLE OF ANTIETAM
SEPTEMBER 17, 1862
TO HAGERSTOWN
TO SMOKETOWN
HOOKER 6:00 A.M.
MANSFIELD 7:30 A.M.
POFFENBERGER FARM
NORTH WOODS
EAST WOODS
CORNFIELD
SEDGWICK 9:00 A.M.
WEST WOODS
7:00 A.M.
MUMMA FARM
DUNKARD CHURCH
FRENCH 10:30 A.M.
RICHARDSON
ROULETTE FARM
SUNKEN ROAD
ANTIETAM
BOONSBORO PIKE
PORTER
MIDDLE BRIDGE
R.H. ANDERSON
11:30 A.M.
PIPER FARM
LONGSTREET
SHARPSBURG
NATIONAL CEMETERY
LEE'S HEADQUARTERS
CROOK
1:00 P.M.
BURNSIDE
3:00 P.M.
LOWER BRIDGE
4:00 P.M.
A.P. HILL
SNAVELY'S FORD
RODMAN
TO SHEPHERDSTOWN
BLACKFORD'S FORD
TO HARPERS FERRY
POTOMAC RIVER
CHESAPEAKE & OHIO CANAL
STUART
JACKSON
HOOD
SUMNER
NICODEMUS HILL
UPPER BRIDGE
KEEDYSVILLE
PRY'S MILL FORD
PRY'S HOUSE
Mc CLELLAN'S HEADQUARTERS
CREEK
N
Union Attack
Confederate Attack
Artillery
0
1
Scale in Miles
MAY 1960 NBS-ANT-7004

# Civil War: The Battle of Antietam, September 1862

**The following notes written about The Battle of Antietam with reference to the West Woods, the Grove-Locher Poffenberger Farmstead/House and nearby properties illustrate the dramatic, lasting effect that the event had on the Grove and Poffenberger families, the citizens of Sharpsburg and the town and landscape they called home:**

**Monday, September 15, 1862 – readying troops and field units for demands of battle**

*Hardship of wartime conditions as experienced by townspeople of Sharpsburg and soldiers:*[20]

- Sharpsburg – left as deserted village when citizens fled to safer, outlying areas– farmhouses were given over to the armed forces for field offices and hospitals
- On the outskirts of town, fences were torn down to expedite troop movements – soldiers later salvaged fence rails for use as firewood
- Union army – was well armed, well fed, and well equipped
- Confederate Rebel army – was weary, footsore, and hungry - troops in tattered clothing

"The baggage and supply wagons of the Army of Northern Virginia were entering Sharpsburg and heading north on the Hagerstown Road. … The troops (Confederate) were very hungry. Finally the order was given for details from each company to enter the fields of the farmers in the Valley of the Antietam. Eight ears of corn were to be gathered for each man. Some of the Confederates urged the Mumma family, living north of Sharpsburg, to leave the farm before the bullets and shells started to fly."[21]

"Soldiers (Union) ransacked nearby **farmhouses** and took all the fruit and vegetables they could carry. They felt justified in this as the government was not keeping them supplied." (as reported by Jonathan P. Stowe – member of the 15th Massachusetts Infantry)[22]

*Criteria for selection of field hospitals:*

"Select the houses and barns most easy of access at such a distance in the rear of the line of battle as to be secure from the shot and shell of the enemy, and such as were well supplied with hay or straw and water. **Barns Preferred.** When circumstances would permit, barns were to be designated as preferable in all cases to houses, as being in that season of the year well provided with straw, better ventilated, and enabling the medical officers with more facility to attend to a greater number of wounded. . . . Hospital supplies were to be taken to all points selected."[23]

Figure 20. *Preceding page – Map taken from Tilberg's Antietam.*

[20] John W. Schildt, *Roads to Antietam* (Chewsville, Md.: Antietam Publications, 1985; reprint ed., Shippensburg, Pennsylvania: Burd Street Press, 1997), pp. 140-141.
[21] Schildt, p. 116.
[22] Schildt, p. 119.
[23] Schildt, p. 132.

**Tuesday, September 16, 1862 – troop movements and preparation for impending battle**

"This morning, a **Mr. Grove** in Sharpsburg invited the Confederates Jackson, Longstreet, and Jeb Stuart to breakfast. The latter two accepted, but Jackson declined. Mr. Grove's daughter, thereby sent breakfast to Jackson's tent with one of Longstreet's aides."[24]

"In the Valley of the Antietam, Robert E. Lee was personally involved in placing his 18,000 men in defensive positions."[25]

*Role of woodlots such as West Woods landscape in positioning strategy:*

"Through the years, the best sections of land were cleared for field crops. The wood from the cleared forest plots was primarily used for construction material for dwellings, barns, fences, and furniture, and for fuel wood. The least desirable land, rocky and shallow soils, was left in old growth forest. To try to gain the most out of the entire property, the management of woodlots was a necessity. Prominent names such as **Grove**, Mumma, and Meyers purchased the land in the early nineteenth century that included the area that encompassed the woodlot, currently know as the **West Woods**. Descriptions of the open character of the woodlots by soldiers (which allowed the rapid advancement of troops through the woods) seem to indicate that the owners grazed animals in the woodlots. "[26]

"That woodlot on the west side of the turnpike – the **West Woods**, it would be called - ran from the Dunker Church northward along the turnpike some 300 yards, where it was cut back to make room for two roadside fields planted in clover. The ground here was sloping and uneven, broken by little ravines and rock outcroppings among the trees, and it was hard to see very much."[27]

"Wherever they could, the Confederates sheltered in the hollows and behind the little rises and the limestone ledges that dotted the fields and woods; the only man-made defense was a rough breastwork of fence rails thrown up in the pasture south of the Cornfield."[28]

**Wednesday, September 17, 1862 – "America's Bloodiest Day"**

*Shots ring out to herald the day long battle:*

Lieutenant A. W. Garber, commanding one of Stuart's Confederate batteries on Nicodemus Hill, would lay claim to firing the opening shot of the Battle of Antietam. However that may be, Stuart's guns and Doubleday's (Union) guns were blazing away at each other as soon as it was light."[29]

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[24] Schildt, p. 138.
[25] Schildt, p. 116.
[26] Maureen DeLay Joseph, *Historic Woodlot Restoration: West Woods, Antietam National Battlefield, Sharpsburg, Maryland* (U.S. Department of the Interior, National Park Service, Eastern Team, Falls Church, Denver Service Center, 1994), pp. 2-3, 8-9.
[27] Stephen W. Sears, *Landscape Turned Red* (New Haven, Connecticut: Ticknor & Fields, 1983), pp. 181, 224.
[28] Sears, pp. 182, 225.

A score of women and children of the neighborhood had taken refuge in the sturdy stone country house on the **Nicodemus farm**, and the scream of the shells flying overhead threw them into a panic. . . . (Reportedly), yankee gunners held their fire while the refugees fled to safety."[30]

"General Hooker's Union plan was to attack due south toward the little Dunker church along the axis of the Hagerstown turnpike. Doubleday's (Union) division would advance from the fields of **Joseph Poffenberger's farm** on the right along the pike and through the Miller farm toward the West Woods." Confederate soldiers were waiting in Miller's cornfield and in the woods beyond. Nearby, the Mumma barn was burning (by Confederate Gen. D.H. Hill's men) to keep it from becoming a stronghold for the Yankees.[31]

"Orders were given by Hooker (Union) to rake the cornfield with artillery fire. He later observed that every stalk of corn was cut as closely as could have been done with a knife, and the slain lay in rows precisely as they had stood in their ranks a few moments before."[32]

*Morning Surprise in the West Woods:*

Pelham's (Confederate) Horse artillery shifted from Nicodemus Hill southward to Hauser's Ridge behind the **West Woods**.[33]

"Gorman's (Union) men pressed on all the way through the West Woods and came out at a **farm lane** that ran along its far edge. Beyond lay open fields. He was now a quarter mile or so west of the Hagerstown turnpike. Pelham's (Confederate) guns opened up once again, at closer range now, and there was a sharp firefight with Colonel Grigsby's (Confederate) pickup force that had survived the earlier struggle with Hooker (Union). Grigsby's men were posted behind the cover of the **house and outbuildings and haystacks on the Alfred Poffenberger farm**, but there were only a few hundred of them.[34]

"The Federal line consolidated in the northern section of the **West Woods**. Union Gen. Sedgwick's three brigades had fairly well crammed themselves into that sector. Gorman's Union Brigade, which held the base of the plateau, fought along a country lane which ran through the woods from the Nicodemus farm part way to **A. Poffenberger's**. Dana's Brigade (Union) stood in line about forty paces to the rear. Howard's Union Brigade secured the plateau near the Hagerstown Pike. The entire brigade was in the woods. The 72nd Pennsylvania (on the extreme left) stood in the forest just below the crest of the hill near the center section of the woods. From the base of the hill, most of Gorman's (Union) men could not see Howard's Brigade because Dana's line and the dense smoke obstructed their line of sight."[35]

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[29] Sears, p. 182.
[30] Sears, pp. 182-184.
[31] Sears, p. 182.
[32] Schildt, p. 148.
[33] Sears, p. 223.
[34] Sears, pp. 223, 224.
[35] John Michael Priest, *Antietam: The Soldier's Battle* (Shippensburg, Pennsylvania: White Mane Publishing Co., Inc., 1989), p. 118.

Sedgewick's (Union) marching men, crossing the Pike unbothered, were ambushed in the **West Woods** by Stonewall Jackson's men, hiding behind rock outcroppings.[36]

"The Second Union Division under John Sedgwick was advancing unsupported and without scouts in front. Straight ahead it came into the **West Woods**, arriving about the time fresh new Confederate troops got into position. Confronted on three sides, the Confederates poured a withering fire into the ranks of the men in blue. And in less than half an hour, Sedgwick's Division was almost wiped out. Two thousand, two hundred, fifty men were dead or wounded."[37]

"The routed Yankees burst out of the woods and ran across the turnpike and into the meadow south of the Cornfield." Farther to the west on the **Alfred Poffenberger farm**, the third of McLaw's brigades (Confederate), under Paul Semmes, struck at Gorman and Dana."[38]

"Upon the old farm that was occupied by another family named **Poffenberger** (Alfred), Gen. Semmes' brigade (Confederate) fought for 10 or 15 minutes before resuming the advance for nearly another half mile, 'crossing two fields and across four fences' before they reached the house, barn and other outbuildings on the Miller Farm."[39]

Massachusetts historian Fred W. Cross' 1921 accounting of the battle recounts: "Sumner crossed the Hagerstown Pike, pushed its way through a rather narrow strip of woods, until its leading regiments under Gorman had begun to descend into the valley where the **log house of Alfred Poffenberger stood and still stands.**"[40]

*Emergency medical attention to wounded:*

"Two field surgeons found the horribly mutilated Lieutenant Ezra Stickley (5th VA) on the parlor floor of an abandoned farm house (**probably A. Poffenberger's**) and prepared to tie off the arteries in the stump of his profusely bleeding right arm. The doctors abandoned him before completing the operation when the Federals hurled several shells through the house. Luckily, a straggler, whom the lieutenant knew, staggered into the room and asked if the lieutenant wanted anything. Water! Stickley needed water! He had a terrible thirst. Unable to find any, the soldier pulled the officer to his feet and dragged him southeast towards the Hagerstown Pike."[41]

"Throughout the night men in hospitals, and those still in the **West Woods** and on the hills near Burnside Bridge called out for water and attention. All through the night the lanterns of the

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[36] Frederick Tilberg, *Antietam: Antietam National Battlefield, Maryland* (Washington, D.C.: U.S. Department of the Interior, National Park Service, 1960), pp. 30-31.
[37] Schildt, p. 149.
[38] Sears, pp. 225-226.
[39] Jay Luvaas and Harold W. Nelson, eds., *The U.S. Army War College Guide to the Battle of Antietam: The Maryland Campaign of 1862* (Carlisle, Pa.: South Mountain Press, Inc., 1987), p. 184.
[40] Fred W. Cross, *Antietam* (Copy of original 1921 manuscript held at Antietam National Battlefield Archives)
[41] Priest, pp. 69-70.

ambulance crews looked for the living among the dead and sought to relieve human suffering and misery."[42]

"Sergeant Edward Moore (Poague's Battery) could not stay long at Jackson's field hospital on **A. Poffenberger's farm.**"[43] For those left behind, the next day would begin the unpleasant task of burying the dead.

"Burial pits for Confederate and Union soldiers were concentrated in and around the **West Woods** because of the high number of casualties in the area."[44]

**September 18, 1862 – battle aftermath and beginning of recovery**

Next day, Lee's Confederate army retreated via the Miller's Saw Mill Road and a glen on the **Grove** farm ("Mt. Airy" west of Sharpsburg) and crossed to the south side of the Potomac. The road to the river was lined with abandoned guns, caissons and wagons.[45] General McClellan did not pursue Lee, insisting that his army required reorganization and new equipment. President Lincoln later removed him from command for this blunder.[46]

"The Hagerstown Pike was built around 1856, making it a relatively new highway at the time of the battle. It was nearly ruined by the armies going back and forth over it. Fortunately for the turnpike company that owned the road, damage compensation was received from the Federal government. Most private citizens were not so fortunate."[47]

According to the war claim filed by **Alfred Poffenberger** (RG92 812/M-917), "the Federal army used the Mary Locher farm after the battle. To the west, the **Joseph Grove farm** (known as Hausers) was also used by the Federal army from September to December 1862 (war claim Joseph Grove – RG92 812/H-4085). The majority of fences were destroyed as were many orchard trees. **Alfred Poffenberger** submitted claims for the destruction of 15 acres of corn and troop seizure of hay, wheat and corn."[48]

*Lasting Effect of battle on the town and valley:*

"The **people of Sharpsburg and its environs** suffered at three distinct levels as a result of the battle. The first was the immediate and residual consequences of having thousands of men and animals come to town, and all the problems that entailed. The second level was the destruction

[42] Schildt, p. 150.
[43] Priest, p. 176.
[44] Joseph, p. 9.
[45] Schildt, pp. 153, 157.
[46] Tilberg, p. 47.
[47] Ted Alexander, "Destruction, Disease, and Death: Battle of Antietam and the Sharpsburg Civilians," In *Civil War Regiments, A Journal of the American Civil War, Volume 6, No. 2: The Maryland Campaign of 1862 and its Aftermath*, ed. by Mark A. Snell (Campbell, Ca.: Regimental Studies, Inc., 1998), p. 152.
[48] Joseph, pp. 9, 11.

wrought by the battle itself which included burned buildings, a scarred landscape, and denuded fields. The last level was the impact of having the dead, dying, and wounded in the midst of the community for days, weeks, and months. All of these factors influenced the economy, ecology, health, and the collective psyche of the community."[49]

"The little farming village had been riddled with shot and shell, scarcely a building escaped. Some homes were plundered, especially those where the residents went elsewhere during the action. In a brick house on the square, there were six holes made by cannon balls. No doubt this was the **Grove** family home. 'Several horses are lying dead in the street and stables.' There was a terrible stench from the dead horses and decaying bodies."[50]

Figure 21. *Famous photographic view of Sharpsburg at time of battle looking westward along Main Street by Alexander Gardner. Copied from "Antietam" by Frederick Tilberg.*
Repository - Library of Congress: Digital ID: cwp 4a39536

[49] Alexander, p. 151.
[50] Schildt, pp. 154-156.

General Fitz-John Porter's headquarters – commander of the Union Fifth Corps – located at the **Stephen P. Grove (step-brother of Mary Grove Locher) house** ("Mt. Airy") and farm –used as a field hospital, men were laying on straw here– some in barns and cowhouses, some in the open air.[51] On October 3, 1862, President Lincoln with McClellan reviewed the Union army here – as recorded in famous Alexander Gardner's photographs.[52]

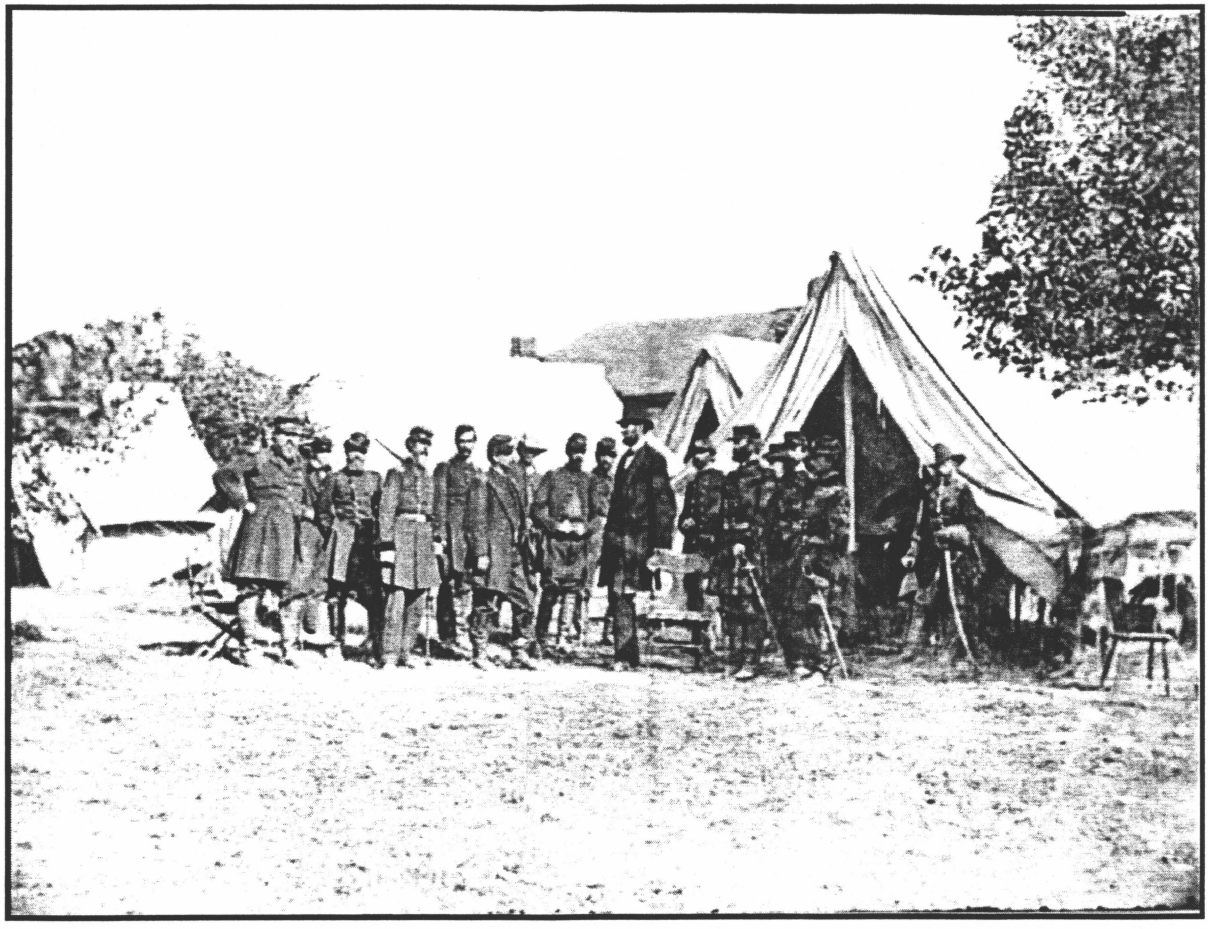


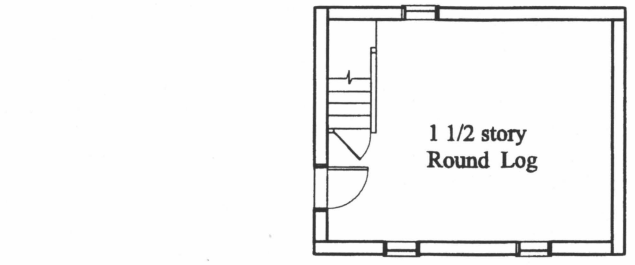
Figure 22. *Famous photograph of Lincoln visiting McClellan and his staff after the battle by Alexander Gardner. Copied from "Antietam" by Frederick Tilberg.*
Repository - Library of Congress: Digital ID: cwp 4a40435

[51] Schildt, p. 156.
[52] William A. Franssanito, *Antietam: The Photographic Legacy of America's Bloodiest Day* (New York: Charles Scribner's Sons, 1978), pp. 276-278.

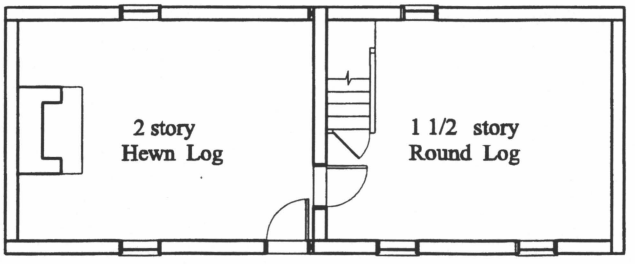
**Facts and Final Statistics:**

- Town of Sharpsburg had 1,300 residents at time of battle.
- Battle of Antietam fought between Confederate Army of Northern Virginia under General Lee, numbering 40,000 men, and Union Army of the Potomac under General McClellan, numbering 86,000 men.
- Combined casualties after twelve hours of combat came to 22,719 - Lee's Confederate losses at 10, 318 men and McClellan's Union losses at 12,401.
- McClellan had 50,000 troops camping in the vicinity of Sharpsburg for at least two weeks after the battle.

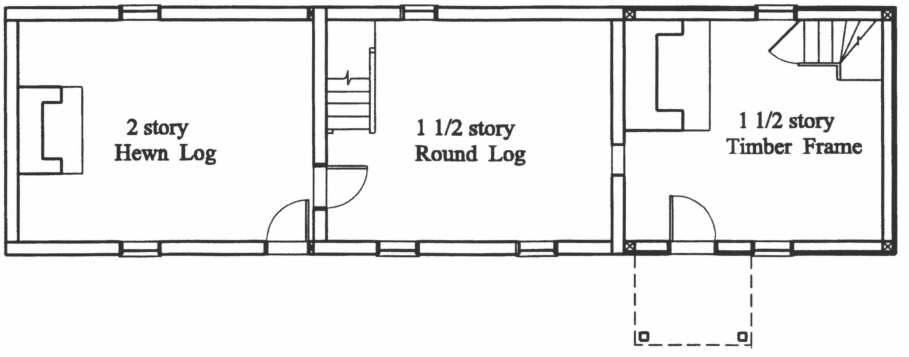
Figure 23. *Scene after the battle along the Hagerstown turnpike, north of the Dunker church. Famous photograph by Alexander Gardner copied from "Antietam" by Frederick Tilberg.*
Gardner Photograph No. 560/Repository - Library of Congress: Digital ID: cwp 4a9529



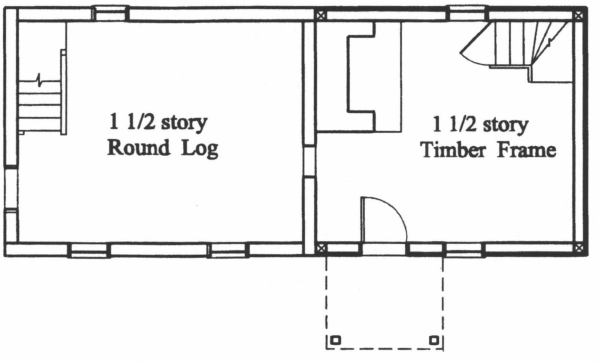

PERIOD I:
by 1811




PERIOD II:
by 1820-30




PERIOD III:
by 1850-60




PERIOD IV:
by 1940

Illustration 3. *Sketch Plan Drawings Illustrate Surmised Chronology of Building Development by architrave p.c., architects*

# C. Chronology of Development and Use

Through examination of physical and documentary evidence, it is possible to establish the sequence in which the three-part structure known as the *Mary Locher Cabin* evolved. The following sources provide documentary clues about the property and the structure:

- Documentation of early habitation occurring on the property contained within the text of Washington County Property Land Records.
- Historic accounts of the Civil War battle with references to the structure.
- Early 20th c. Surveys and Inventories performed by NPS including photographs taken of the structure (1934, 1938, 1940).

The following recent investigations undertaken by NPS provide:

- Historic Woodlot Restoration Study.
- Phase I and Phase II Archeological Investigation of the West Woods including the "cabin" site with analysis of Artifact Recovery, establishing patterns of refuse relative to this building's use and physical evolution. Artifacts recovered from the yard of this building indicate domestic use and continuous occupation from late 18th century (earliest ceramic shard recovered) up until the early 20th century.

The following investigations performed as part of this project provide additional insight with specific application to this property:

- Structural Analysis with Wood Species Examination and Construction Methodology
- Historic Finishes Report – Documents when finishes were applied relative to one another

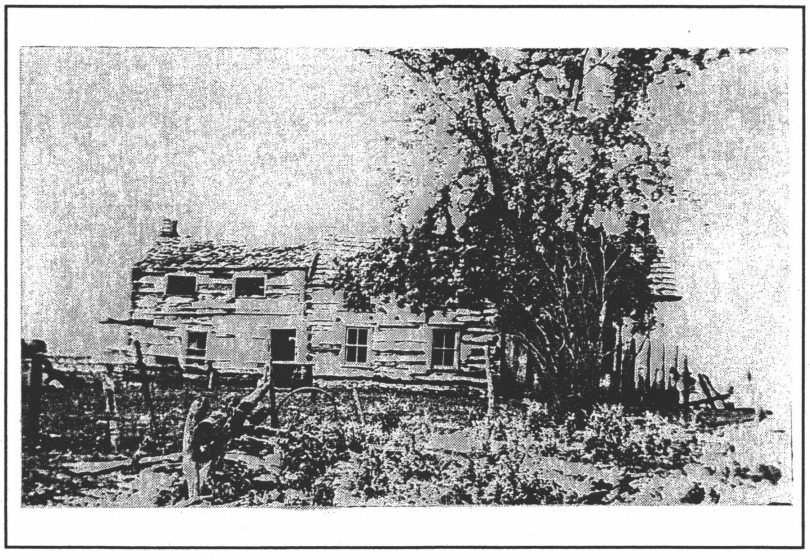


Figure 24.
*1934 NPS Photograph, View of structure from East.*

*Courtesy of Antietam National Battlefield Archives*

Opposite page:

Figure 25. *NPS Photographer and date unknown – taken prior to 1940, View from Southeast*

Courtesy of Antietam National Battlefield Archives

Opposite page:

Figure 26. *NPS Photographer and date unknown – taken after 1940, View from Southwest*

Courtesy of Antietam National Battlefield Archives

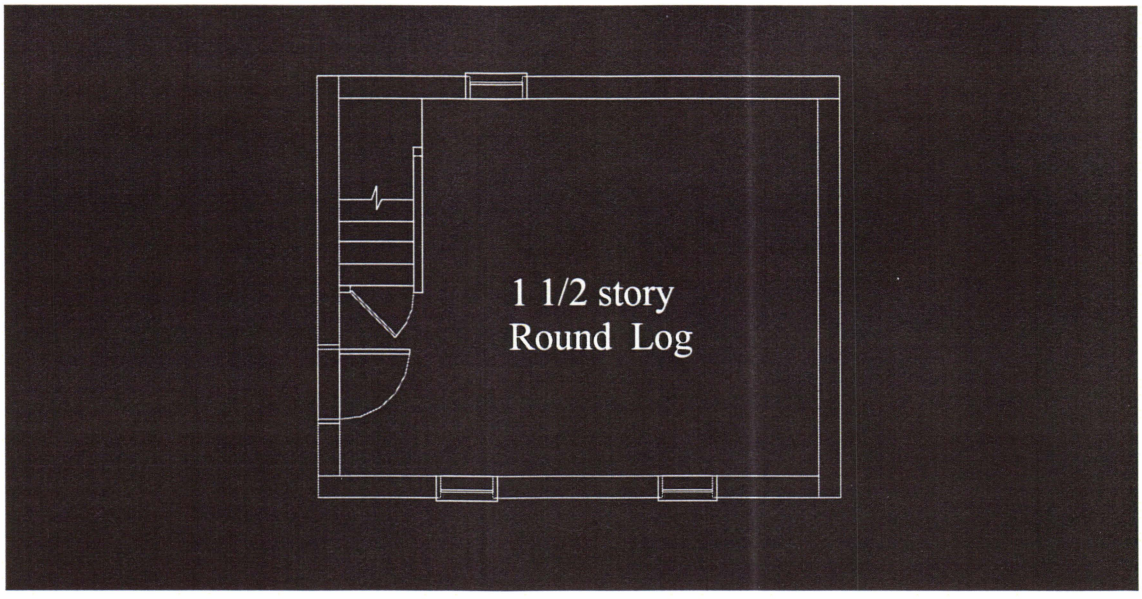
Opposite page:

Figure 27. *Color photographic view of local cabin during 1940s from Holiday Magazine (1947) – recent NPS acquisition. When acquired, this cabin was misidentified as the Mary Locher Cabin; however, this image provides a valuable record of a typical early hewn log cabin in the Sharpsburg vicinity that has reportedly survived the battle and into the 20th century. It's present day location, if standing, has not yet been identified.*

Courtesy of Antietam National Battlefield Archives

**This log cabin,** near Antietam Battlefield, has bullet holes from bloody Civil War battle.

# Developmental Period I: by 1800 - 11



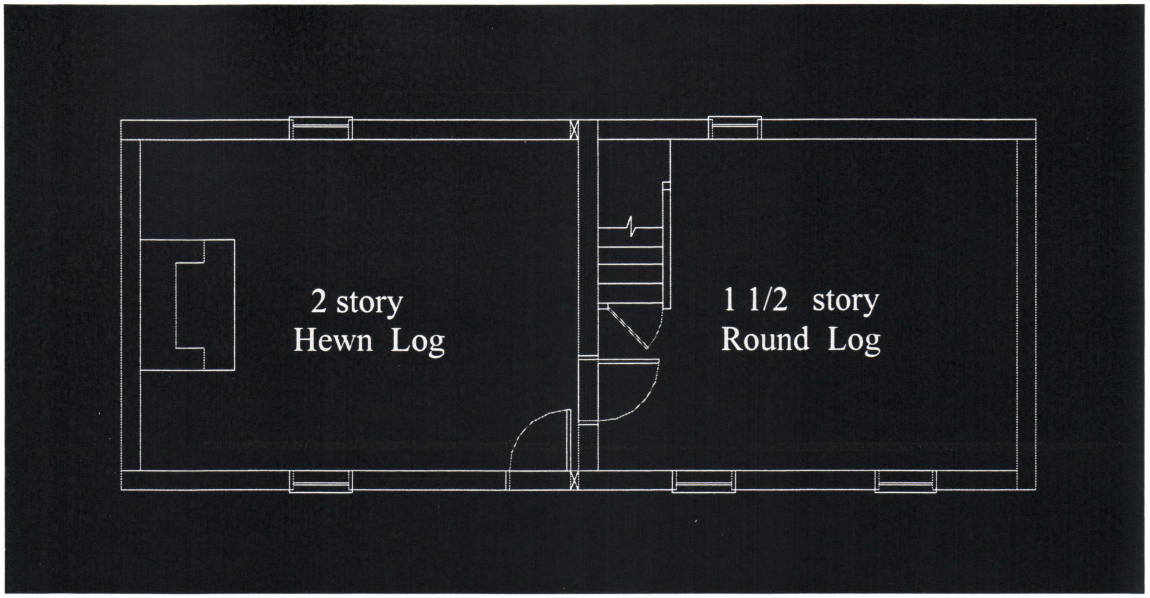

In its earliest form, this structure was a crude dwelling built for a tenant farmer, likely only seasonally used, rather than a permanent dwelling for the landowner. It contained one room for all living and working functions, with an attic or loft for sleeping. There is no physical evidence visible indicating a heat source, but during this time period both "stick chimneys" constructed of wood planks or logs lined with clay, and, in the most rustic buildings, pits excavated into the bare soil floors were used. Remaining evidence of either would be obstructed by later application of interior finishes and building additions. Physical investigation would require removal of this material (plaster & substrate) along the North wall, where the chimney opening would likely have been located. A stove may have been used at this early date.

For a log structure of this stature at the turn of the 19th century or into the first quarter, the interior was likely unfinished, the exterior wall openings were minimal, smaller than current openings, and window units were likely shutters. The roof covering was either wood shingles or long wood staves secured with rods.

**Supporting Documentation and Physical Evidence:**

| | |
|---|---|
| Photographs: | None |
| Structural Analysis: | Wood Species Test indicates first growth red oak heartwood |
| Architectural Evidence: | Presence of hand split clapboard siding, riven oak lath, and rose head nails. Corner notching technique is indicative of early construction. Visible clues of an earlier stove may have been later. |
| Phases I & II Archeology: | Artifacts recovered from the yard of this building indicate continuous occupation (by earliest ceramic sherds recovered) and domestic use. Earliest ceramics recovered in the Southern yard, in direct path from original door location, date from 1790s – 1820s. Therefore, these may be associated with Development Period I. |
| Historic Finishes Report: | No surviving interior finishes (lath/plaster) or coatings date to this period. Only window/shutter on West wall may date to this period. |

# Developmental Period II: by 1820 - 30



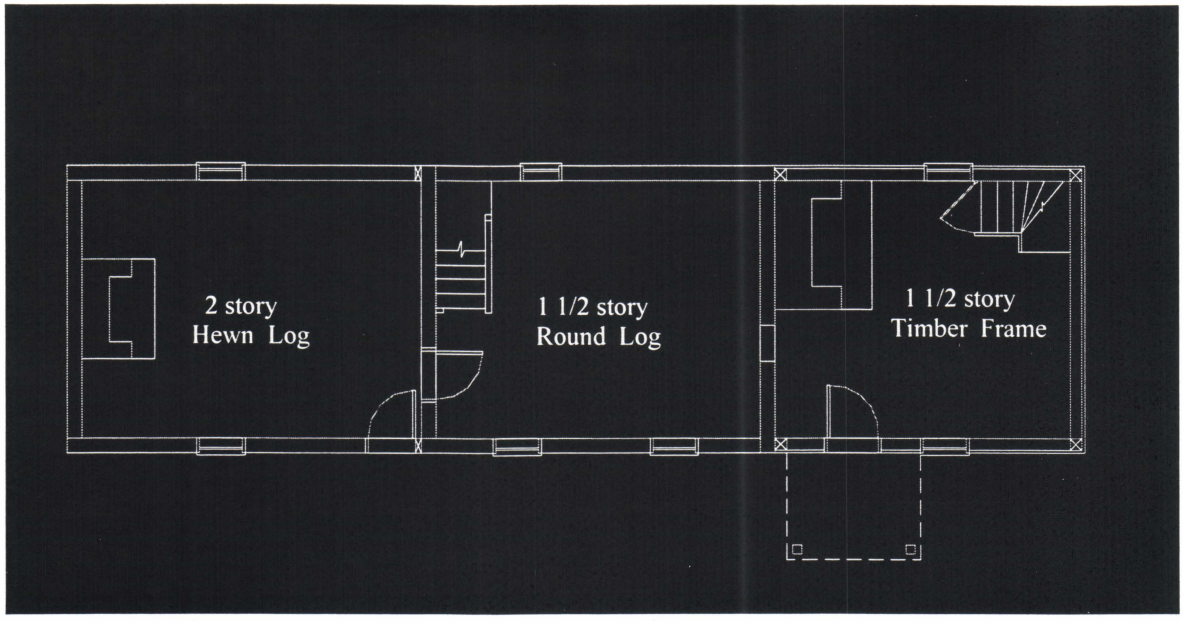

In its second form, this structure (owned by Philip Grove) was likely a permanent, habitable dwelling, lived in by a tenant farmer (unknown), due to its rustic qualities. It contained two rooms for living and working functions, with an attic or loft space in both independent "cells" for sleeping and storage. There is an internal masonry end chimney located in the addition, serving to heat the entire structure (or in addition to earlier heat source). The stair in the round log structure likely also served both, with a doorway cut between the two rooms upstairs.

For a log structure of this stature into the second quarter of the 19th c., the interior was likely finished in simple style, and the exterior wall openings larger than earlier periods, with glazed window units replacing shutters. The roof covering was likely wood shingles.

**Supporting Documentation and Physical Evidence:**

| | |
|---|---|
| Property Deeds: | Property "may have tenants" – stated in 1811 Deed of Sale |
| Photographs: | None during this period, but 20th c. photos depict hewn log addition prior to structural failure. 1940 Waterman photograph after failure indicates interior plaster finish of hewn log addition applied directly to South wall of round log structure. |
| Architectural Evidence: | Extant iron bracket at Southwest corner held vertical post in place against pre-existing log wall. South end gable door opening was likely cut from smaller opening in loft space, above height of logs. |
| Phases I & II Archeology: | Change in refuse patterns began in 1830. Ceramics recovered in the Southeastern yard, in direct path from new door location, date from 1830s – 1850s. Therefore, these may be associated with Development Period II. Artifacts indicate that the tenant had access to/means to acquire fine imported ceramics in complete sets. |
| Historic Finishes Report: | Interior plaster attached to riven oak lath may date to this period. Some window and door units may date to this period at the earliest. Minimal interior coatings date to this period. |

# Developmental Period III: by 1850 - 60



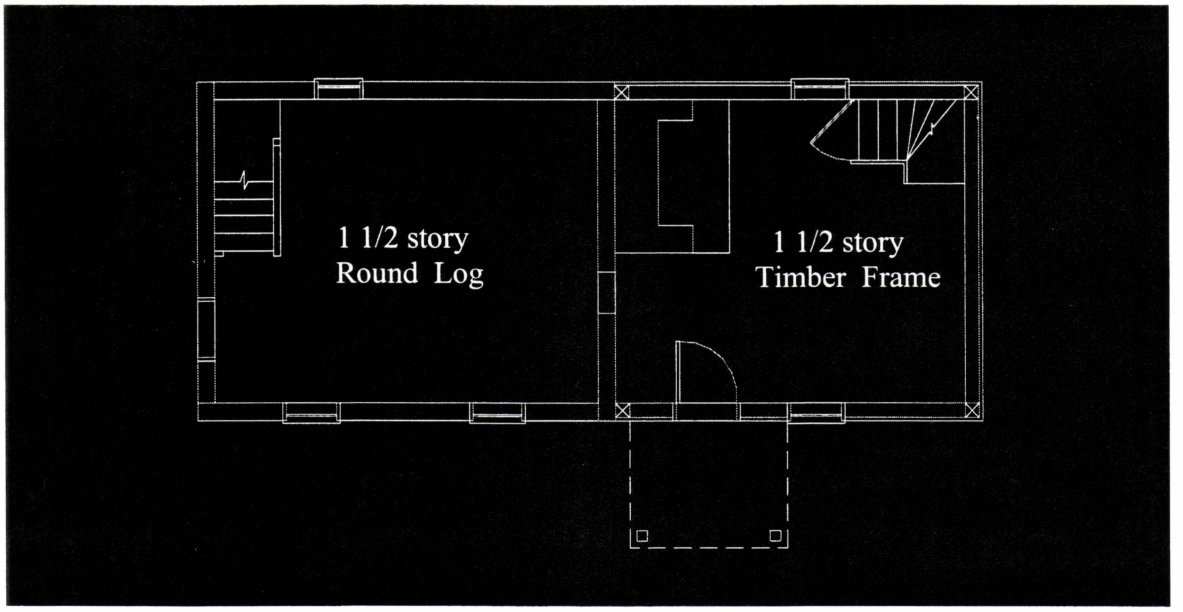

In its third form, this structure was a habitable dwelling occupied by Alfred Poffenberger, tenant farmer, from c. 1840 – c. 1875. By the 1860 census, Alfred and his wife, Harriet, had a young son, a daughter, a male farmhand, and a twelve-year-old male slave. In addition to constructing a new building section, the Poffenbergers may also have redecorated and updated the earlier log building sections. The farm property during this period was owned by Mary Locher of the Grove family, and later by George Poffenberger by the turn of the 20th century. There are periods of time that the farmhouse is reportedly abandoned, as it was during the Battle of 1862. Although serviceable in plan, there were no modern conveniences added. However, the large interior stone chimney in the timber frame addition added new flexibility for domestic cooking. New doorways were cut in the North wall of the round log section to connect with the frame addition on both levels.

Based on photographs taken during the later years of this developmental period and after, the interior walls (not ceilings) are finished with plaster on riven lath, the exterior walls are in good condition with chinking and daubing intact, and the roofing material is wood shingles.

**Supporting Documentation and Physical Evidence:**

| | |
|---|---|
| Photographs: | NPS 1934 and 1938 Survey/Inventory photos. |
| Architectural Evidence: | Greek Revival decorative profiles/motifs at window trim. |
| Phases I & II Archeology: | Artifacts recovered from the yard of this building indicate another pattern change in refuse disposal, corresponding to the new exterior door location in the timber frame addition. No military related artifacts were recovered near the structure, but many buttons found around the foundation may be from field hospital. |
| Historic Finishes Report: | Interior plaster attached to riven lath may date to this period.<br>Window and door units (and trim) most likely date to this period according to finishes analysis and sash/profile styles.<br>First layers of interior coatings likely date to this period. |

# Developmental Period IV: by 1940




In its latest and current form, this structure has not remained a permanent dwelling. Photographic documentation of the demise of the hewn log structure suggests that the building may have been unoccupied at the time (late 1930s). Some minor modifications to modernize the building clearly indicate that there was occasional occupation during the 20th century, perhaps used as a "get-away" cabin by the younger Poffenberger family members. George Poffenberger who purchased this property from the Locher heirs built his stately home across the road around 1900. While the hewn log structure was still intact, he may have adapted this cabin for use during the planning and construction of his new home, partly by finishing the plaster treatment on the ceilings within upper level rooms.

The wood shingle roof was removed and replaced with tin sheeting on the West side just prior to 1940. Plaster finishes applied to sawn lath at Second Floor ceilings in both sections may have been added in the early 20th century. The ceiling of the upper floor of the frame addition was finished with remnants of a grid pattern on the plaster indicating a wallpaper shadow. Remnants of the paper were recovered in this study. The large chimney was fitted with clay pipe to facilitate ventilation of wood burning iron stoves added in both building sections. Evidence remains of a modern fireproof board nailed to the underside of joists near the chimney. The window and door units shown in early photographs remain extant, but in poor condition. The entrance canopy (with tin roof over shingles by this time) was recently removed by NPS park staff for safety concerns. Temporary shoring members have been added to log section.

**Supporting Documentation and Physical Evidence:**

| | |
|---|---|
| Photographs: | NPS 1940 Waterman Photographs, existing condition photographs |
| Architectural Evidence: | Hipped ceilings finished off with plaster on sawn lath. |
| Phases I & II Archeology: | Artifacts recovered from the yard of this building indicate some occupation during the mid-20th century, during this period. |
| Historic Finishes Report: | The top layer of painted plaster and wood trim indicate some occupation during the mid-20th century, during this period. |

Plate 1. Entry to building site from abandoned farm lane, which crosses the current Hagerstown Pike. Vaulted stone root cellar, covered with sod, marks former stone path leading to dwelling. Photograph by architrave p.c., architects – 9 February 2000

# D. Physical Description and Condition of Building Fabric

## Location and Landscape

The dwelling known as the *Mary Locher Cabin* is set upon a rocky knoll situated just west of the current alignment of the Hagerstown Pike, 1 1/2 miles north of the town of Sharpsburg in Washington County, Maryland. The historic turnpike route to the east of the current path followed a low north-south ridge line dividing the land mass between the Potomac River located to the west and the winding Antietam Creek located to the east. The pristine, pastoral setting of the peninsula, punctuated with rolling, rocky hills is characteristic of the terrain of Western Maryland. This gentle, open terrain with zones of densely forested woodlots hiding limestone outcroppings, however, proved deceptive to the army scouts who judged it in comparison to the more pronounced and dramatic terrain south of the town of Sharpsburg, near the mouth of Antietam Creek. These factors were strategic in the staging and unfolding of the infamous Civil War battle which ever after altered this landscape.

## Site and Structure

At the base of the knoll to the south is a recently restored root cellar, of vaulted stone construction, covered with sod. From early pictures, the path to the dwelling wound around the east side of the gentle rise up to the front door on the east side of the combination log and timber frame dwelling.

The structure sits above an abandoned farm lane, which once crossed a dense woodlot in a southeasterly direction from the property, to access the historic Hagerstown and Sharpsburg Turnpike. An intersecting farm lane running north from the dwelling, now indistinguishable due to the rerouting of Maryland Route 65 around the primary battlefield site, connected the Locher Poffenberger farmstead to the adjacent Nicodemus farm complex. The lane continued northeast from there until its terminus at the turnpike where a tollgate was located during the 1800s.

Figure 28.
*1934 NPS Photograph,*
*View of structure from southeast.*

*Courtesy of Antietam National Battlefield Archives*

The extant structure consists of two side-gabled sections, built independently. To the south, measuring roughly nineteen feet by sixteen feet deep, and oriented in a north south direction, is a one room, one and one-half story round log structure. To the north, and measuring roughly seventeen feet by sixteen feet deep, is a contiguous one-room structure with matching ridge line, sheathed in vertical board and batten siding.

From survey photographs taken in the region of the Antietam Battlefield by the National Park Service in 1934, a third building section is in evidence, connected in a linear arrangement to the south of the round log structure. This one room, two story section of similar dimensions to the adjacent round log section, was composed of stacked hewn logs at the three exposed walls. Vertical corner posts supported the log ends at the juncture between the two structures. A substantial iron strap that apparently provided the structural connection between the log buildings, remains visible today, secured to the exterior of the round log structure at the southwest corner. A series of photographs taken in the spring of 1940 by Thomas T. Waterman, an associate architect of the National Park Service identifying architecturally noteworthy buildings for future *Historic American Buildings Survey* projects, found the section composed of hewn logs in a ruinous state, with collapsed materials remaining in place on the ground. Currently, there is no visual evidence of that structure.

Plates 2 and 3. *View of the Mary Locher Cabin from the Southeast, above, and the Southwest, below*
*Photographs by architrave p.c., architects – 9 February 2000*

While the two extant bays have a similar volume, and nearly matching floor lines and eaves, their material makeup illustrates two different structural methods. The following narrative descriptions will consider the exterior of the log portion first, and then the timber framed portion:

## Characteristics, Features and Condition of Round Log Section Exterior (Dating to Developmental Period I)

The dwelling structure is supported on a series of natural limestone rock outcroppings, with horizontal courses of indigenous angular and flat fieldstones, originally dry laid, as infill in gaps along the perimeter base. This solid foundation provides a level surface for the partly hewn sill log that supports the stacked wall of logs above.

Plate 4.
*Detail of Southeast Corner of Log Section showing stone fieldstone foundation - freshly mortared - and deteriorated condition of round logs at the supporting corner notch.*

*Photograph by architrave p.c., architects – 9 February 2000*

The measurement of the round logs, some with the bark left intact, vary from 7 to 9 inches in diameter. The technique utilized by the builder to provide structural stability to the stacked log composition resembles a saddle notch pattern, but with a distinct "V" shaped groove carved from the log bottom rather than a round shaped notch. The log interstices are chinked with flat field stones laid diagonally with some split or hewn logs as occasional infill and daubed with a rough mortar mixture, providing an insulating, weatherproof wall when in good condition. The logs are in varying states of decay, and most mortared joints are crumbled, with the remaining chinking exposed to weather. There are a few spots on the rougher log surfaces where layers of whitewash remain in evidence, indicating that the log walls were never encased with a weatherboard sheathing, as was typical in this geographic region. Where logs are severely deteriorated and portions missing with chinking lost, the vertical oak riven lath supporting the interior plaster finish is dramatically exposed to the exterior.

Plate 5.
*Detail of Southeast Corner of Log Section showing corner notch detail.*

*Photograph by architrave p.c., architects – 9 February 2000*

Plate 6. *Detail view of condition of log end at a second floor joist. Chinking and daubing are missing. Photograph by architrave p.c., architects – 9 February 2000*

Ends of round log second floor joists, set at roughly 2 feet 10 inches on center, extend from the face of the building between the seventh and eighth log course from the base at the east and west elevations, bearing directly on the perimeter logs. Likewise, round log rafters project beyond the wall above, and are notched to bear on the top log course. A newer tin metal roof extends down over the rafters on the East side, and an older section of rusty tin roofing covers the West side. This material appears to have been put in place sometime after the NPS 1934 survey that shows a highly deteriorated wood shake roofing system and before the 1940 T. Waterman visit.

Plate 7.
*1934 NPS Photograph,*
*West Elevation of Structure*

*Courtesy of Antietam National Battlefield Archives*

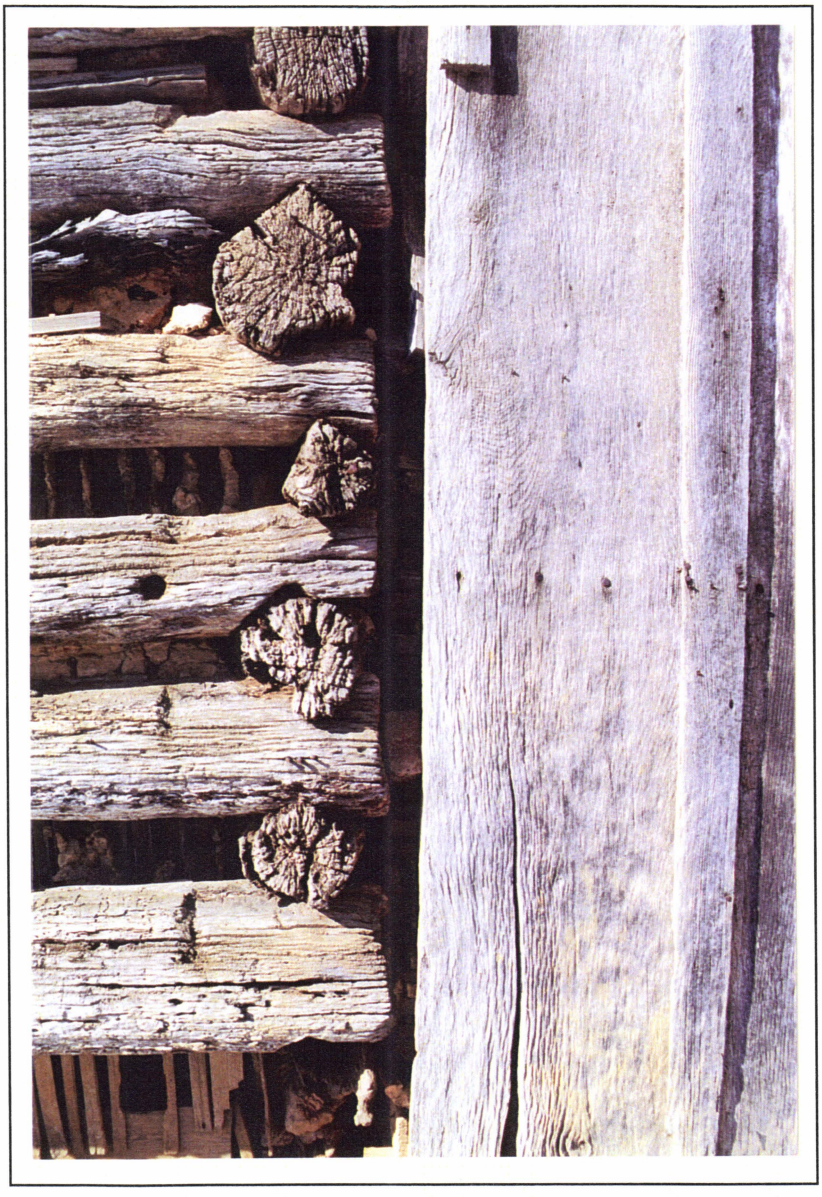


Plate 8.
*Detail of Juncture of Log Section with Timber Section at East Elevation.*

*Photograph by architrave p.c., architects – 9 February 2000*

**East Elevation - Round Log Section**

- Ashlar stone foundation at roughly 12-16" above grade – deep rectangles with flat rectangles
- 11 log courses – 7 below Second Floor joists and 4 above
- Bottom right log sill gone – as is center and left south end top log where dark discoloration indicates evidence of smoke damage or progressive decay
- Log infill between Second Floor joists – 6 joists between end walls
- Little mortar remains this face, but some rough logs still have evidence of whitewash
- Logs: 3 to 6 have holes with wooden pegs – or just holes (2 at South end, 7 between windows, 2 at North end)
- 2 vertical double-hung windows at First Floor – 4 logs high – covered with corrugated metal, windows have 2/2 (vertical) wood sash, framed in trim with profile

- 1 horizontal window at Second Floor - 2 logs high – slightly offset south of left First Floor window, 2/2 double-hung set on side with plain trim, but trim piece prohibits operation of sash
- Window sashes have wooden pegs, but trim secured with metal nails – combination of square and round heads
- Logs continue above window and below Second Floor– also at roof eave
- Some split or hewn logs as infill – can see adz marks on some (and some short scrap boards)
- Several logs at north end – apparent vertical column of cut nails –as though something were attached vertically
- At juncture with timber structure, the logs turn back at the corner to form the North log wall, exposed in Developmental Periods I and II – chinking remains visible - at interior of Timber Frame structure, log surface supports lath and plaster
- Horizontal riven lath, at 3-4" between end of logs (11 log courses) and corner post of frame structure

**South Elevation - Round Log Section**

- Foundation drops slightly to west – West corner built on field boulder
- Sill log at level 1 log course below side walls (East and West elevations)
- 11 log courses to eave – eave course 1 log below side walls
- Gable end - Horizontal Clapboard above eave – secured to vertical members running between end girder and rafters
- Sill log shaped at door opening – squared off at face – can see axe mends
- At door opening, sill log notched 2-3" for threshold – 1" x 6" board each side of door opening – frame is attached to logs with square head nails (several look like rose head)
- Log at door head notched for frame – V-notch
- Several diagonal saw marks at top right frame but mostly very smooth with weather
- Log at head of door also continuous below door in gable above – is at Second Floor level and last tie log – only tie log this end - log notched for door sill above
- Gable door almost centered on gable peak, but slightly to right - left edge of First Floor door aligns with right edge of Second Floor door
- Much of outside face of mortar has whitewash
- Lath exposed – vertical at First Floor, horizontal with furring (vertical) at floor level – vertical to eave – horizontal above eave (on vertical posts)
- First Floor door off hinges– (is in interior) vertical boards (several missing) with 2 horizontal boards nailed together with square or rose head nails, painted on inside face – hook and thumb latch on inside, lever on outside
- Second Floor door also vertical board – tongue and groove with beaded edge
- Roof material (metal) turned down and tacked at rake board
- 2 log courses below eave on west side is heavy metal strap, roughly 1 ½" x 12" with 4 rose head nails – appears to have secured corner post of former hewn log section to extant section
- Log walls splay severely each side due to structural load, especially above Second Floor and on West side
- Splay on East wall seems due to top log deterioration and possible burnt area
- NPS has stabilized with 3 vertical 2" x 6" pine boards (modern lumber) wired to structure

Plates 8 and 9. *View of bracket at Southwest gable end (above) and South door head showing bark intact (below). Photographs by architrave p.c., architects – 9 February 2000*

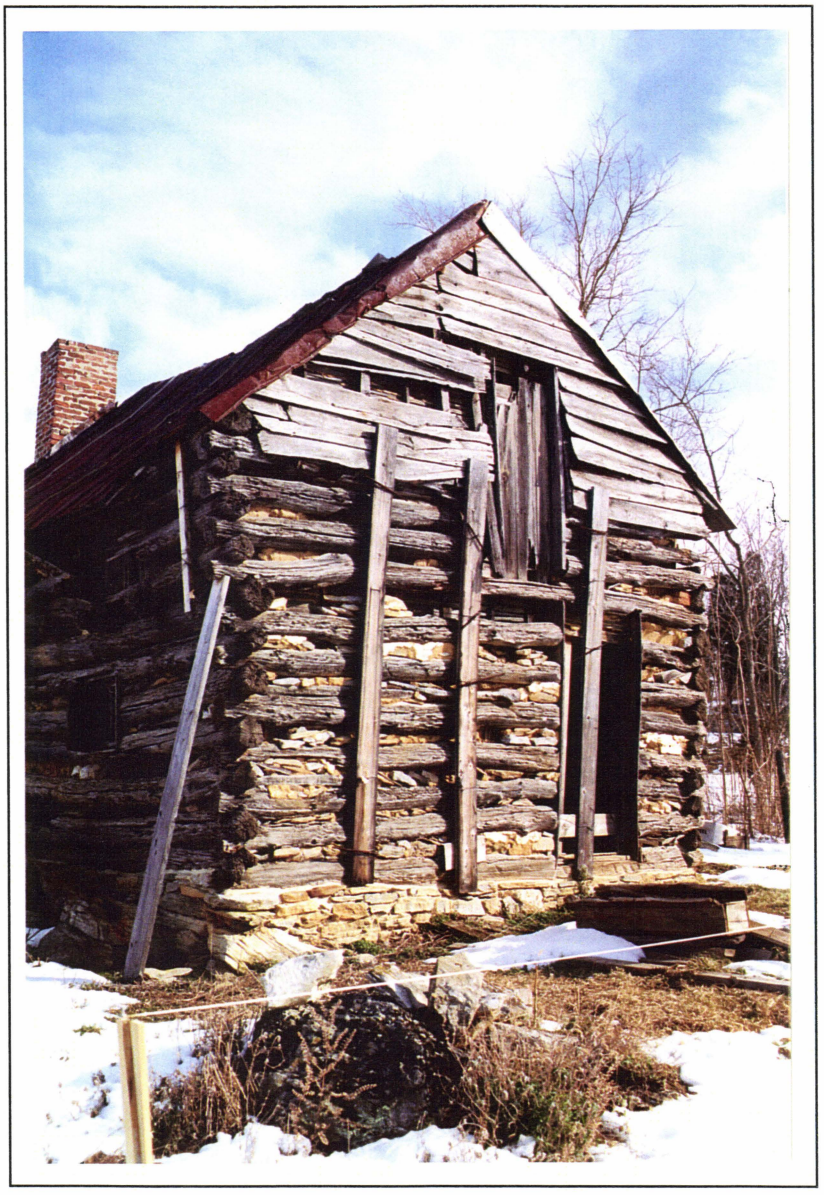


Plate 10.
*View of Southwest corner of Round Log Section showing temporary bracing and shoring members.*

*Photograph by architrave p.c., architects – 9 February 2000*

**West Elevation – Round Log Section**

- Drop in grade at South corner with fieldstone foundation– balance of foundation set on outcropping of rock
- 11 log courses – 7 below Second Floor joists and 4 above
- West side most deteriorated wall – sill log missing north half – next log split above
- Logs at Second Floor gone in entirety above window at center
- Small window – 4 pane stationary with exterior shutter of vertical boards hinged on left
  Nailed together with square heads – hinges have round heads, lots of nail holes in frame
  Logs notched at top and bottom for window
- Fieldstone chinking, diagonally laid, visible in large gap between logs below window
- Much lath exposed this side – especially at Second Floor
- At juncture with Timber Frame Section, logs turn back at corner to form north log wall (exposed in Developmental Period I and II) – can see chinking, even behind stone chimney
- Horizontal clapboard siding visible in gable above eave

- Old rusty metal - tin roof this side
- NPS temporary bracing with 2" x 6" board at South corner from grade to Second Floor

Plate 11. *Detail view of small window on West Elevation and deteriorated condition of logs and chinking materials, especially near foundation. Vertical split lath on interior is exposed to exterior conditions Photograph by architrave p.c., architects – 15 October 1999*

## Characteristics, Features and Condition of Round Log Section Interior (Dating to Developmental Period I)

### First Floor – Round Log Section

The flooring material within the cabin consists of tongue and groove pine boards, 4 – 4 ½" wide, supported by log sleepers set at grade. There are buckles in places due to the long board runs. The floor slopes down towards the west where the material is significantly deteriorated. During the summer months, a woodchuck (or groundhog) was observed living in the ground under this opening. All walls are plastered with flaking paint, the color blue being the most recently applied. A wood base with scoop shape at the top runs continuous along the walls, with the exception of the beaded paneling and stair wall. The southwest corner of the room has a steep straight run stair with beaded wood enclosure and cupboard beneath the stairs. The walls of the stairs are plastered. The flooring material extends through the cupboard with wood base and plaster walls exposed. The cupboard door has a wood thumb turn. The stair enclosure had a door but the panel is missing. However, pieces of the decorative metal hinges are still visible on the frame. The north entrance door is set off center to allow for the stair placement. There is no

trim remaining on the frame, though some nail holes and nails are evident. One hole in the plaster beside the door exposes the split lath beyond. The lath, secured to the logs with nails, runs vertical at this point. The logs may have had a whitewash on the walls below the layers of paint. Several circular holes in the floor above are unexplained. There is a row of miscellaneous nails on the walls at hanging height. Situated near the northwest corner is a metal furnace pan with a corresponding round hole in the ceiling. The National Park Service has recently installed temporary wood bracing, consisting of a 2" x 6" floor plate with five vertical 2" x 6" boards (modern lumber) at third points, that supports the severely sagging Second Floor round log joists.

First Floor East Interior Wall:

- Plaster detail at base at South and North – exposed vertical lath
- 2 windows this wall – shaped window trim with beige paint – these openings likely enlarged from previous small scale windows, and new units installed to match newer building sections
- Window at North end of wall has one pane of glass in top right (2/2 sash)

Plate 12.
*Detail view of 2/2 window sash and profiled trim at East Elevation of Round Log Section.*

*Photograph by architrave p.c., architects – 9 February 2000*

First Floor South Interior Wall:

- Enclosure for straight run stair south half of plan towards West corner
- Horizontal lath at stair and south of door, vertical lath at north of door
- Door has flat 1" x 4" trim (left side missing) - attached with square head nails - one screw at right head

Plate 13.
*View of Southwest corner of Round Log Section interior showing straight run stair and wall enclosure. Panel door is missing from hinges.*

*Photograph by architrave p.c., architects – 9 February 2000*

First Floor West Interior Wall:

- Small window has flat trim – lower right glass pane
- Much plaster, and lath missing, especially near the floor level

First Floor Ceiling:

- Exposed round log joists support 10" wide tongue and groove flooring boards – all painted blue on underside
- 2 round holes in 3rd bay from south and one round hole with metal straps above metal pan
- High shelf attached to 5th bay at west wall – 1" x boards
- Round nails each side joists – regularly placed
- Some joists have plaster between joists and floor - painted

Plates 14 and 15. *View of First Floor East and North walls of Round Log Section (above) and West wall (below). Photographs by architrave p.c., architects – 9 February 2000*

**Second Floor – Round Log Section**

NOTE: UNABLE TO SURVEY COMPLETELY DUE TO STRUCTURAL INSTABILITY

- Straight run stair rises in Southwest corner – simple, open rail with small horizontal boards
- Lath for plaster walls and ceiling exposed – most plaster is off with remnants on floor – lath at knee walls (vertical) and South/North end walls (vertical to shelf height/horizontal above at gable ends) have riven lath – sawn lath at ceiling (indicating later addition of finishes)
- Wood shutters (likely salvaged from another site) laid on top of log rafters - used for nailing surface for replacement metal roof
- Wide random width floor boards covered with fallen lath and plaster fragments – some boards missing and broken - most appear weak and unsafe
- Clay pipe through wall into chimney (part of timber section) –where stove may have been
- Horizontally laid double-hung window situated in knee wall on East side – does not operate
- Door at South gable end has hook and pull (fancy)
- NPS has added miscellaneous shoring boards – set at angles to prop up sagging rafters

Plate 16. *View of Second Floor of Round Log Section in dilapidated state (from North doorway) Photograph by architrave p.c., architects – 15 October 1999*

## Characteristics, Features and Condition of Timber Frame Section and Exterior Finishes (Dating to Developmental Period III)

The later built timber section was constructed upon a stone foundation set at the same level as the previous two building sections. Because the site is rather flat at the point where the additional cell was added, little foundation is exposed there. There is a continuous hewn timber sill plate broken only at the corners where vertical posts extend vertically to the level of the roof plate along the eave line. All major horizontal timber members such as the second floor girt and roof plate at the East and West walls and the raised end girt at the North wall are mortised into the corner posts and set with wooden pegs. 2" x 7" studs run vertically at regular intervals between the horizontal timbers and 3" x 5 1/2" diagonal braces cut into the studs at all corners provide additional stability to the two story frame.

The outer covering of the timber section at the East, North and West walls consists of vertical boards with battens, attached with nails to minor horizontal framing members running between major timber posts. The boards typically measure 1" x 16", and battens typically measure 1" x 3 ½." Generally, boards are deteriorated at the bottom, where they meet the stone foundation and sill timber, thus exposing to weather the 6" x 6" sill plate and bottom of posts. There is some evidence of straw packed into the wall cavity created within the timber frame 7" width, between the outer board sheathing and interior lath and plaster. At the eave line, the boards were notched to allow for the timber rafters that extended beyond the timber roof plate.

The rafters, which rest on a 5" x 7" roof plate in the East and West walls, meet at the ridge without a ridge board, and are braced by horizontal collar tie beams. Purlins that run across the tops of the rafters provide interim support for the roofing material, currently metal. The height of the second floor joists, ridge line and roof slope of this section were set to match the adjacent round log section, so that the two interiors efficiently join with access provided through interior doorways.

A substantial stone chimney was located in the Southwest corner of the timber frame section at the common wall, also providing means for a flue and internal heat source for the adjacent log section. An exterior door that was located at the Southeast corner of this section near the common wall, became the primary entrance for the entire structure upon its construction. A series of stepping stones are still visible which led to this door from the East side of the Root Cellar. A porch roof, set on posts at this door location, was recently removed by the National Park Service due to its failing physical condition and safety concerns for uncontrolled visitors.

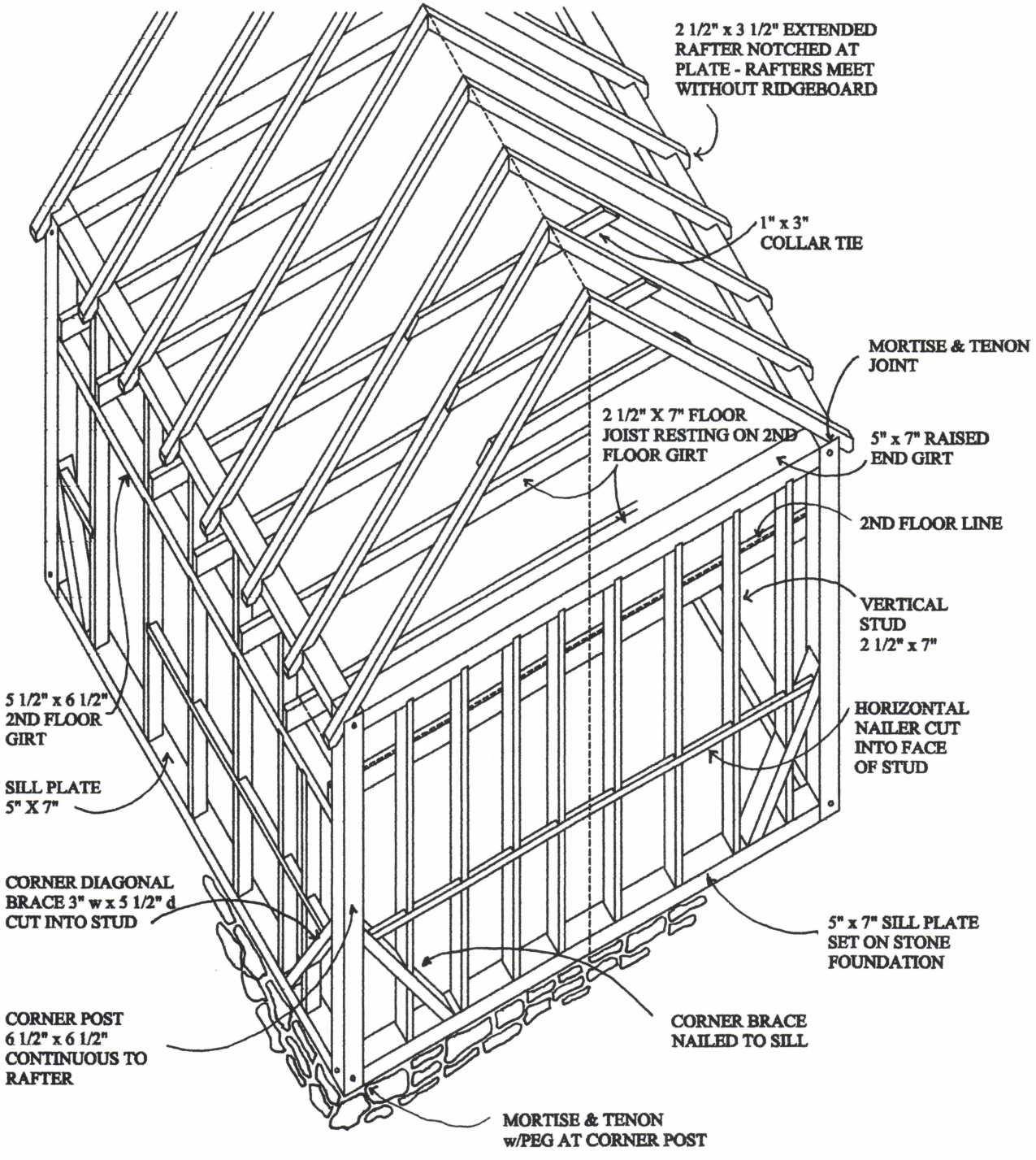



Illustration 4. *Components of Timber Framing System at the Mary Locher Cabin – Sketch reflects Actual Conditions by architrave p.c., architects*

**East Elevation - Timber Frame Section**

- Sill plate, exposed, mortised into post – wooden peg apparent
- 4 horizontal rows of square head nails, attaching siding to framing members – 1 row at eave, Second Floor, one-half height between Second Floor and sill, and at sill plate (nails in plate although wood is deteriorated)
- Door at left, window right – heads align – with plain 1" x 3 ½" trim
- Window has metal panel nailed to front, 6/6 sash below panel
- Siding is gone below window sill – can see vertical post each side, mortised into plate
- Sill plate gone below window – exposed top of stone foundation and stone step up to floor behind where plate would have passed
- Vertical studs (exposed) measure 1 ¾" x 7"
- Similar studs each side door – mortised into plate – stud covered with 1" wide board at door frame
- Vertical board door – hinged on left – LP and other initials scratched in door and frame
  May have been door at outside frame – mortised for hinges for door to open out
  Paint or whitewash evident on frame about door and at eave – mostly white, some blue
- Miscellaneous boards by window and at juncture with log – were parts of the removed porch
- Rafters project to carry furring (purlins) for metal roof - Horizontal strip at top below eave
- Corner post is evident at juncture with round log section - Sill plates (roughly 6 x 6) at First and Second Floors turn back - Siding ends at corner post
- Wood tongue and groove flooring projects over sill plate – can see back of lath and base attached to exterior of frame and at interior of log wall

**North Elevation - Timber Frame Section**

- Gable end
- 1" x 4" (or 5") rake board at eaves
- Vertical board and batten – in gable also, but laps First Floor and is offset
- Horizontal nailing board placed at one-half height between sill and Second Floor
- Window opening in gable – nearly on center - Simple 1" wide plain board frame – batten trim at left
- Wood generally deteriorating w/ horizontal lath beyond exposed
- Wood sill plate continuous, but deteriorating
- Floor boards extend onto plate at Second Floor
- 6 ½" x 6 ½" Diagonal brace exposed at each bottom corner, 3" x 6" notched at vertical studs

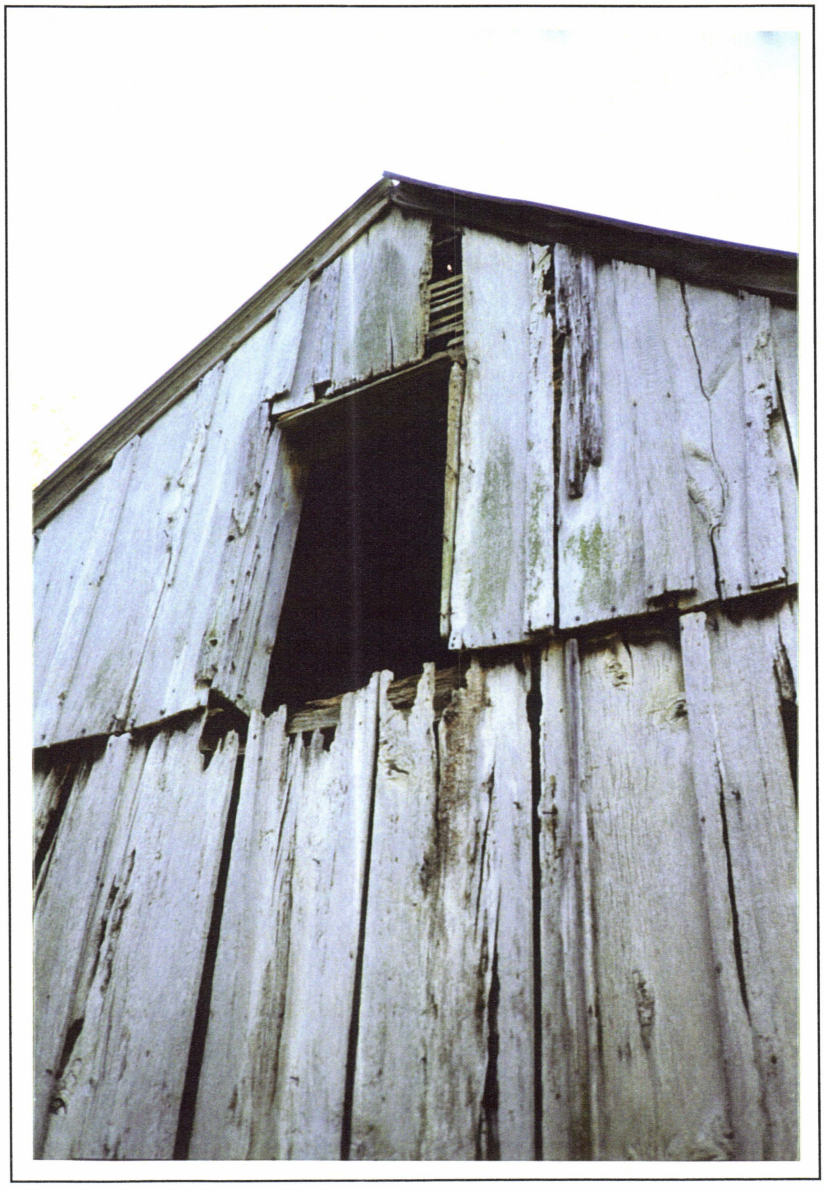


Plate 17.
*Detail view of gable end of Timber Section at North Elevation.*

*Photograph by architrave p.c., architects – 15 October 1999*

Plate 18.
*View of Northwest corner of Timber Section at West Elevation showing exposed diagonal corner brace and corner stair.*

*Photograph by architrave p.c., architects – 15 October 1999*

**West Elevation -
Timber Frame Section**

- Board and batten – deteriorating below window and one vertical board missing at North end
  Missing board (next to corner board) - vertical section exposed to show the following:
  Plate – diagonal brace at corner bottom – may be mortised into plate and post;
  Vertical stud notched for diagonal brace and for horizontal nailing board (1" x 2");
  Studs run from top of sill plate (mortised in) to bottom of Second Floor 6" x 6" plate, rabbeted in; Horizontal lath at First and Second Floor – stud missing between Second Floor sill and eave – lath ends wherever stud would have been and lath has nails/holes
- No horizontal nailer at top
- Window – 6/6 wood sash with simple trim – only one board below sill – exposed lath, base – studs each side – sashes pegged together with wooden pegs, but nails of all types in trim
- At juncture with log section: Siding stops at corner post - Sill and Second Floor plate turn back through stone chimney (built on sill plate to bottom of Second Floor plate) – Second Floor boards extend over plate, base and lath attached to log wall

## Characteristics, Features and Condition of Timber Frame Section Interior (Dating to Developmental Period III)

### First Floor – Timber Frame Section

The flooring material is 3" wide tongue and groove, and the wood boards remain truer than those at the log section, although there is some slope to the Northwest corner. The flooring in the closet under the stair, set into the Northwest corner, consists of wide boards, varying 6" to 8." The boards stop at the former line of a hearth concrete-like material at the massive chimney set into the Southwest corner of the room. The walls are plaster on lath and some walls retain a vertical board wainscot terminating with a simple rail profile at chair rail height. Two horizontal nailing boards are attached to the plaster walls above the wainscot at the North and West walls.

Plate 19.
*View of Southeast interior corner of Timber Section showing both exterior entrance door and interior passage door, immediately left of the chimney, cut in North Log wall to provide access between building sections.*

*Photograph by architrave p.c., architects – 9 February 2000*

The chimney is composed of stone with a plaster coating, directly applied. A hewn timber lintel spanning the entire width of the chimney, roughly 7 feet 4 inches wide, supports the large opening.

The second floor joists and flooring boards, with varying layers of white paint in peeling condition, are exposed at this time; however, there is evidence that a modern thin masonite or asbestos material was tacked to the underside of the joists near the chimney at one time. Perhaps this was to guard against interior fire damage at the location of a stove or heating unit placed at the location of the hearth and vented through the chimney flue.

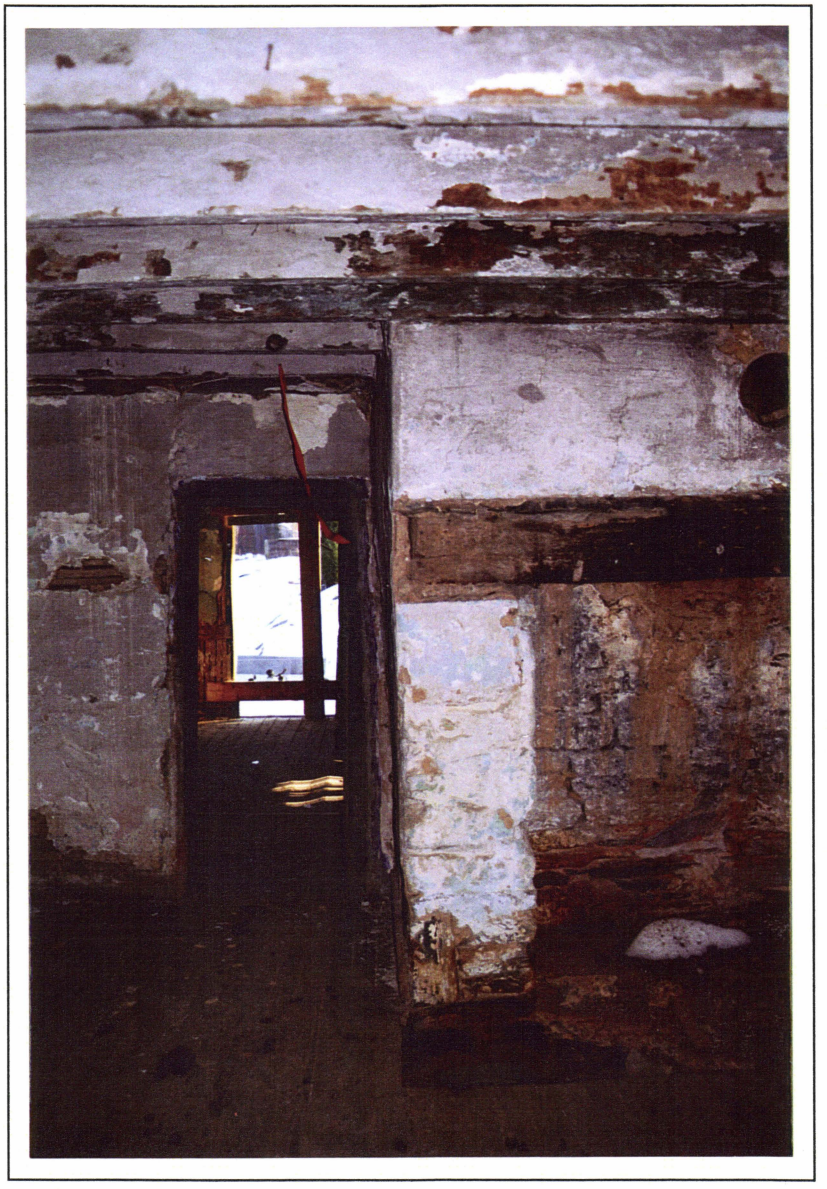


Plate 20.
*Interior View within Timber Section looking South towards the chimney and adjacent Round Log Section*

*Photograph by architrave p.c., architects – 9 February 2000*

*Plates 21 and 22. View of Timber Section West wall at First Floor window (above) and Corner stair (below). Photographs by architrave p.c., architects – 9 February 2000*

First Floor East Interior Wall:
- Wood base – square profile – aligns with plaster
- Beaded wood wainscot below window and between window and door
- Square wood trim at window and door
- Vertical wood plank door with beaded horizontals – hardware remnants consist of applied knob/lock set – knob missing, key hole below – old thumb latch above (deteriorating)
- Wood has dark finish, except base was painted as walls
- Horizontal board between door and window head with nail in it

First Floor North Interior Wall:
- Wainscot base with Plaster wall above wainscot
- Horizontal wood boards, below bottom of joists

First Floor West Interior Wall:
- Wainscot between chimney and stair – stair enclosure beaded board
- Enclosure for stair – side vertical boards, tongue and groove, stained dark – door missing to closet below stairs – closet was plastered and painted – shelves along North wall
- Plain window trim
- 2 horizontal boards in plaster above wainscot with nails for hanging

First Floor South Interior Wall:
- Plaster, base – small door has plain board trim
- Stone fireplace, massive element – stone was plastered over – wood lintel, beveled on inside
  Chimney offset above lintel – round hole with pipe in above lintel
  Hearth – may have been concrete at one time (base for something else?)

First Floor Ceiling:
- Rectangular sawn joists, supporting wide floor boards, painted
- Nails in sides of joists – tacks in bottom of joists
- Winder stairs at Northwest corner

**Second Floor – Timber Frame Section**

The flooring consists of wide boards. This level is also finished with lath and plaster, with the ceiling finish treatment partly following the slope of the rafters and the balance attached to the underside of the collar ties to form a flat center portion. Only large patches of the plaster remain, exposing most of the lath. The extant plaster walls have a distinguishable square grid pattern that is a residual of a former wallpaper. There is a square wood base throughout. The lath installed in a horizontal direction at the knee walls, is an earlier split lath, whereas the lath at the ceiling is sawn cut. It is therefore assumed that the plaster treatment was completed in stages, as evidenced by the photograph, Plate 24, which shows the plaster knee wall extending within the ceiling rafters, beyond the connection with the lath holding the sloping ceiling plaster in place. The lack of a good bit of lath and interior finish at the ceiling exposes the timber roof framing system to view. There is a square hole cut from the lath that indicates a former access panel.

Plates 23 and 24. *View of Timber Section Roof framing (above) and lath/plaster at knee wall and ceiling (below). Photographs by architrave p.c., architects – 9 February 2000*

Second Floor East Interior Wall:

- Plaster on lath, horizontal split lath at knee wall, and horizontal sawn lath at hip
- At hip, row of modern wire nails, 6" length - perhaps for hanging something

Second Floor North Interior Wall:

- Ledge at eave/sill level – formed by 6" x 6" plate or end girt
- Wall above ledge is horizontal lath attached to vertical exterior board siding
- Window or panel frame – 1" x 6", projects in
- Window sash – stored inside – 2/2 – however measurements do not match this opening
- Winder stair in Northwest corner

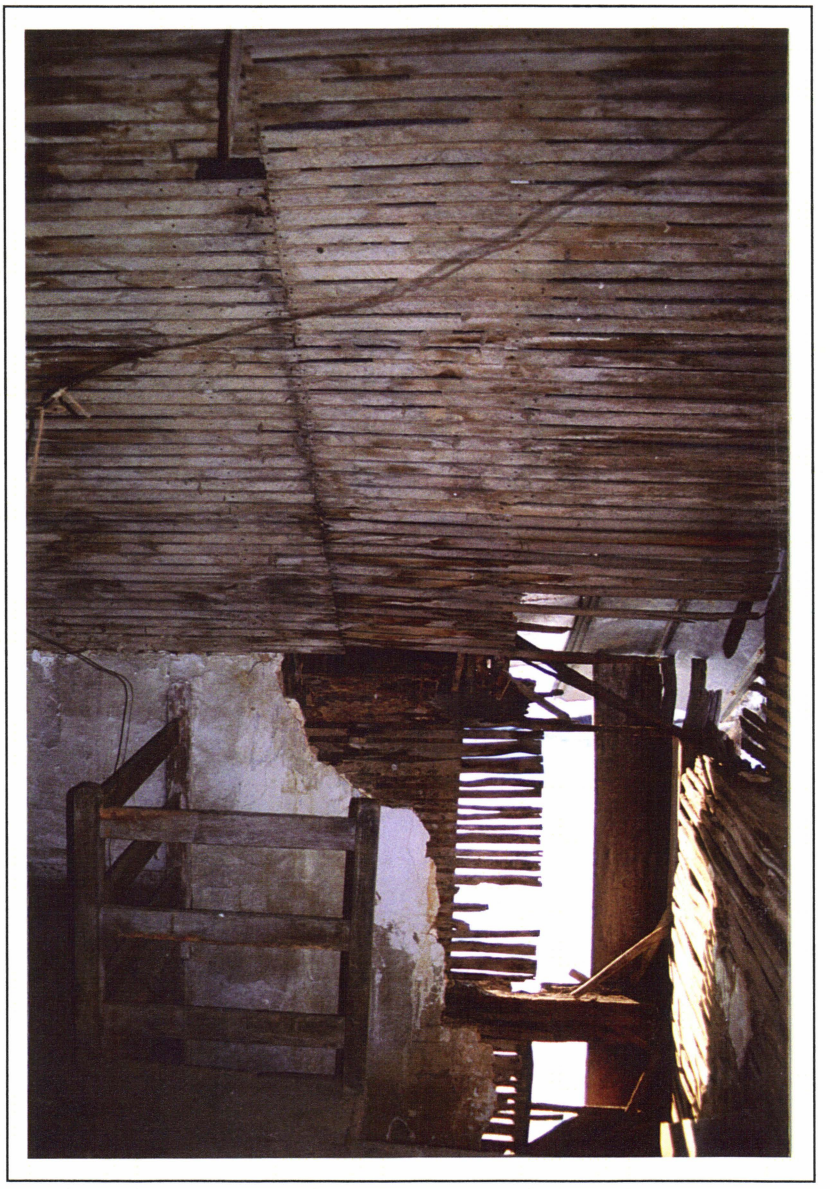


Plate 25.
*Interior View at Second Floor of Timber Section looking towards the corner winder stair. Shelf at sill on North wall is visible to right.*

*Photograph by architrave p.c., architects – 9 February 2000*

Second Floor West Interior Wall:

- Winder stair in Northwest corner
- Plain wooden rail at winder stair– rounded tops to posts – 3 horizontals
- Significant deterioration of framing and exterior cladding materials in Northwest corner, including top of post. (Rafter end is not bearing on post or roof plate).

Second Floor South Interior Wall:

- Door to Log Section – wide board and wide board trim – latch and former strap hinges gone
- Canted chimney, major element in Southwest corner – plaster at broad base, exposed brick above – board trim at transition
- To right side (west) of chimney, lath gone - hand dressed clapboards visible at upper gable end of log house (going behind chimney)

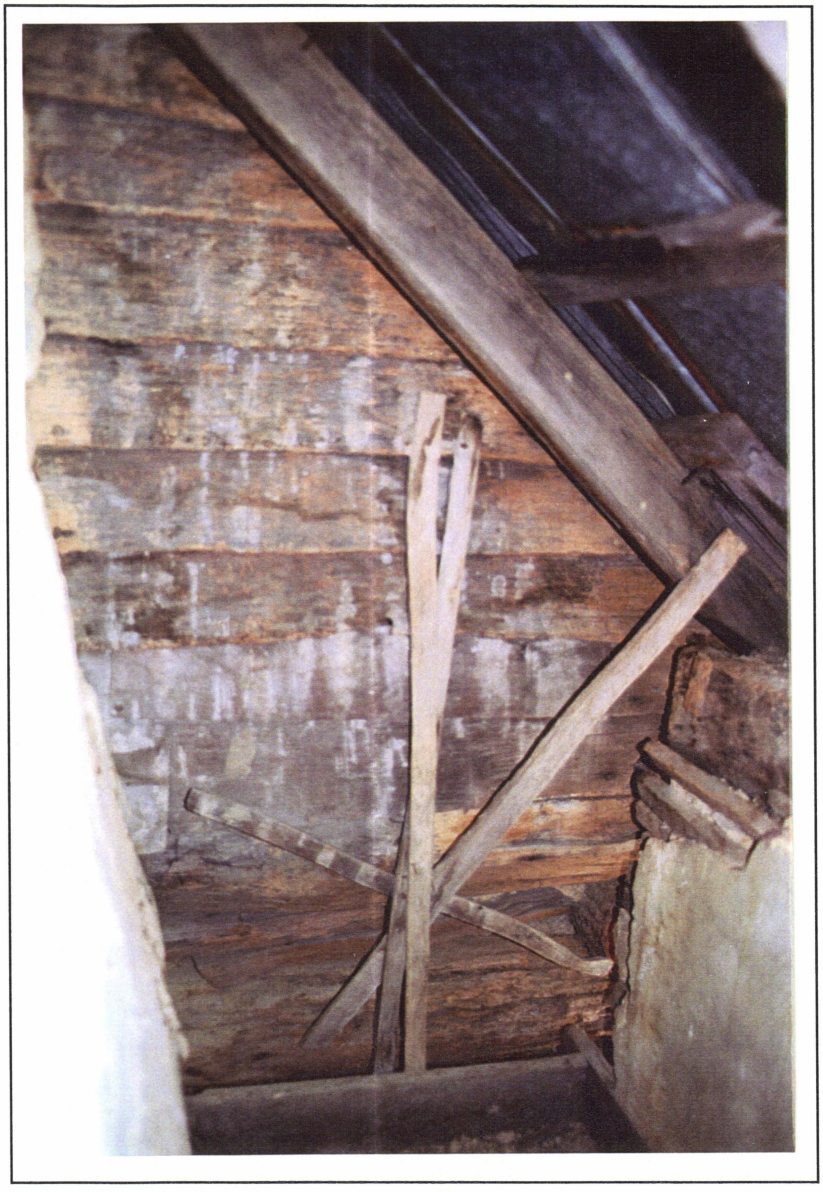
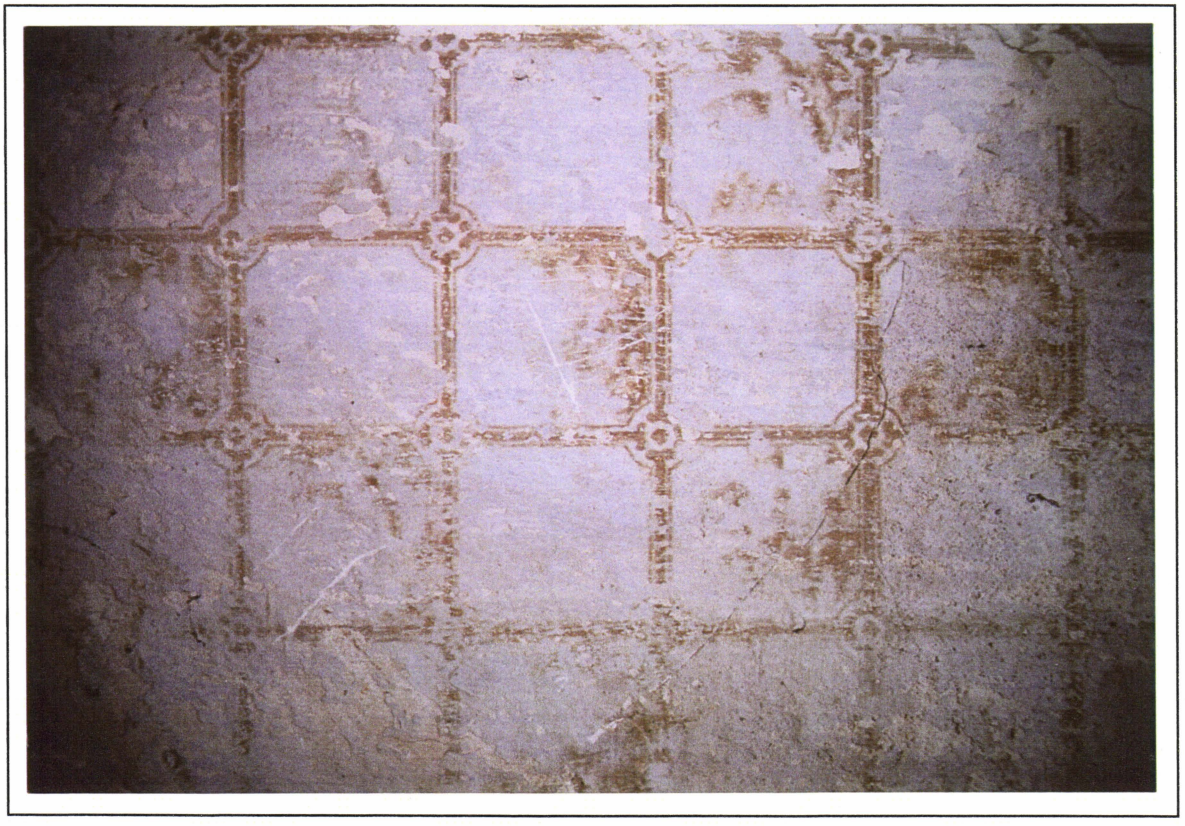


Plate 26.
*Interior View at Second Floor of Timber Section looking South towards chimney and exposed North upper gable end of the Round Log Section – to right.*

*Photograph by architrave p.c., architects – 9 February 2000*

Plates 27 and 28. *Detail view of Timber Section upper South wall (above) and shadow pattern on plaster (below). Photographs by architrave p.c., architects – 9 February 2000*



# E. Physical Condition Inspection and Evaluation of Existing Building Systems

## Structural System

### Inspection Methodology

A comprehensive structural inspection and evaluation of the building was undertaken by McMullan & Associates, Inc. structural engineer Doug Bond. The existing structural system was identified on 8.5 x 11 inch reduced architectural drawings and indicated the existence of tongue and groove connections, corner braces, rafters, joists, connections with the masonry chimney, staircase framing, and connections between the log cabin and timber framed portion.

Individual structural members that are readily visible and factors that affect their structural load capacities were recorded. Where conditions are not visible, conditions were assumed to be to typical conditions.

The structural adequacy of the framing to support loads was evaluated using the National Building Code administered by **Building Officials and Code Administrators, Inc. (BOCA)** and loads anticipated by the National Park Service (NPS). The NPS is not, of course, legally bound to use the Basic building code; but, as a matter of policy, tries to meet all local building code and regulations.

Based on this evaluation, recommendations were developed by McMullen & Associates and architrave p.c., architects for strengthening structurally deficient framing and supporting the existing framing from internal or external bracing and shoring.

The structural evaluation methodology used on the Mary Locher Cabin is based on the application of assumed allowable stress values for modern wood. The actual stresses at failure for "old growth" timber are often greater. The results of the structural evaluation should be considered in relation to the successful performance of the Mary Locher Cabin over time.

### Description of Structural System

The building consists of two types of construction constructed in different phases. The southern portion consists of stacked log walls, a gable shaped metal roof on log rafters, and log floor joists supporting a second floor (see sketch in Appendix B-1). The ground floor consists of hardwood flooring spanning between log joists that are set in the earth. There is a small stair to the second floor. The log walls bear on a wood sill that is supported by a fieldstone wall with mortar between the stones. The wall may have originally been dry laid without mortar.

The northern portion consists of a combination timber frame and stick frame structure (hereafter referred to as "timber frame") with a gable roof. There are posts at each corner and girts between the posts under second floor joists and rafter plates or roof plates at the roof eave (see sketches in Appendix B-1). The walls are sheathed with 16" wide wood planks and are supported by wood studs that span vertically between a wood sill and the girts. There is a second floor supported by sawn lumber joists spanning between exterior walls. There is a small stair to the second floor. There is a fieldstone wall below the sill that may have originally been dry laid but now has mortar in the joints between stones. The ground floor is constructed similarly to the log cabin with wood flooring spanning between sawn timbers that rest on earth.

## Existing Conditions

*South Elevation*

The south wall of the log cabin is composed of logs below the eave line and wood plank sheathing above the eave line. There is a log sill that bears on a fieldstone foundation wall that is 15 inches high. The logs are missing chinking and daubing in several places, particularly under the log directly above the doorframe. A sample from one log was identified as red oak. Most of the logs are solid when probed with a knife. Above the eave line, there is a gable end wall composed of wood sheathing boards applied directly to the interior plaster lath. Several of the sheathing planks are disconnected from the studs that they were originally nailed to. There is a metal plate with spikes on one log at the west corner. Several of the logs have insect and microorganism damage. The wall is bowing outward approximately 3" at the intersection of the logs and wood sheathing planks at the eave. There are three 2"x 6" boards laid flat against the logs from the sill to the roof eave line that are tied to the logs with small round bars.

*East Elevation*

The southern portion of the east wall is a log cabin wall that is entirely composed of logs averaging 8 to 10 inches in diameter. Many of the logs have voids in the center of the log, but the shell is hard when probed with a knife. The log sill that bears on the field stone foundation is badly deteriorated. Most of the chinking and daubing is missing between the logs at each end of the log cabin. The center portion of this wall has most of the spaces between logs filled with chinking. The ends of the logs at the corners are cut in a "V" shape to secure them. The second floor joist logs protrude a few inches from the exterior wall and are notched to secure the end of the floor joist to the exterior logs. At the south end near the small window, the logs above the second floor joists are deflected outward from the second floor line to about 6" out of plane at the roof. The ridgeline of the roof above the log cabin is deflected approximately 12" in the middle. There is a vertical deflection of the roof rafters estimated at 3" at the center of the rafters.

The northern end of the east wall is a timber framed wall composed of wood sheathing panels, approximately 1" x 16," that are fastened to wood studs, approximately 2" x 7," and corner posts 6.75" x 6.5". All the wood siding has insect and microorganism damage. Some of the ends of the siding are loose and are not fastened to the studs. The wall studs bear on what remains of a

5" x 7" wood sill that is badly deteriorated in many spots. The outer 3" of most of the wood sill is missing and portions of the remaining sill are soft when probed with a knife. The wood sill bears on a small fieldstone wall. The corner posts bear directly on the stone wall. The sill frames into the corner posts with a mortise and tenon joint. There is a wooden peg through the tenon. The corner posts are solid where McMullan probed them with a knife.

The wall studs frame into the underside of a 5.6" x 6.5" second floor girt. The second floor joists rest on the second floor girt. There is a 5" x 7" wood roof plate that supports the roof rafters above the second floor. The rafter ends are cut into a birds-mouth and protrude from the roof plate. Although hidden from view, McMullan assumed that there are probably short wall studs that span between the top of the second floor girt and the underside of the roof plate. The second floor girt and roof plate frame into the corner post with a mortise and tenon joint. There is a wooden peg through the tenon. At the north end of the wall, there is a corner brace between the sill and the corner post that is approximately 5 feet in length. The corner brace is nailed to the sill. There is a vertical deflection at the center of the roof rafters above this wall of approximately 2". There is no visible connection between the southern log wall and this timber framed wall.

*North Elevation*

The north wall is sheathed with wood planks that cover similar construction to the north end of the east wall. The wood siding has insect and microorganism damage. Some of the ends of the siding are loose and are not fastened to the studs. The wood sill is almost completely destroyed in places along this wall and is fastened to the corner posts with a mortise and tenon joint. There are diagonal corner braces at the east and west ends of the wall approximately 5 feet in length. The 3" x 5.5" corner brace at the east end is cut into the wall stud it passes through. There is no visible second floor girt but there is a wood end plate visible at the roof eave line that has broken in two pieces at the middle of the wall. Above the end plate, the wall sheathing is nailed directly to the wood plaster lath.

*West Elevation*

The northern end of the west wall is also sheathed with wood planks that cover the wall studs. At the north corner, one section of sheathing is missing and the stair to the second floor is exposed. There is a 3" x 5.5" corner brace exposed that runs from the north corner post to the sill. The sill bears on a field stone wall. Some of the joints between the stones do not contain mortar. The north end of the wood roof plate that supports the roof rafters is missing a section 2 feet long where it originally framed into the corner post. The top of the wall studs have a rough tenon that fits into a small mortise in the second floor girt. Most of the south side of this wall is covered by sheathing and is inaccessible for viewing. There is no visible connection between the southern log wall and the northern wood sheathed wall. There is an interior wood sill that frames into the southern corner post with a mortise and tenon joint that runs underneath the fireplace stone work. The wall of the log cabin has undergone a racking type deflection so that there is a gap several inches wide between the two walls at the top.

The southern end of the west wall is a log wall that has almost collapsed. The center portion of the top 3 logs that supported the roof rafters is missing. Most of the chinking and daubing is also missing, so that the logs only have bearing at the ends of the logs or are held in place by the interior wood plaster lath. Many of the logs are soft when probed with a knife. Some of the logs in the center of the wall are sagging up to 3" vertically. The logs average 8" in diameter. Most of the original wood sill is missing. Portions of the field stone wall below the sill bear on a natural outcropping of stone. One of the ends of the floor joist logs that protruded from the wall is broken and separated from the log wall. The southern end of the log wall is racked approximately 6" from the vertical at the roof eave line.

There is a brick chimney that is exposed on the western side of the building. The mortar joints between the bricks vary in thickness.

*Log Structure Floor Framing*

The first floor of the log cabin consists of wood flooring spanning over log sleepers that bear on soil. The logs are spaced approximately 28" apart. The flooring appeared damp at the time of our visit. Some of the flooring visibly deflected when McMullan walked over the flooring. Some internal stabilization consisting of 2" x 6" posts underneath the second floor log joists exists on the western end of the room. The posts bear on a 2" x 6" plate over the existing wood flooring. The second floor log joists originally were supported by the log wall, but several of the joists that have been severely damaged from microorganisms or insects are now supported by the 2" x 6" posts.

The stair framing for both stairs is supported by the exterior walls and interior wall studs. At the stair in the log cabin, the interior wood studs are 2.5" x 2.5". The interior studs under the stair in the timber frame are approximately 1" x 3". The interior studs for both stairs sit on the wood flooring. Several of the treads for the stair in the timber frame are loose.

The second floor log joists average 5.5" in diameter, are spaced approximately 36" on center, and span approximately 15'-0" between the log walls. Most of the ends of the log joists at the west wall have some degree of damage from insects or microorganisms. Several of the log joists have splits that run several feet long. The ends of the log joists are cut flat to bear on the exterior log walls. Several of the joists are solid when probed with a knife.

McMullan viewed the surface of the second floor from the small stair in the log cabin and the second floor door opening between the log cabin and timber frame because the second floor appears to be unsafe. The second floor boards are sawn lumber with tongue and groove edges. The surface of the second floor is covered with plaster debris from the ceiling of the second floor. The floor surface slopes toward a low point near the stair opening. There is a badly deteriorated floor joist under the low point.

*Log Structure Roof Framing*

The roof over the log cabin was observed from the doorway between the north and south rooms. The roof rafters are small logs, approximately 4 inches in diameter, spaced approximately 30

inches on center. There are collar ties, approximately 1" x 3", similar to the timber framed roof. There is a visible sag in most of the rafters that varies from 1 to 2 inches. This may indicate damage to the wood from microorganisms or insects. The wall near the small window at the southeast corner has deflected outward several inches. The roof has dropped several inches along the west wall where several logs that originally supported the roof rafters are missing. There is an approximate 4-inch vertical deflection at the end of the collar ties on the western side. The wood lath is bowing under the western end of the roof rafters.

*Timber Frame Floor Framing*

The first floor of the timber frame portion of the building is composed of wood planks that span between dressed logs that bear on the earth. McMullan viewed the flooring composition from a small existing hole and could not determine the spacing or the size of the logs. There is a large stone fireplace in the southwest corner of the room.

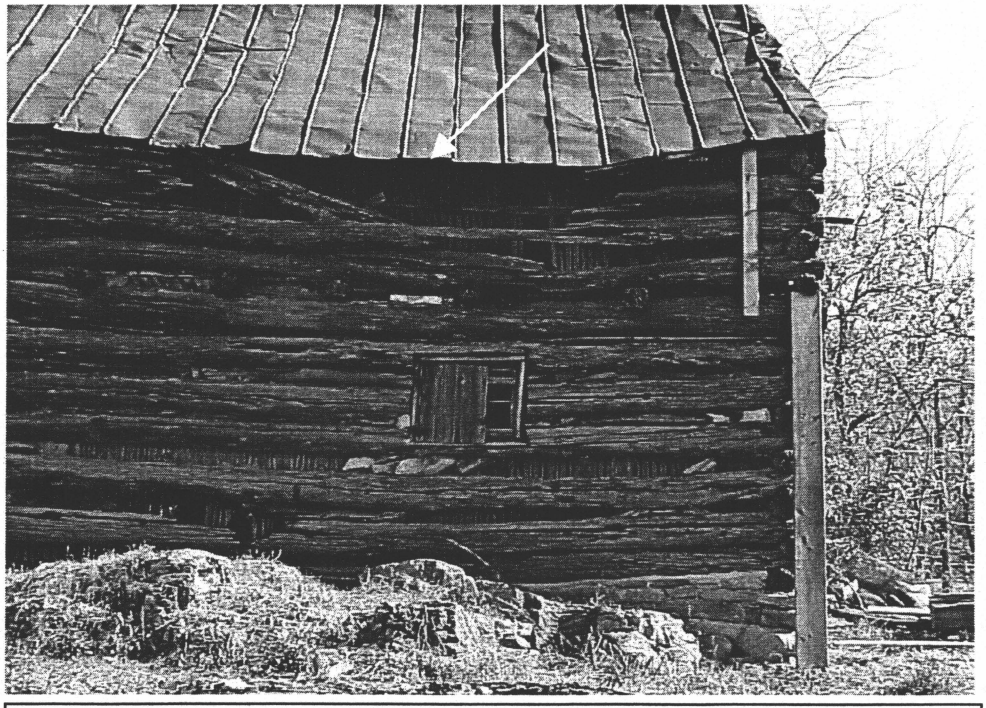
The second floor joists average 2.75" x 6.75", are spaced 24 inches on center and span between the exterior walls. The joists bear on the second floor girts and several have shimmed ends. Above the doorway between the log cabin portion and the timber framed portion, there is a 6.75" x 6.75" wood joist that is framed into the east side corner post with a mortise and tenon joint similar to the girts. This girt also penetrates the stone fireplace wall and may frame into the corner post on the western end. There is no visible connection between the log cabin framing and the timber framing. There is a gap between the two types of framing that widens towards the top of the roof. One of the floor joists penetrates the front of the stone fireplace and is visible when facing the fireplace. Several of the joists have a horizontal sweep or knots or splits. The wood joists that frame around the small stair have notched ends for half lap joints. There are 1" thick boards that form the interior wall below the stair and support the stair treads. Some of the stair treads have minor insect or microorganism damage and are loose enough to pose a hazard.

The second floor is covered with wood flooring similar to the log cabin area, but in a much better condition. The gable end wall above the end plate is wood lath applied directly to the exterior sheathing without any studs. The stone fireplace transitions to a brick chimney above the second floor.

*Timber Frame Roof Framing*

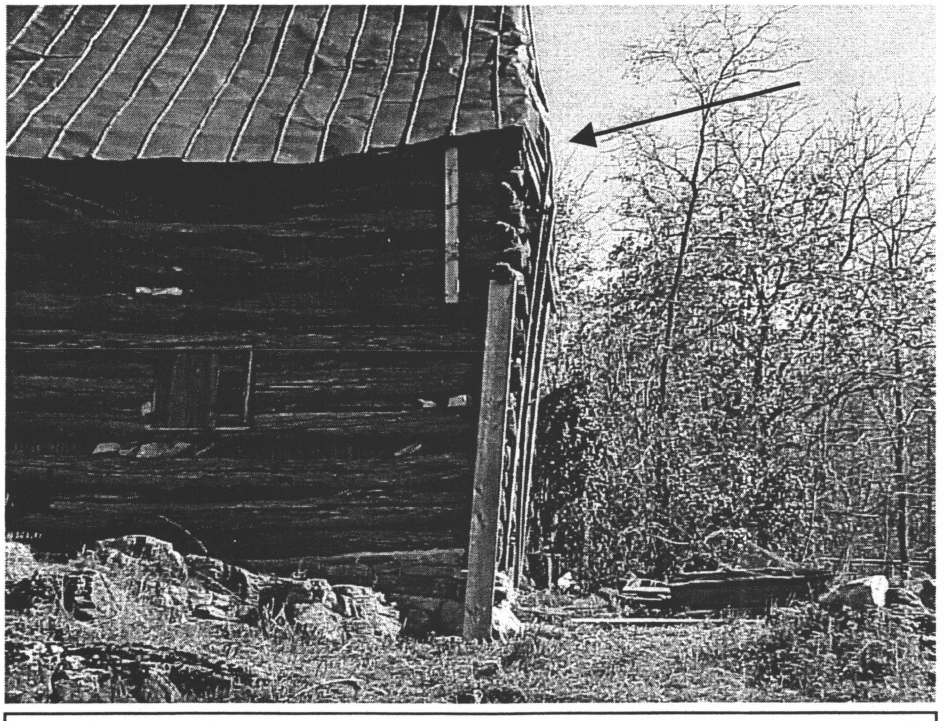
The roof framing over the timber framing consists of 2.5" x 3.5" rafters spaced approximately 30" on center. There is a 1" x 3" collar tie 7'- 6" above the second floor that is nailed to the rafter with 3 nails. A wooden lath is applied directly to the rafter and collar tie. The rafters bear on 5" x 7" wood plates on the west and east sides of the building. The plates on both sides of the room are suffering from both insect and water damage. Some areas of the plate are soft when probed with a knife. A 2-foot section of plate is missing at the north west corner of the room. There is vertical sag at the middle of the rafter's span that varies from 1 to 2 inches. Some of the rafters have spots of damage from microorganisms or insects. The rafters bear directly against each other since there is no ridge board.

Structural Photo 1. View of the southern end of log cabin. The western side (near prop) is racking at the top. The log over the doorframe has little bearing. *Photograph by McMullan & Associates, 11 November 1999.*

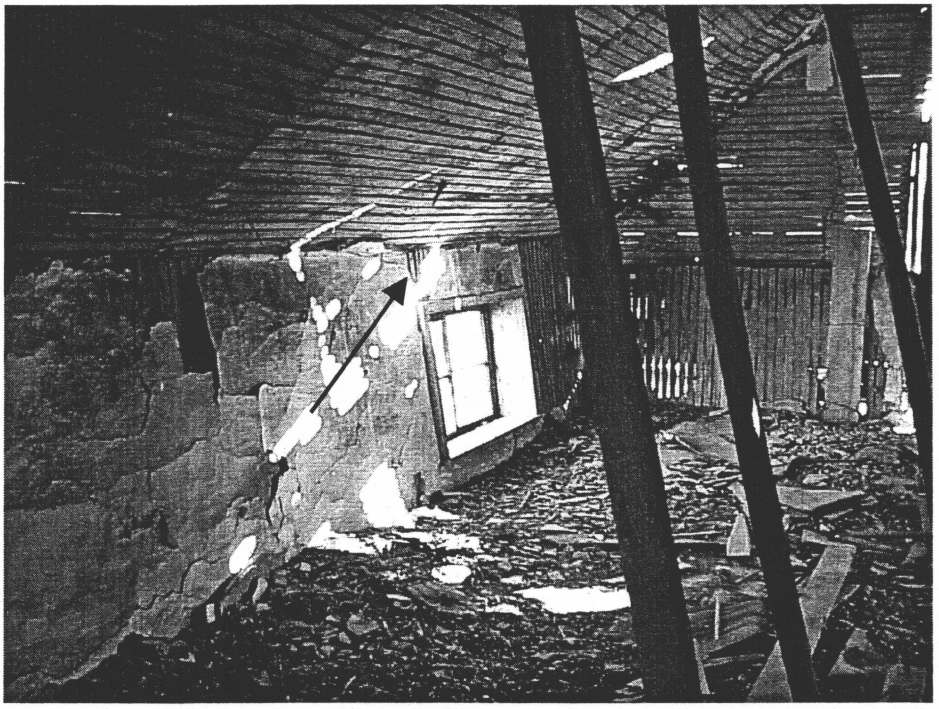


Structural Photo 2. West wall of the log cabin. Several logs are missing at the roof eave. The roof is deflected where the logs are missing. Several logs are sagging. *Photograph by McMullan & Associates, 11 November 1999.*

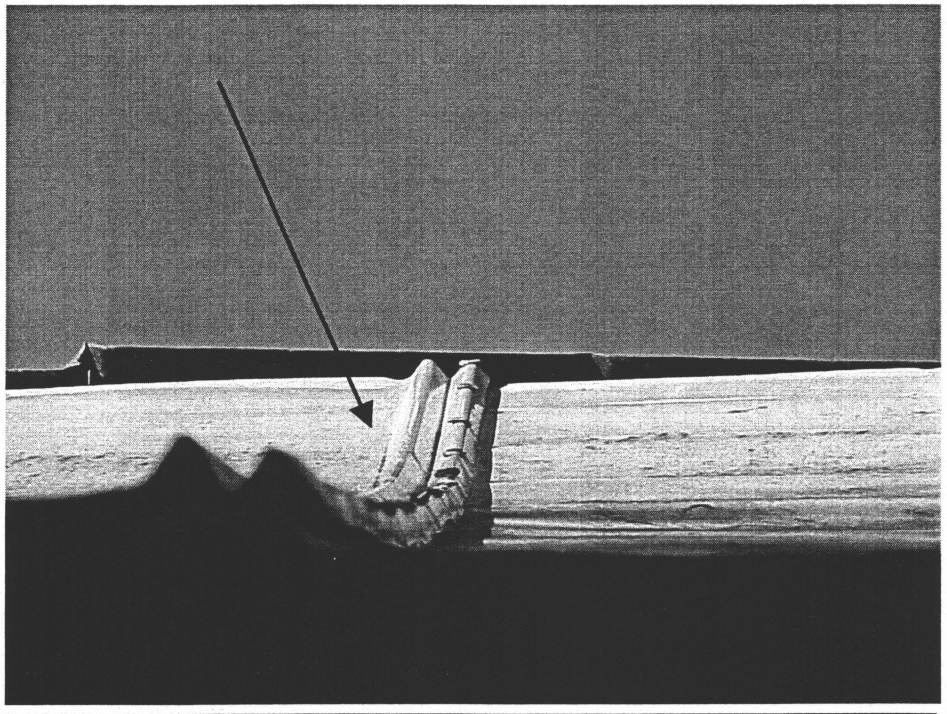
Structural Photo 3. West wall of log cabin. The sill log is missing, and several other logs are damaged.
*Photograph by McMullan & Associates, 11 November 1999.*



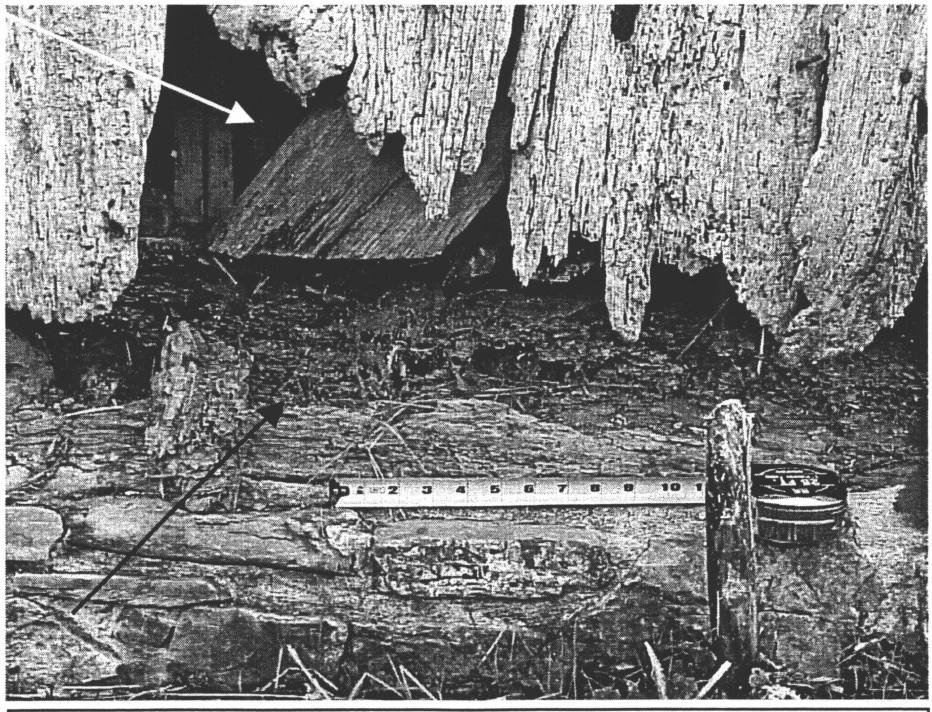
Structural Photo 4. Southern end of log cabin. The top of the south log wall is racking outward from the building approximately 6" at the top.
*Photograph by McMullan & Associates, 11 November 1999.*



Structural Photo 5. Second floor of log cabin – view of east wall. Wall is tilted outward. Floor is covered with plaster debris.
*Photograph by McMullan & Associates, 11 November 1999.*

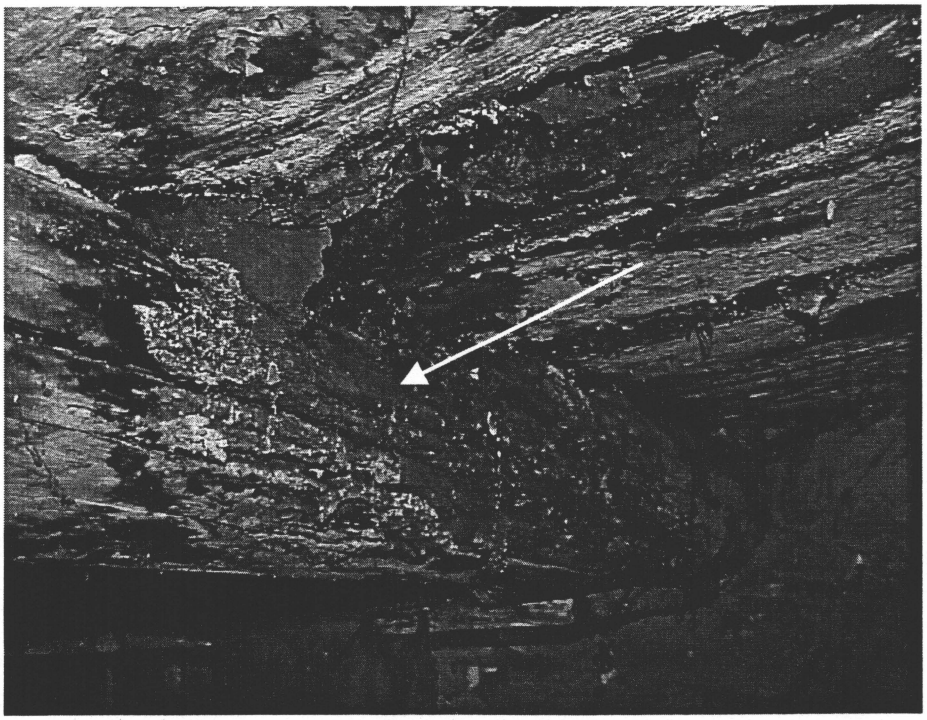


Structural Photo 6. Close up of metal roof. There is a sag in the roofing, estimated at 2," in the center.
*Photograph by McMullan & Associates, 11 November 1999.*

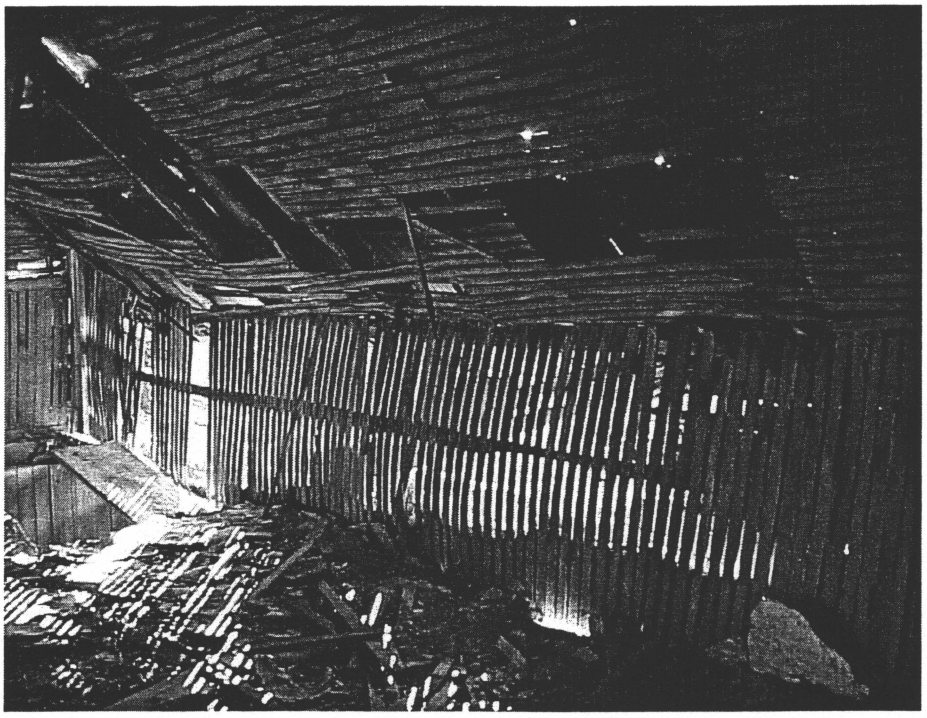


Structural Photo 7. Log sill on western side of timber frame. Log sill is badly damaged. The diagonal timber is a corner brace.
*Photograph by McMullan & Associates, 11 November 1999.*

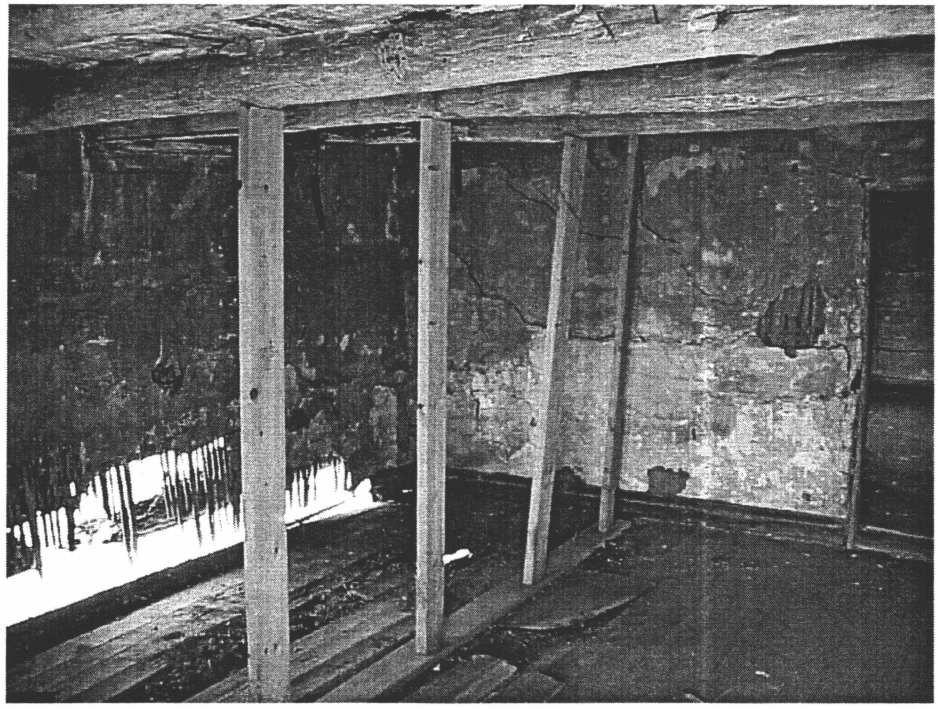
Structural Photo 8. Floor framing around stair in timber frame building. The joists have notched ends that reduce the cross-sectional dimensions.
*Photograph by McMullan & Associates, 11 November 1999.*



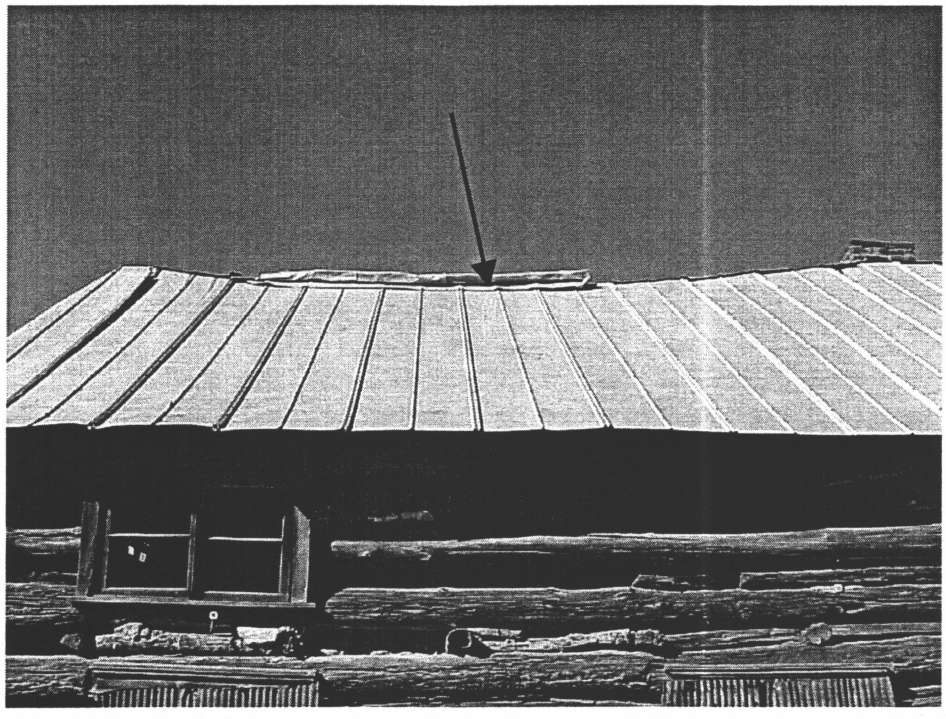
Structural Photo 9. End of second floor log joist with severe deterioration.
*Photograph by McMullan & Associates. 11 November 1999.*



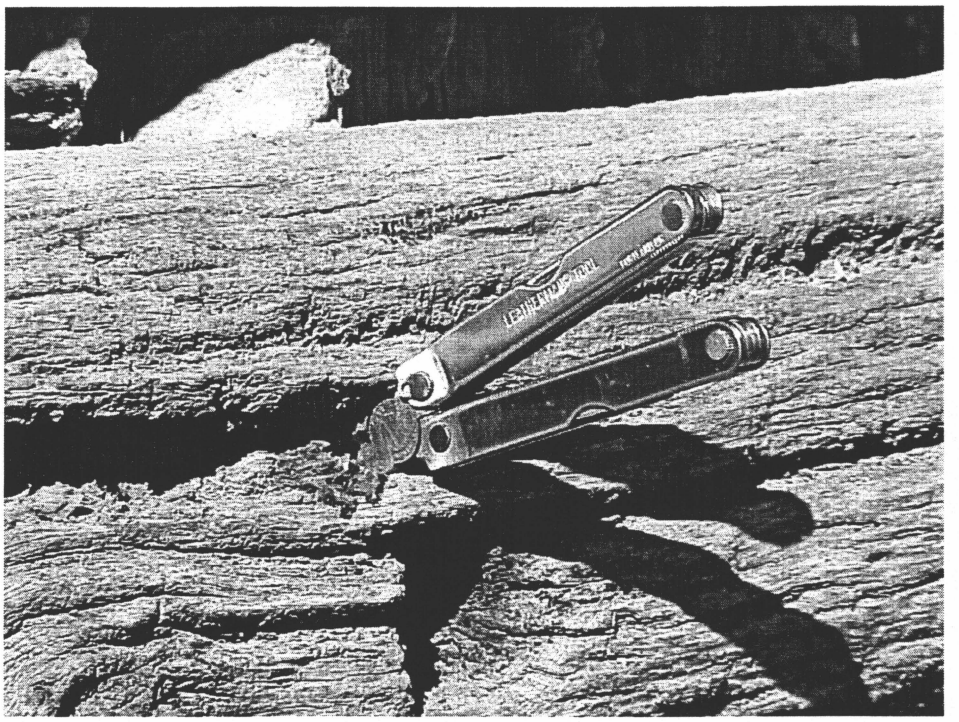
Structural Photo 10. Western end of log cabin roof framing. There are no logs to support the rafters. The plaster lath is bowing under the roof weight. *Photograph by McMullan & Associates, 11 November 1999.*



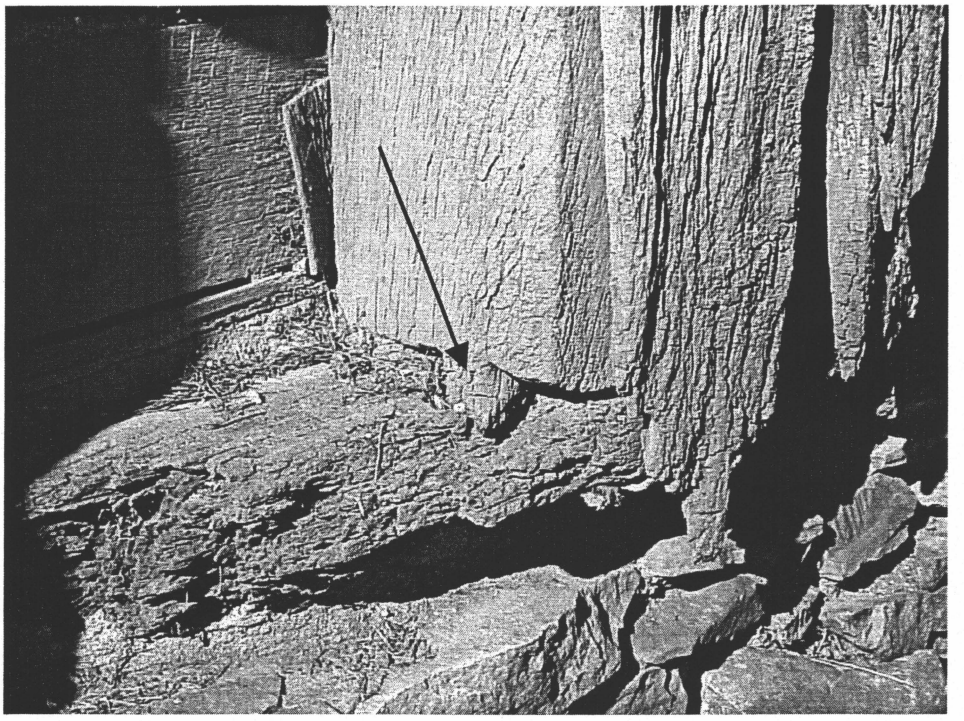
Structural Photo 11. Shoring for the second floor log joists. The log sill is missing. The flooring next to the shoring is damaged.
*Photograph by McMullan & Associates, 11 November 1999.*



Structural Photo 12. View of east wall and roof. Roof ridge is sagging. Several logs have gaps between them.
*Photograph by McMullan & Associates. 11 November 1999.*



Structural Photo 13. Probing of log soft spot with tool on the eastern log wall. *Photograph by McMullan & Associates, 11 November 1999.*



Structural Photo 14. Western side of timber frame. Sill is badly damaged and the wood stud is mortised into the sill.
*Photograph by McMullan & Associates, 11 November 1999.*

**Structural System Analysis**

The stresses produced in the log cabin walls and timber frame walls from gravity and lateral loads are relatively small. Their load carrying capacity is more defined by an assessment of their integrity and condition than by calculated capacities for specific members.

The 5.5-inch diameter (average) second floor log joist capacity was calculated to be a live loading of 14 pounds per square foot (psf). This capacity is based on the assumption that the plaster debris on the surface of the second floor is removed, the exterior walls (or shoring) are capable of supporting the joists, and the joists do not contain structural wood defects. However, all of the log joists contain defects, such as splits, notches, or microorganism damage, and none are capable in their present condition to support a 14 psf load.

The typical second floor joist in the timber framed area, with average dimensions of 2.5" x 6.75," can support a live loading of 26 psf. Several of the joists contain structural defects such as splits or cracks in the bottom of the joists and have a load capacity 10 to 20 percent less. The floor joists surrounding the stair all have notched ends to form half-lap joints. The notches reduce the area of structural cross-section, resulting in a reduced live load capacity for the short girder parallel to the stair of 1 psf.

The configuration of the roof rafter framing under gravity loads creates a horizontal thrust that is resisted by a combination of the exterior walls and collar ties. Both conditions were analyzed separately since it is impossible to accurately determine the contribution of each. The collar ties provide the majority of the resistance to the thrust because of the poor condition of the plates. Each collar tie must resist a 250 lb. dead load and a 370 lb. roof load. At least 8 nails are required to safely resist this loading. Also, there is a dead load bending stress in the rafter of 1480 psi with a deflection of approximately 1.9 inches. There is a deflection in the roof that is estimated at 2 inches. With this magnitude of dead load stress already present in the rafters, the live load capacity of the rafters is negligible.

For the roof framing over the log cabin, it was not possible to accurately measure the size of the rafters because entry to this area is unsafe. There is a large vertical deflection estimated at 2 inches in the roof rafters under dead loads only. Since the roof rafters are small logs similar in size and spacing to the rafters over the timber-framed area the load capacities and deflections are likely to be similar. Since there is no structural support for the rafters on the western end, the roof framing has no live load capacity.

An importance factor less than 1.0 in accordance with BOCA table 1609.5 was used in determining snow and wind loads, since the building is considered to "represent a low hazard to human life in the event of failure". With the importance factor, exposure factor slope factor, and ground snow load of 35 psf, the roof snow load was determined to be 14.7 psf.

The wind loads on this building were calculated to be a total leeward plus windward 12.7 psf on the walls and 4.4 psf towards the windward side of the roof and 8.8 psf away from the leeward side. For this relatively small building, the magnitude of calculated stresses produced in individual framing members from lateral loads is small and is not meaningful. The building's

resistance to lateral loads is dependent on the assessment of continuity and integrity of walls and floors and the connections between the two.

**Assessment and Load Compliance Evaluation**

The building components were assessed using criteria from the National Building Code developed by BOCA. According to the code, a residential live loading of 30 psf was used to evaluate load compliance of the second floor framing, and a sloped roof snow loading of 16 psf was used for evaluation of the roof framing.

The deterioration of logs and the lack of chinking and daubing in the log cabin walls have allowed many of the logs to sag vertically. Since there are gaps between logs along the length of the log cabin and most of the chinking and daubing is missing, the logs are required to span between points of support, such as areas of chinking and daubing that remain or other cross logs at corners. Insects and microorganisms have contributed to a loss of structural stiffness of each log cross section and this has caused an increase in vertical deflection. Also, the log walls have little or no resistance to in-plane lateral movement (racking) without the logs in continuous contact and without the chinking and daubing.

Almost all the chinking and daubing is missing from the west wall. Most of the logs sag vertically in the center. Several of the logs above the second floor appear to be supported by the cantilevered ends of the second floor log joists. The logs that originally supported the rafters at the top of the wall are missing. Most of the other logs have undergone varying degrees of deterioration. The observed bowing of the plaster lath is an indication that they now support most of the rafters. The top of the west wall has moved both southward and westward. This wall is not capable of resisting structural loads and is in immediate danger of collapse.

The logs on the south and east walls are also in poor condition due to the deterioration of the logs and lack of chinking and daubing. At some locations, logs bear on small remaining pieces of chinking, on the corners of window frames, or on crossed logs at the corner joints. The interior plaster may be providing some support to the logs. There is little or no continuity in the vertical load path along the height of these walls. As a result of the outward movement of the walls and the lack of continuous vertical supporting elements in the walls, the south and east log walls have little or no structural capacity.

The existing walls of the log cabin portion of the building are capable of providing only minor resistance to in-plane lateral loads. There is significant racking evident in the east and west walls at their south ends.

The existing log walls need to be replaced, repaired, or shored to remain stable and to resist any additional loads applied to them. Replacement or repair of the log walls requires temporarily shoring the remainder of the building framing for lateral and gravity loads. The west wall logs need to be completely replaced. Repair of the south and east walls includes restoring missing logs, removing severely damaged sections of existing logs and splicing on new sections

("dutchmen"). There is too much damage to the existing logs to make epoxy injection feasible for anything but a few conditions.

The walls of the timber-framed area are in slightly better condition resulting from the sheathing protecting the studs and corner elements from direct exposure to the elements. The wood sill is exposed in most areas and has sustained enough microorganism and insect damage that it has little load capacity. Several of the wall studs only have a few inches of bearing because portions of the sill are missing. Portions of the sill that are missing or are soft should be removed and a new section spliced to the remaining sill to restore full load bearing capacity to the walls.

For the timber frame portion, the condition of the roof plates and the lack of continuity between the corner posts weakens the in-plane wall stiffness significantly. The exterior sheathing boards are currently providing some stability to the timber frame.

Typically, one-inch thick wood roof and floor sheathing are strong enough to provide an adequate horizontal diaphragm for this size of structure. There are only a few sheathing boards across the roof rafters under the metal roof over both the timber frame and log cabin and there is no recognized method of calculating the lateral load capacity for this type of diaphragm. However, this sheathing in combination with the metal roof have withstood wind loads for many years. The deteriorating condition of the log walls is the greatest concern.

The roof plate on the west side and the end plate on the north side have missing or broken sections and do not tie the corner posts together. In addition, the roof plate on the east side has almost no load capacity due to microorganism damage. Rainwater may run down the sides of the rafters and collect on the top of this plate. The girts are able to transfer roof loads through bearing on the studs below them, but are unable to provide continuity between corner posts. This weakens the ability of the walls to carry lateral loads or brace the building. The load capacity of the timber walls is limited by the condition of the wood sill and roof plates.

The interior shoring under the log cabin second floor joists is composed of a wood 2" x 6" propped under each second floor log joist. These 2" x 6" props are not tied together on their weak axis and therefore are inadequate to support significant structural loading.

The typical log floor joist capacities of 14 psf is less than the required 30 psf loading required by the BOCA code for residential sleeping rooms. Several of the joists contain structural defects. The joists could be replaced, strengthened or shored to achieve the desired load capacity. If the joists are replaced, the new logs might be 7 inches in diameter, depending on the type of wood used and may require a slightly deeper bearing on the log walls. To strengthen the joists, an additional 2" x 8" could be fastened to the existing joists and span between bearings on the exterior walls. During our site visit, the poor condition of the exterior bearing wall and the log joists made the second floor unsafe for foot traffic or any additional loads.

The typical second floor joist capacity of 26 psf in the timber-framed area is less than the 30 psf loading required by the code for residential sleeping rooms. To obtain more capacity, the floor joists could be replaced, strengthened, or shored. If the existing joists were replaced with a No.1 graded Southern Pine material, the new joists sizes could match the existing. The notched

connections of the existing framing around the stair could be replaced with nailed light gauge framing angles or wider framing members so that the notch does not remove so much of the cross section. The floor joists could be strengthened by fastening an additional 2" x 8" along the length of the joist. Since the ends of the existing floor joists appear sound, bearing the new floor joists on the existing wall is not required, but will provide stronger floor framing.

For comparison purposes, it should be noted that the BOCA code requires a live loading of 20 psf for residential attics. The Park Service has the ability to limit access to the second floor and could restrict that access with requirements that are compatible with the load capacities, such as allowing access to only a few people at a time.

The interior wall studs under the stair in the timber-framed area are inadequate to support a 300 lb. concentrated load and need to be strengthened with larger studs placed adjacent to the existing studs.

The roof rafters over the timber-framed area have a dead load stress of 1480 psi. This exceeds the assumed allowable stress of 1150 psi. The calculated deflection of 1.9" is similar to the existing deflection of approximately 2". Additional loads from snow (16 psf according to BOCA) or workers would produce an even greater over stress. Also, the existing collar ties are nailed with only 3 or 4 nails to the rafters instead of the 8 nails required. Therefore the existing rafters should be replaced, strengthened, or shored. If the rafters are replaced, larger rafter sizes should be used, such as 3" x 5". The existing rafters could be strengthened by fastening a new rafter, such as a 2" x 6," to the existing rafters or placing it between the existing rafters. If additional rafters are placed between the existing rafters, each additional rafter should be secured to a collar tie similar to the existing.

The load capacities of the existing timber framing are calculated using assumed allowable stress values that are based on factors of safety that vary from 30% to more than 100% so that ultimate material failure occurs under a loading that exceeds the allowable stress. Also, timber framing that is from "old growth" lumber can have higher allowable stresses than modern values. These two factors may account for existing framing that is still standing despite having less calculated capacity than that required by code.

The existing collar ties can be strengthened by adding additional nails or wrapping the joint with a light gauge strap. In general, the higher a collar tie is located above the rafter bearing towards the roof ridge, the more horizontal force must be resisted by the collar tie. A strong connection between the collar tie and the roof rafters is essential to prevent outward deflection of the rafters at the their bearings on the exterior walls.

The roof framing over the log cabin has deflected up to 4 inches on the western end as a result of the poor condition of the west log wall. The rafters are currently supported by a combination of plaster lath and small wood shores. The top of the log walls has deflected outward on both the west and east sides. There is also a vertical deflection estimated at 2 inches in the roof rafters under dead loads only. Since the roof rafters are small logs similar in size to the rafters over the timber-framed area, the deflection is likely to be related to the rafter sizes and relatively high position of the collar ties. At the ridge, the rafters do not bear against each other but one rafter

bears on the other. This is a weak joint that could be strengthened with a plywood gusset. In its existing condition, the roof framing has negligible live load capacity. The existing log cabin roof framing could be replaced, strengthened, or shored similar to the timber framed roof.

The metal roofing and randomly placed wood planks that span between roof rafters are not capable of supporting the weight of a worker. The metal roofing needs to be removed in order to place uniform wood sheathing across the roof rafters.

**Structural Alternatives**

*Immediate Stabilization of Floor and Roof Framing*

Structural stabilization of the building for the loads discussed in the Analysis section should include supporting the floor and roof framing for gravity and lateral loads. After shoring the floor and roof framing, stabilization of the exterior walls would not be required to support the floor framing, but would be necessary to ensure that the walls have the ability to carry their own weight.

A preliminary sketch of one method of internal shoring for support of the floor and roof framing is included in Appendix B-1. As part of the internal shoring, the west-end of the roof framing over the log cabin would need to be moved back to its original position. The shoring will allow safe access to the floors of the cabin. Access to the roof by foot traffic would require new sheathing to span between rafters. However, this would require removal and replacement of the roofing and may require strengthening of some of the existing rafters.

Once the floor and roof framing is shored, the exterior walls are not required for floor or roof framing support. However, a method of strengthening the exterior walls for supporting their own weight walls is included in the shoring sketch.

The existing collar tie connection needs to be strengthened to adequately resist horizontal forces. This can be accomplished by adding 4 or 5 fasteners at each rafter. Where the additional fasteners cannot be properly spaced or the existing wood is badly deteriorated, an additional collar tie should be fastened to the 2" x 6" rafters. Alternately, a 6" x 6" beam could be placed directly under the roof ridge and supported from the internal shoring by 6" x 6"posts.

Both stairs need to be strengthened in order to safely allow foot traffic. This can be accomplished by providing additional fasteners to attach the tread supports to the wall studs or log walls. The interior wall under the stair in the timber framed area needs to be strengthened with 2.5" x 2.5" studs at sixteen inches on center. Treads and risers that are loose need to be fastened securely to their supports.

External shoring could be used to stabilize the walls of the building, but would not support the second level floor joists internally. Also, the uneven ground and rock outcroppings immediately west of the building make placement of shoring difficult.

*Stabilization of Walls*

Before beginning work on the walls, the floor framing and roof framing need to be shored for gravity and lateral loads. The support of the exterior log walls in their present condition is difficult because the poor condition of much of the remaining wood makes attachment to supporting members impractical. Instead of supporting the walls, a simpler option is to permanently shore interior framing, but repair the walls to carry their own weight and for appearance purposes.

With this option, blocking consisting of logs or even sawn lumber is inserted into the wall where portions of logs are missing. Sections of existing logs that have enough integrity to support the weight of the wall can remain in place. Strips of 2" x 4" lumber are fastened to the blocking in order to tie the individual pieces together. Instead of rebuilding the wall, enough blocking would be used to restore the wall's ability to carry its own weight.

Stabilization of the timber-framed walls includes replacing portions of the sill under the wall studs. Approximately 60% of the length of existing sill should be replaced under the timber frame area. Sections of the sill that are replaced should be tied into the remaining sill with metal ties and epoxy. An alternate to this approach would be to replace the sill with a longer lasting pressure treated sill. Approximately 50% of the existing sill under the log walls needs to be replaced in a similar manner.

The gable end wall needs to be fastened to the internal shoring in order to be laterally braced. Some interior finishes would be damaged by installation of the shoring.

*Restoration of the Log Walls*

All the west wall logs require removal and replacement. Approximately 80% of logs on the south and east walls need sections of the log replaced. New sections of log will average about 50% of the length of the existing log. Sections of replacement logs should be tied to existing logs and other replacement sections with rods and epoxy or wood splice joints. The logs at the corners on the south end should be pushed back into the vertical plane of the wall.

Window frames adjacent to replacement logs will need to be fastened to them. Chinking and daubing between all the exterior logs should be included. The plaster lath and plaster should be removed and replaced entirely on the west wall and where it is necessary to complete repairs to the south and east walls. Existing roof framing on the western side of the log cabin needs to be carefully lifted to its approximate original position and be fastened to the repaired walls.

The roof plates over the timber-framed structure also need to be restored along with the exterior wall. The interior plaster covering the hidden portions of the roof plates on the east and west timber framed walls needs to be removed and replaced in order to repair the roof plates. McMullan assumes that 60 percent of the roof plate lengths need to be replaced so that the entire piece will probably be more economical. The replacement pieces should be tied into the corner posts using the existing mortise and tenon joints. A five-foot length of the north end plate needs to be replaced with a spliced timber.

*Strengthening of Floor and Roof Framing with Shoring Removed*

It is possible to remove the internal shoring if the floor and roof framing are strengthened and the walls are restored and repaired. All six of the existing log joists require replacement or strengthening. To avoid removing flooring, one method of strengthening is to provide new 7 inch diameter log joists to bear on the exterior walls, placed between the existing joists, and fastened to the existing flooring.

All eight of the existing sawn joists in the timber-framed area can be strengthened by providing a 2" x 8" fastened along the length of the joist. At the stair, a small 2.5" x 2.5" stud should be placed under the short girder beam at the notch. This stud can be worked into the stair wall.

The seventeen existing roof rafters can be strengthened by fastening a 2" x 6" along the length of the existing rafter. The existing collar tie needs an additional 4 or 5 fasteners at each rafter. Where the additional fasteners cannot be properly spaced, an additional collar tie should be fastened to the 2"x 6" rafters. The ceiling wood lath will need to be removed and replaced in several locations to access the rafters. The metal roofing will need removal and replacement in order to provide uniform wood planking to support the weight of workers.

Both stairs need to be strengthened by providing additional fasteners to attach the tread supports to the wall studs or log walls. The interior wall under the stair in the timber-framed area needs to be strengthened with 2.5" x 2.5" studs at sixteen inches on center. Treads and risers that are loose need to be fastened securely to their supports.

# Mechanical, Electrical and Plumbing Systems

Existing conditions of this unimproved, rustic structure do not include any of these building systems. The future introduction of these systems is addressed in Part 2: Section C – Alternatives for Management and Treatment Options.

# Architectural Enclosure System

Building materials that collectively envelope a building's exterior skin traditionally provide a layer that encloses and shields the building's structural systems from a host of deteriorating forces in the environment. At the "cabin," advancing deterioration and loss of these materials directly affect the structural integrity of the building, thus threatening the building's ability to remain standing as an architectural feature on the landscape. Prime factors of deterioration at the combination log and timber structure include: direct water infiltration through roof and wall systems and open window and door cavities; decay of wood materials induced by unprotected exposure to environmental conditions, direct contact with soil, and trapped moisture; and general unabated invasion of timber by wood destroying insects and microorganisms.

**Identification of Deficiencies in Building Envelope**

| Element | Condition | Notes |
|---|---|---|
| Foundation: | Good | Stone foundation recently mortared - most likely historic condition was dry laid; |
| | Poor | First floor joists (sleepers) bear on soil |
| Roofing: | Marginal | East and West sides differing metal material; West side requires replacement<br>Historic material – wood shingles |
| Chimney Structure: | Satisfactory | Stone, bricks, mortar joints and flashing generally holding up to elements, but top corbelled coursing has worn down; |
| | Marginal | Absence of damper, flue liner and cap/ screening allows free entrance of weather, birds and vermin |
| Walls: | Perilous | Both log and frame sections require solid timber members for load bearing capacity of roof framing – advancing decay primarily due to age and exposure is threatening building to near collapse;<br>Corner notching at log section compressing due to decay and deterioration at log crowns;<br>Extreme sagging at mid-spans of logs due to missing chinking and daubing materials |

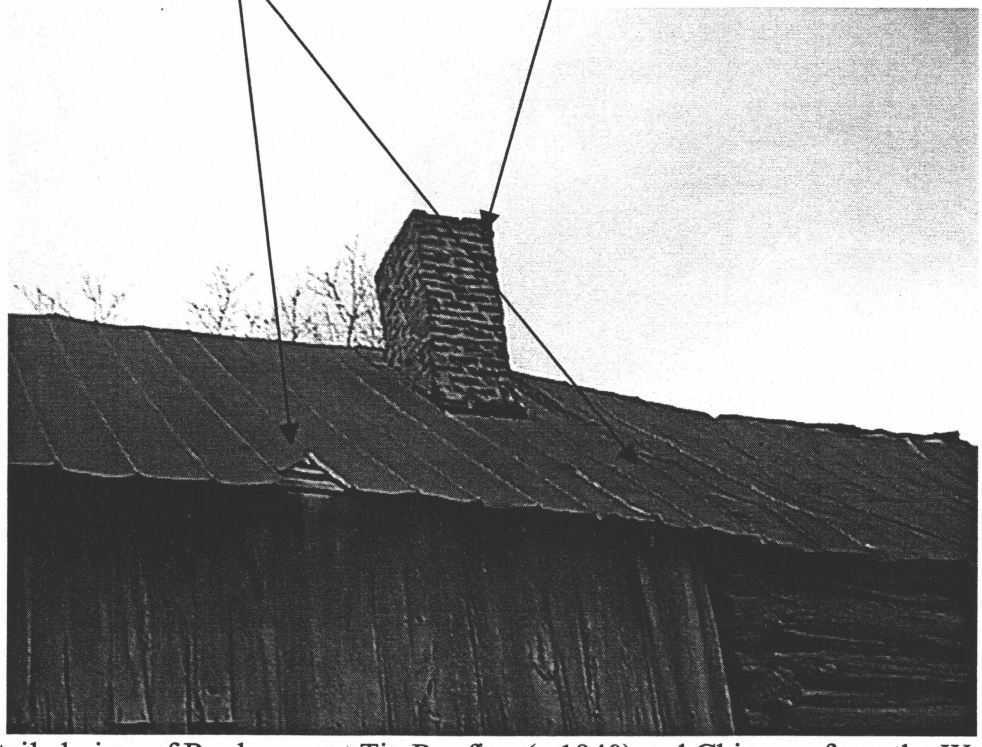
| Element | Condition | Notes |
|---|---|---|
| Windows: | Poor | Elements of window units failing due to exposure to weather/absence of finish; sills deteriorating; glass panes missing from most sash – some windows are covered, others not - offering little protection and security against entry of birds, insects, etc. |
| Exterior Doors: | Poor | Entrance door on South Elevation missing boards - laying inside of downstairs room; Door on East Elevation intact and on hinges; Sills deteriorating; |
| | Insecure | No locking mechanism, building not secure from vandals or wayward visitors leaving NPS open to liability claims |
| Wood destroying insect induced damage | Marginal | Rocky soils and free air flow limits the moist conditions favored by these pests - but some damage of this kind from foundation level up; |
| | Advanced | First floor joists (log sleepers at log section and dressed timbers at frame section) laid directly on soil - (not visible in most cases due to floorboarding) may be threatened due to trapped, moist conditions; Note: a species identification sample was extracted from a log section - results identified as red oak; First growth heartwood from this species naturally resistant to wood destroying insects |
| Water/moisture induced decay | Advanced | Water infiltration primarily through log walls with missing chinking and daubing and through frame walls with missing board & batten siding – bottoms of vertical board siding are missing, exposing sill plate/posts; |
| | Advanced | Stone foundation is solid and limits moisture wicked from the soil but sill plates, laid directly on stone, are in serious state of deterioration; |
| | Advanced | First Floor joists consisting of sleepers laid directly on soil at both log and timber frame sections are rotting due to direct contact with soil and trapped moist conditions at ground plane |

| Element | Condition | Notes |
|---|---|---|
| Microorganism induced decay | Advanced | Log members, weatherboarding (or clapboard), timber framing and vertical siding (board and batten) all suffering from natural aging process, expedited by exposure to harsh conditions and lack of protective coatings; Most deterioration near grade level |

# Building Envelope – Identification of Deficiencies

Finish coating wearing off sheet tin roofing. Aging metal material has become brittle, with sections broken off – leaving purlins and structural elements exposed. Roofing material is conforming to failing wall/roofing structures, providing little reinforcement or stiffening.

Lack of mortar cap at chimney top has led to deterioration of corbelled top coursing, and open flue allows Unabated entrance of birds/weather. Bricks are spalling due to poor pointing repairs and inappropriate mortar mix. Flashing not apparent.



Detailed view of Replacement Tin Roofing (c.1940) and Chimney from the West

The following pages provide a visual summary of the physical condition of the "cabin" as apparent from the overall exterior elevations and detailed views of the building elements and materials. Annotations denote weak points in the building envelope where deterioration has advanced to critical stages.

## South and East Elevations

Brick chimney not capped or screened,
allowing entrance of foul weather, vermin and birds

Window panes broken from most sash

Structural bulging of gable end
causing weatherboard siding to shift
from end connections

Tin metal roofing providing adequate
coverage this side - crudely applied
at gable end and lap joint at ridgeline

Stone foundation recently
Mortared, in good condition

Entrance door in ruinous condition
off hinges, leaving building unsecured
and open to vermin and birds

Absence of whitewashing treatment
diminishes protection from timber decay

Board & Batten siding
decaying from ground level
due to contact with moisture,
exposing timber sill

Crudely applied unattractive
metal shielding at windows
causing damage to historic fabric

Window unit (single-hung set on
side) improper for opening –
operation prohibited

Most chinking and daubing materials missing from log interstices –
load bearing capacity and structural integrity of log construction diminished to critical stage

## West Elevation

Metal roofing this side, dating to c.1940, deteriorating, but providing moderate protection

Chimney (flashing, bricks and mortar joints) appears in satisfactory condition relative to structure

Log sag advancing rapidly to point of failure due to severe decaying of logs – entire sections of logs missing at the attic level

Old metal roof missing at corner - new section matching opposite side pieced into place

NPS temporary bracing members (providing essential support) visually obtrusive due to haphazard application

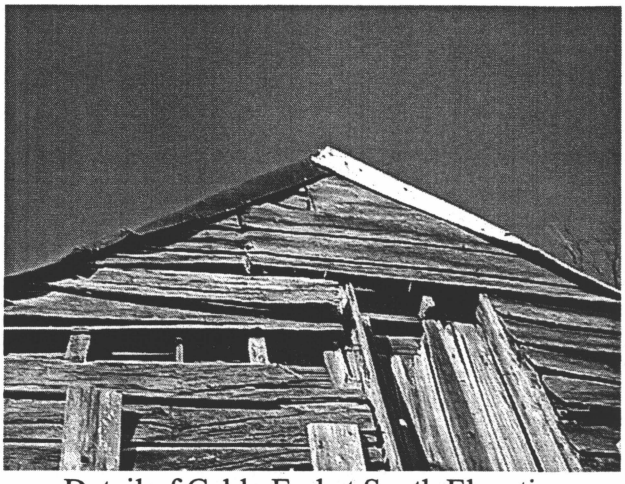
Board & batten panels missing at corner and under window, exposing timber frame structure and interior lath to weather
Top of timber corner post missing, causing perilous lack of bearing for roof rafters this side

Sill plate unilaterally rotting in both sections of structure

Absence of whitewash treatment at siding diminishes protection from exposure to harsh exterior conditions

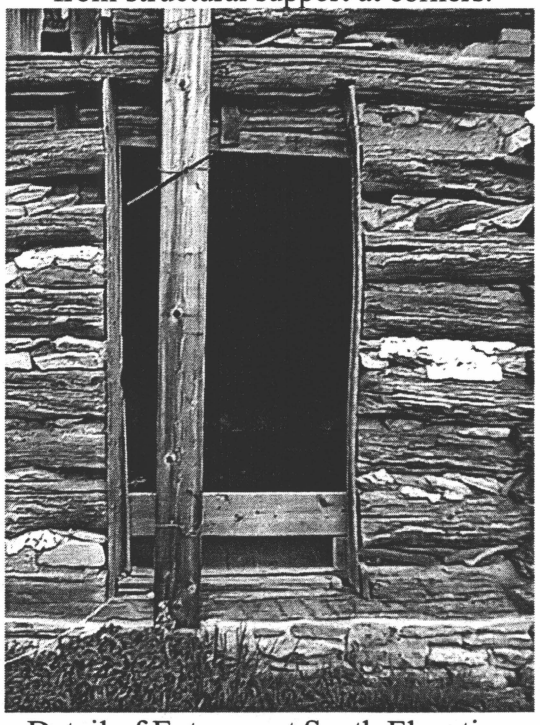
## Details of Building Enclosure Systems at Log Cabin Section

Deterioration at weatherboard ends at upper South Gable End causing connections to stud framing to fail. The door frame, cut into the wall to provide a Second Floor access to the now missing Hewn Log Section, split the boards into sections.



Detail of Gable End at South Elevation

Door off hinges at South Elevation, leaving cabin open to entry. Chinking provides all support to log sections separated by wall cavities from structural support at corners.

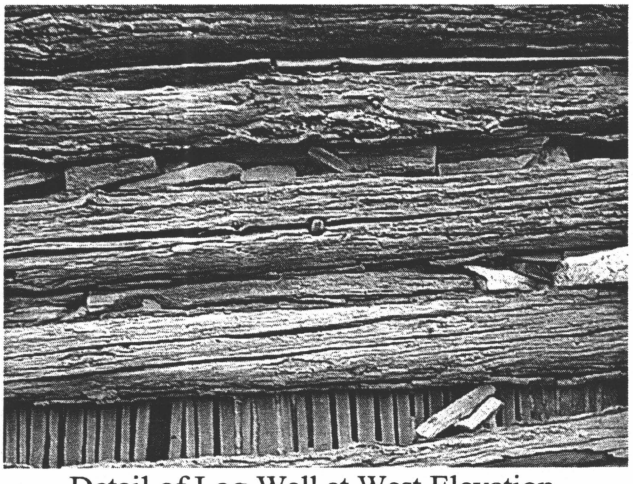


Detail of Entrance at South Elevation

Total loss of log sections threatening structural integrity of building – bearing for rafters gone, causing extreme sagging in center section of span

Detail of Upper Wall at West Elevation

Many log interstices entirely void of chinking – a critical building element that completes load bearing capacity of log wall



Detail of Log Wall at West Elevation

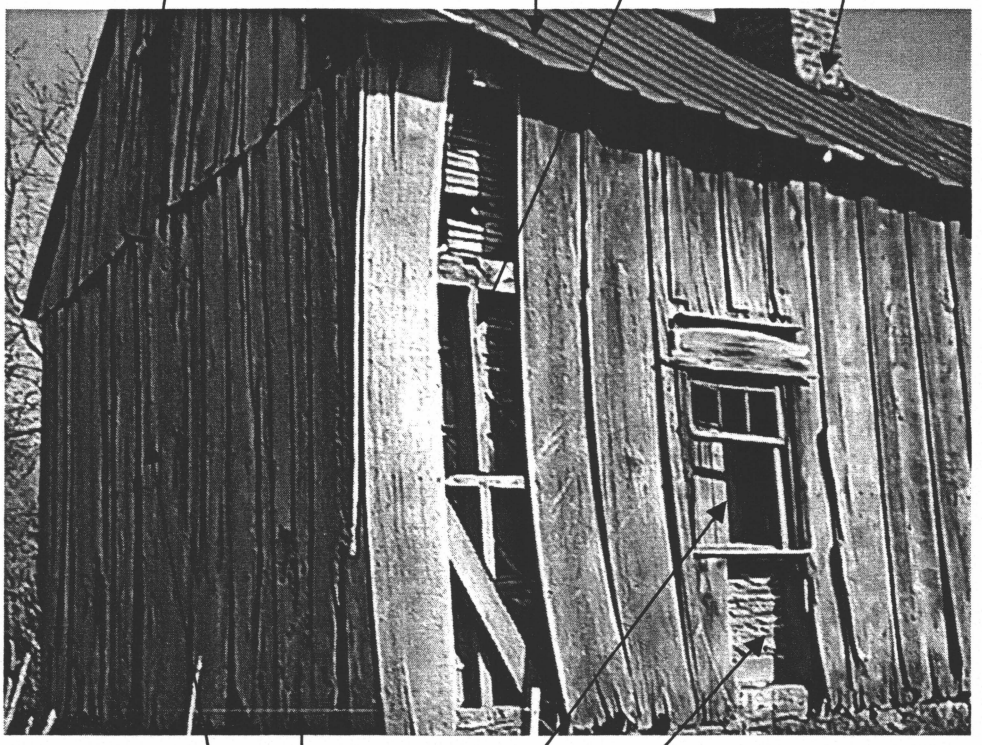
## West and North Elevations

Aging tin roofing material missing sections at corner and finish coating failing to hold up to western exposure

Access door or window unit missing from gable end opening

Missing board and battens leave significant hole in wall, exposing the timber framing to deteriorating natural elements

Flashing at chimney crudely applied



Numerous battens missing allowing wide boards to hang - free of connections and warp

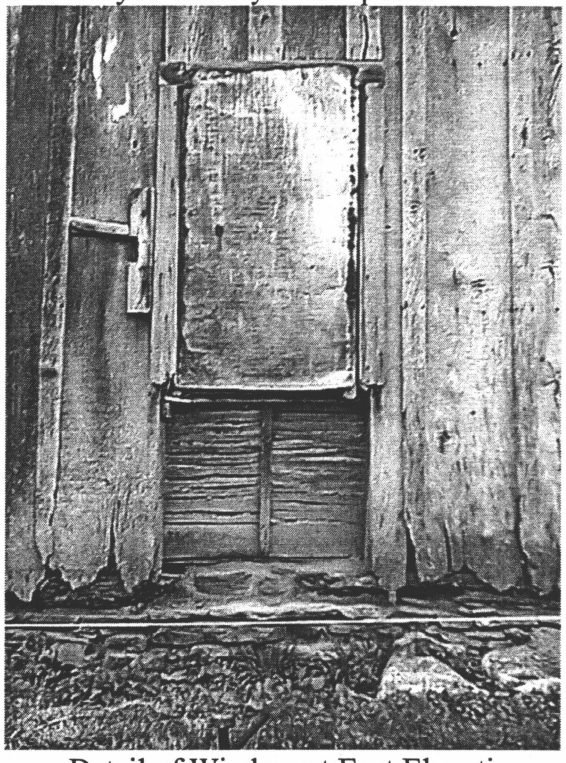
Missing siding leaves extant lath and plaster vulnerable from exterior

Window unit with glazing missing not secured or covered for protective purposes

Although most hanging in place, boards have lost most nailed connections to framing members - Boards decaying at foundation level leaving sill plate exposed–
Protective coating on exterior wood completely worn away, advancing bleaching of material

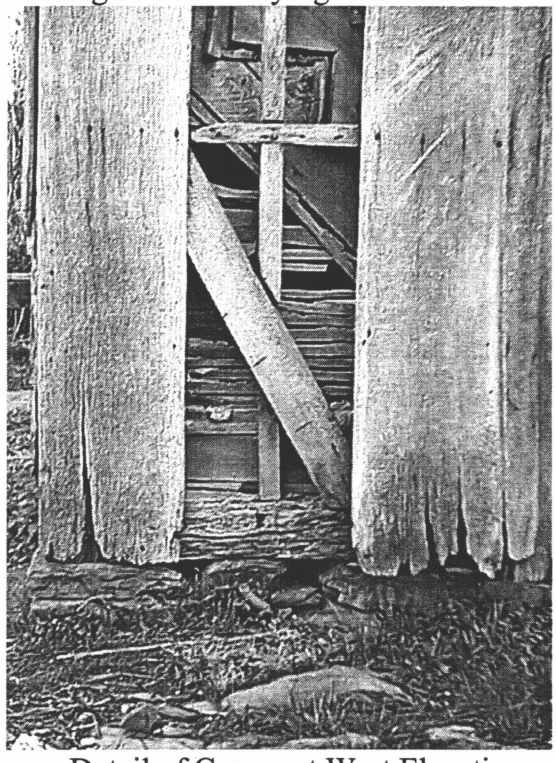
## Details of Building Enclosure Systems at Timber Frame Section

Boards missing under window opening where no framing members (studs) provide connection and support for nailing. Open cavity accelerates deterioration of all elements of wall. Sill plate has decayed entirely at this point.



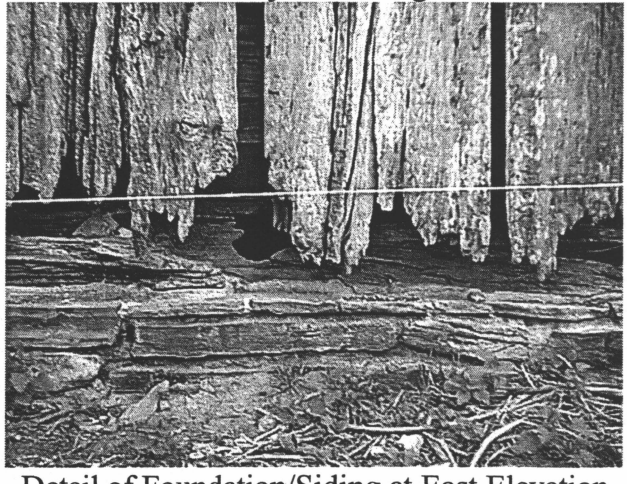
Detail of Window at East Elevation

Missing board opens stair assembly and critical structural framing and corner bracing members to harsh western exposure. Sill plate is intact at this point but is not solid. Siding boards decaying from bottom.



Detail of Corner at West Elevation

View of failing condition of sill plate and advancing decay of bottom of boards near the stone foundation set just above grade level.



Detail of Foundation/Siding at East Elevation

Absence of framing members (stud) in wall below window has allowed boards to fall away from tenuous connections.

Detail of Foundation/Siding at West Window

# Graphic Documentation

## HABS Photographs - Building Exterior of Mary Locher Cabin:

(Addendum to existing HABS photographic file for structure known as A. Poffenberger House)

8 x 10 prints from 4 x 5 large format negatives
Photographed by Hoachlander Davis Photography;
Judy Davis - Photographer, 15 October 1999

- Overall, Context View of Site from SE - HABS No. MD-90-8
- South Elevation - HABS No. MD-90-9 (not to scale)
- Perspective View from SE – replicating historic view of Thomas Waterman's 1940 Memo, "Detail of Front" POFFENBERGER LOG HOUSE (Appendix A) - HABS No. MD-90-10
- North Elevation - HABS No. MD-90-11 (not to scale)
- Perspective View from NW – replicating historic view of Thomas Waterman's 1940 Memo, "General View of Rear" POFFENBERGER LOG HOUSE (Appendix A) - HABS No. MD-90-12
- West Elevation - HABS No. MD-90-13 (not to scale)

**Building Photographic Elevations printed in report at scale: ¼" = 1'-0"**

- West Elevation (A)
- South Elevation (B)
- East Elevation (C)
  Note: The East Elevation consists of multiple photographs spliced together due to site limitations/interference of vegetation.
- North Elevation (D)

## Drawings prepared following HABS Standards and Guidelines:

24" x 36" Mylars reduced to 11" x 17" sheets for inclusion in report (reductions not to scale)

HABS No. MD-90 Drawing 01:

- **Title Sheet** - Historic Photograph, Background Narrative, Surveyed Site Plan

HABS No. MD-90 Drawing 02:

- **Floor Plans** - First Floor Plan, Second Floor Plan

HABS No. MD-90 Drawing 03:

- **Framing Plans** - Foundation and Roof Plans, Second Floor and Roof Framing Plans

HABS No. MD-90 Drawing 04:

- **Elevations** - West, South, East and North Elevations

HABS No. MD-90 Drawing 05:

- **Building Sections** – Longitudinal Section, Transverse Section

# HISTORIC AMERICAN BUILDINGS SURVEY

## INDEX TO PHOTOGRAPHS

Addendum to:
Mary Locher Cabin HABS No. MD-90
(A. Poffenberger House)
Antietam National Battlefield
Sharpsburg Vicinity
Washington County, Maryland

Hoachlander Davis Photography; Judy Davis, Photographer, October 15, 1999.
Photographed: 4"x 5" negatives
Prints: 4"x 5" contacts and 8"x 10" enlargements

MD-90-8 OVERALL, CONTEXT VIEW OF SITE

MD-90-9 EXTERIOR, SOUTH ELEVATION, ENTRY DOOR ON RIGHT

MD-90-10 EXTERIOR, PERSPECTIVE VIEW FROM SOUTHEAST

Replicates c1940 view "Detail of Front," POFFENBERGER LOG HOUSE, Thomas Waterman Memo, NPS

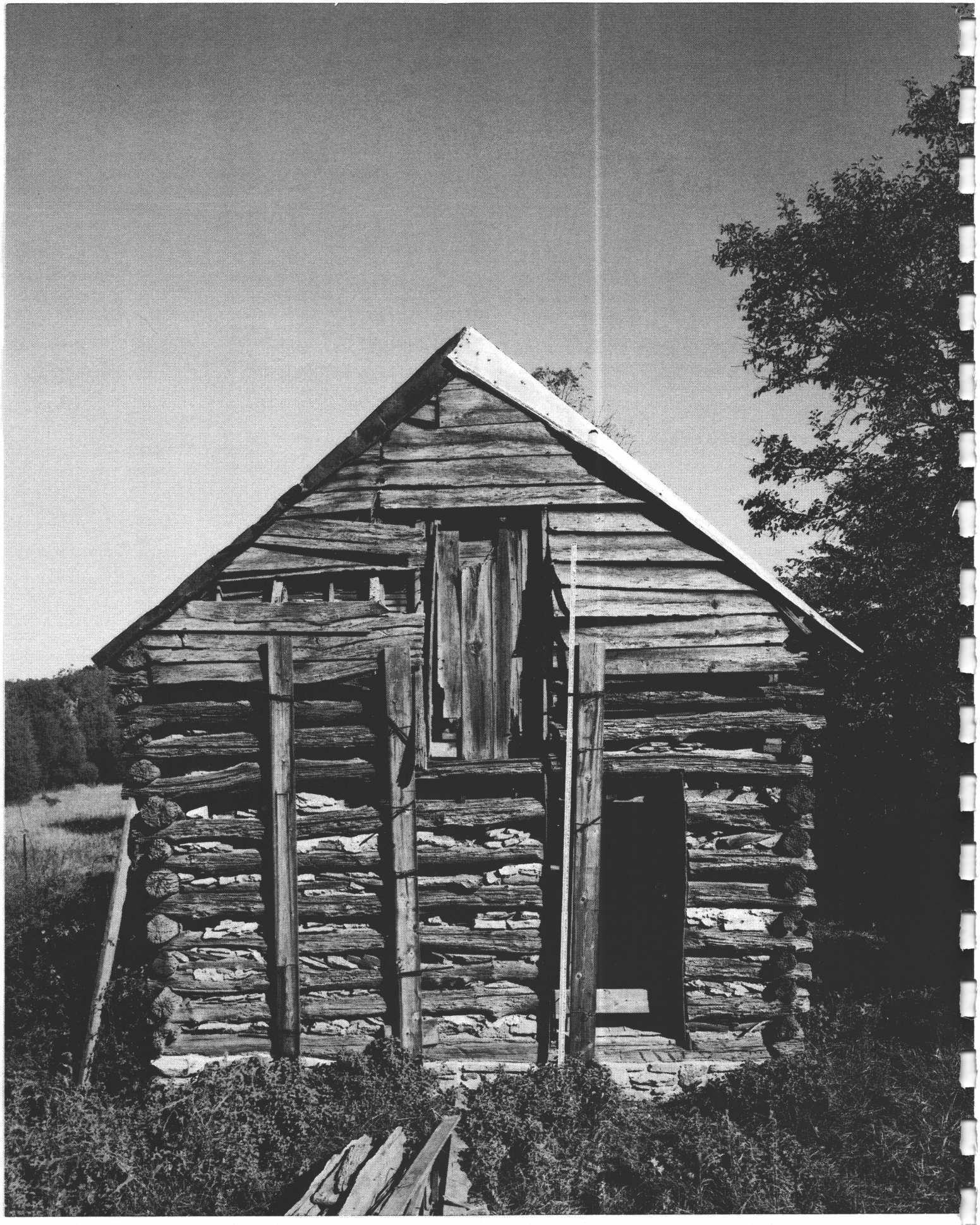
MD-90-11 EXTERIOR, NORTH ELEVATION
OPEN WINDOW AT SECOND FLOOR LEVEL

MD-90-12 EXTERIOR, PERSPECTIVE VIEW FROM NORTHWEST
BRICK MASONRY CHIMNEY THROUGH ROOF

Replicates c1940 view "General View of Rear," POFFENBERGER LOG HOUSE, Thomas Waterman Memo, NPS

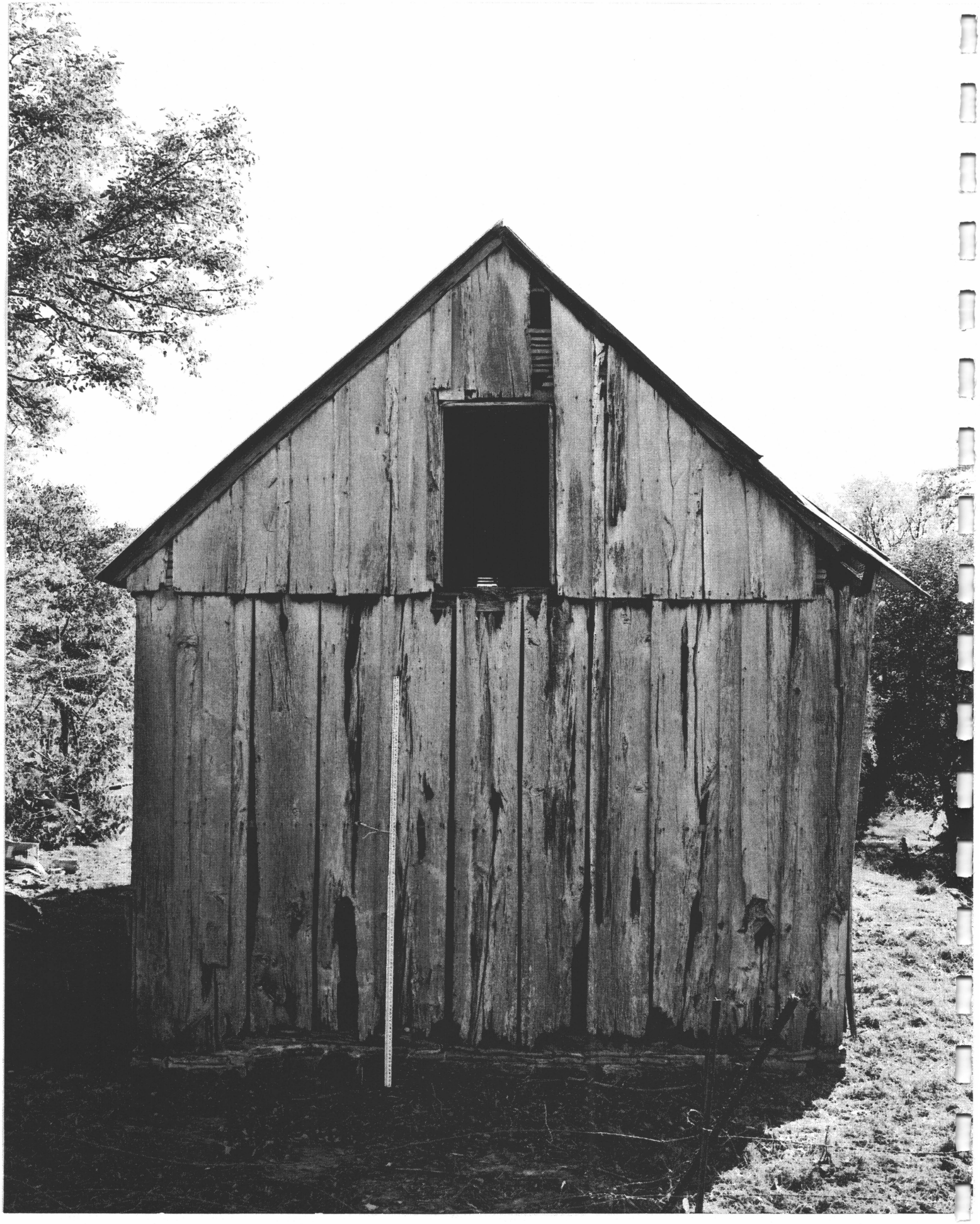
MD-90-13 EXTERIOR, WEST ELEVATION
WINDOW ON LEFT;
BRICK MASONRY CHIMNEY THROUGH ROOF

MD-90-8



MD-90-10

Page 107

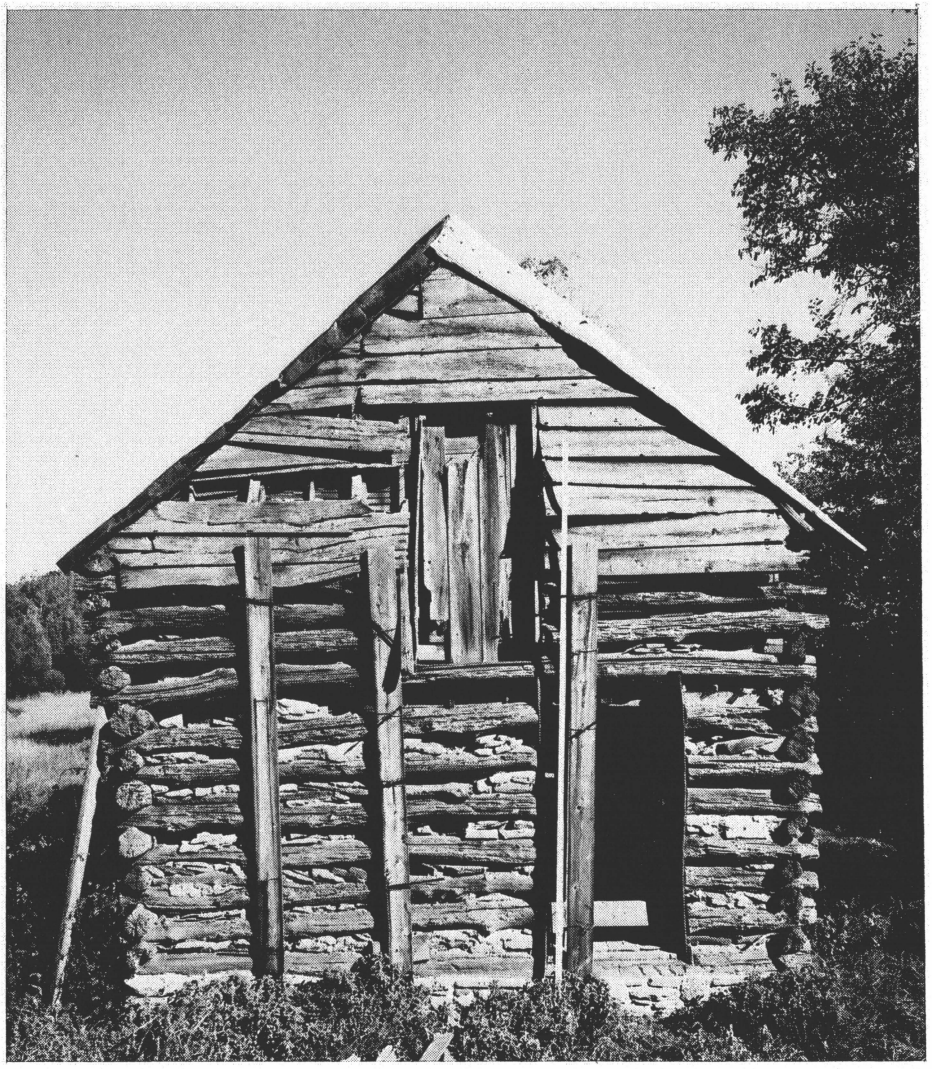


MD-90-12

A WEST ELEVATION

0 1 4 8

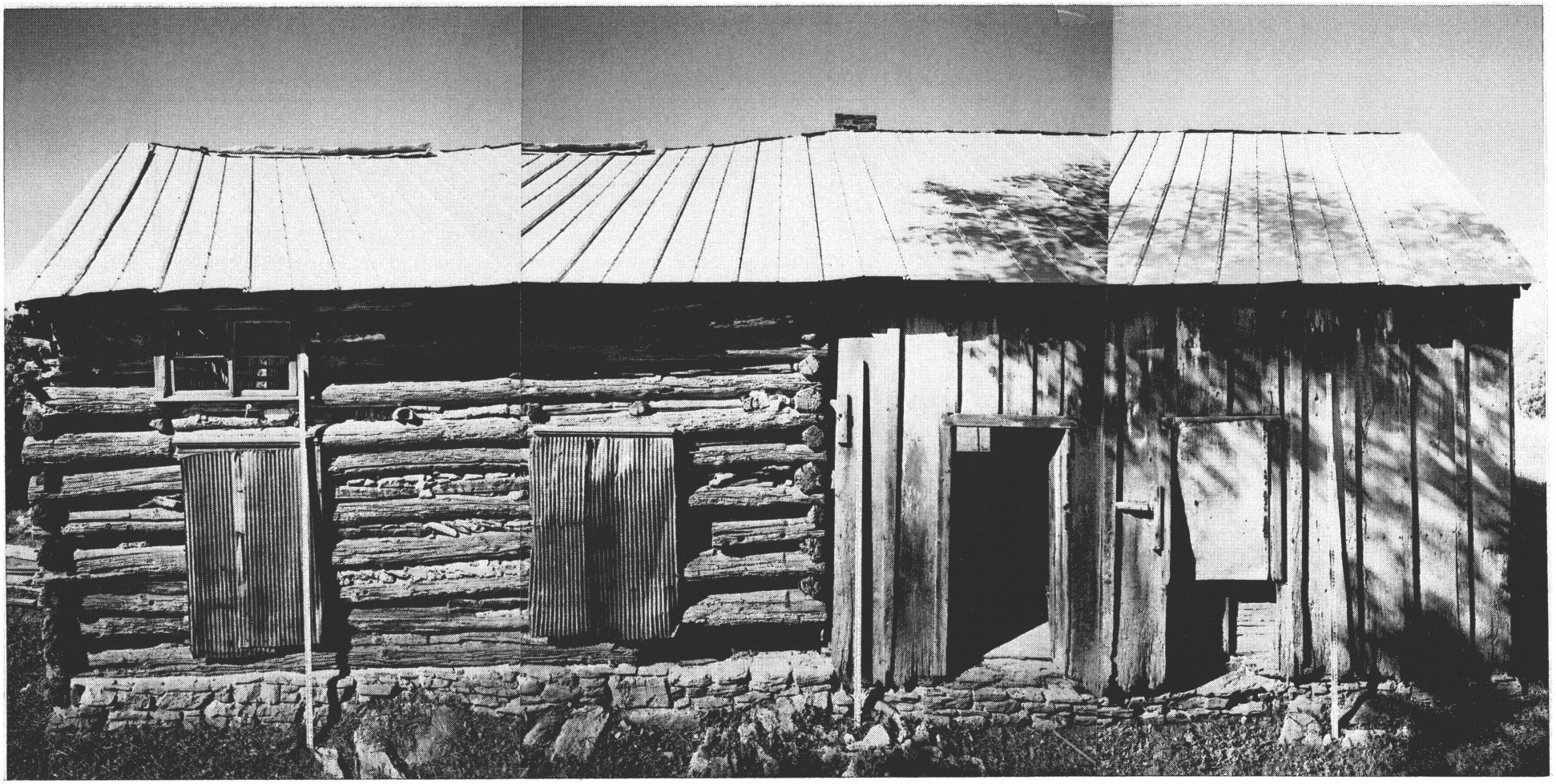
FEET 1/4" = 1'- 0"



B SOUTH ELEVATION

0 1 4 8

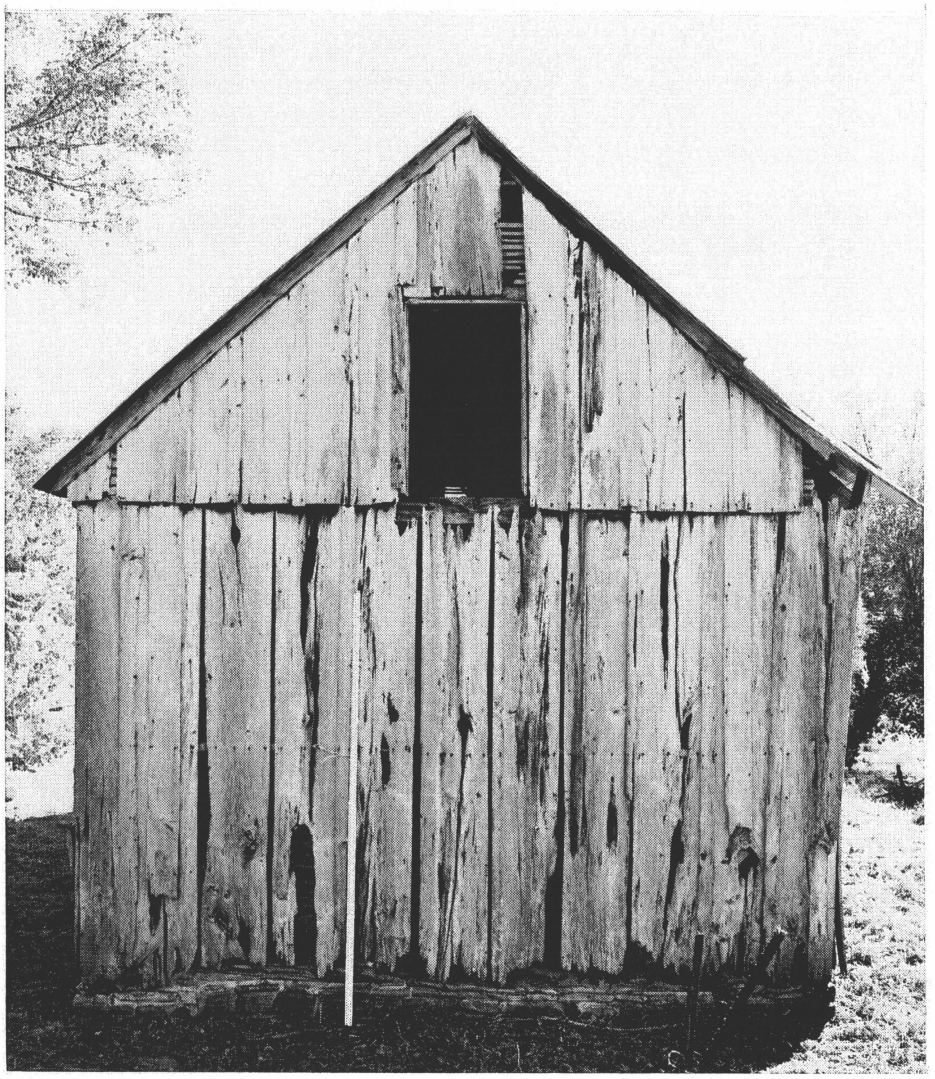
FEET 1/4" = 1'- 0"



C EAST ELEVATION

0 1 4 8

FEET 1/4" = 1'- 0"



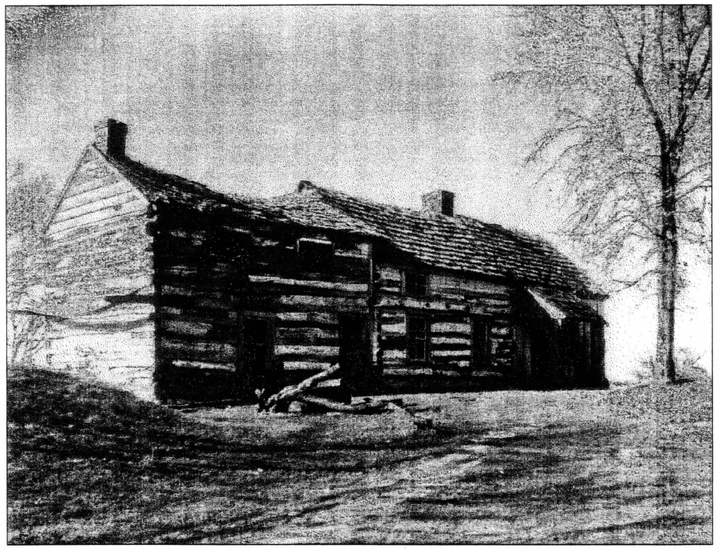
D NORTH ELEVATION

0 1 4 8

FEET 1/4" = 1'- 0"

# MARY LOCHER CABIN

## ANTIETAM NATIONAL BATTLEFIELD

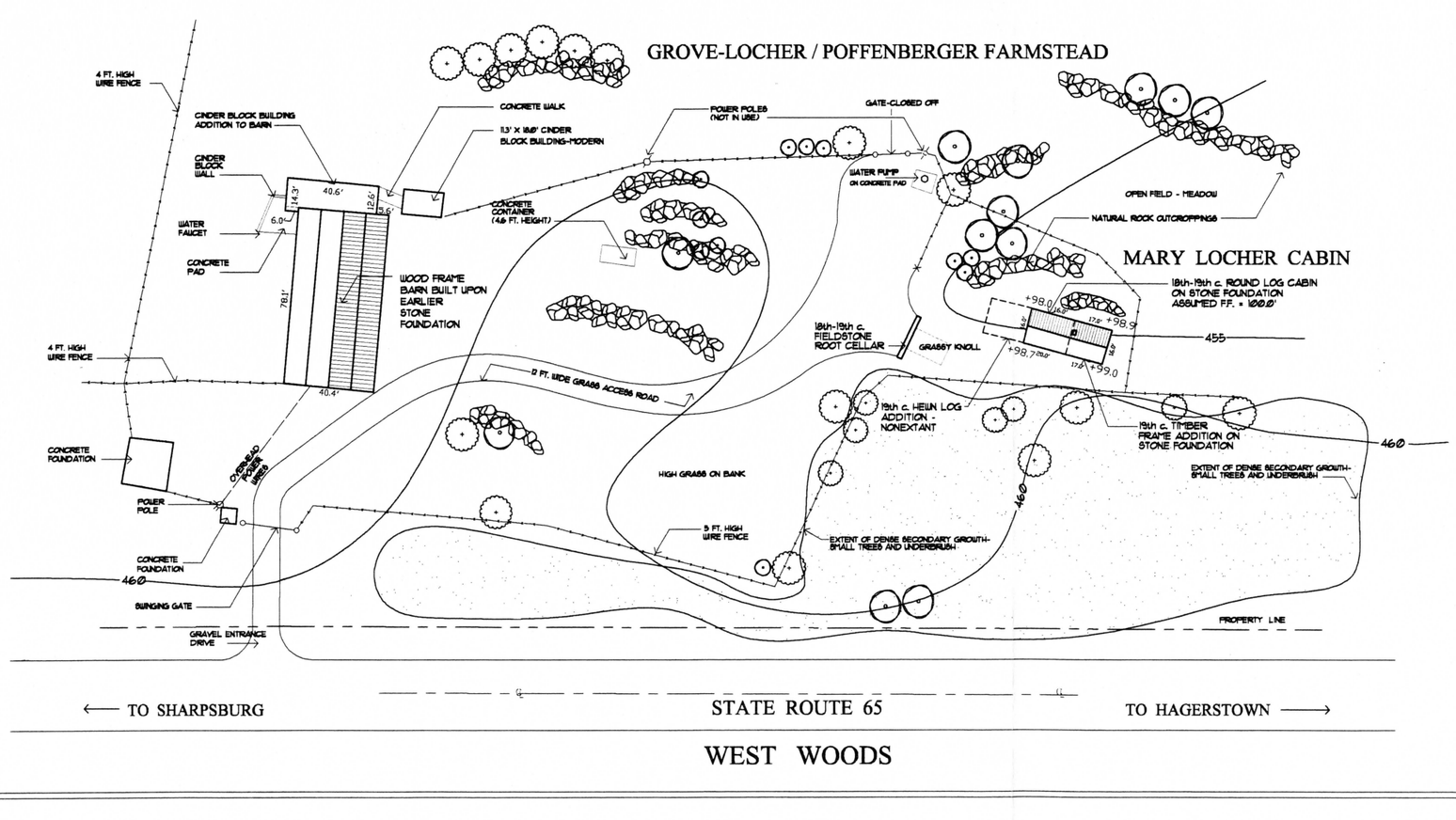


View of the Mary Locher Cabin from the Southeast  Photographer unknown  NPS Collection
Historic Photograph taken before 1940, just prior to collapse of hewn log section to the far left.

This abandoned farm dwelling is historically significant as part of a farmstead that existed before and during the Battle of Antietam, and as a surviving structure in the West Woods landscape, north of the town of Sharpsburg.

The modest, multi-cell structure in its earliest form dates to around the turn of the 19th century, and was likely built for use by the acting tenant farmer and family, on property held by wealthy land speculators. The siting of the log structure on a series of rocky outcroppings, inappropriate for agricultural use, and its location upon a knoll situated along an early farm lane, reflect traditional patterns of rural development in Western Maryland. Ultimately, this specific farmstead like many others in the Hagerstown Valley, were part of the innocent landscape that witnessed one of the most horrific, yet defining battles of the Civil War, the Battle of Antietam - occurring on September 17, 1862.

The dwelling's proximity to the concentration of fighting at the West Woods, where the Union and Confederate armies clashed in the bloody morning phase of the battle, guaranteed the property's role as a field hospital. The farm was occupied by Confederate troops leading up to the battle, and was used as an encampment for weeks after. At this time, title to the farm property was held by Mary Locher of the locally prominent Grove Family. Mrs. Locher, an absentee owner residing in Pennsylvania, leased to a tenant farmer, Alfred Poffenberger, of a large, local farming family. It was Alfred Poffenberger, the Civil War era resident, who filed a war claim to the Federal Government for the destruction and seizure of crops. Alfred's younger step-brother, George Poffenberger, purchased the farm in the 1890s from the Locher hiers, and although he soon after built a grand residence across Hagerstown Pike, the cabin and barn remained in the family until acquired by the National Park Service for inclusion in the Antietam National Battlefield.




KEY

- EVERGREEN TREE-MOSTLY NATIVE CEDAR
- DECIDUOUS TREE-VARIOUS SPECIES
- NATURAL ROCK OUTCROPPING
- F.F. FIRST FLOOR
- ℄ CENTER LINE
- +99.0 SPOT ELEVATION

TOPOGRAPHY TAKEN FROM U.S. GEOLOGICAL GEOLOGICAL SURVEY
SITE SURVEYED BY HAROLD A. LOGAN ASSOCIATES, P.C., CIVIL ENGINEERS

NORTH

## SITE PLAN

SCALE: 1" = 30'- 0"

0 15 30 60 120 FEET

THE PROJECT TO MEASURE AND RECORD THIS HISTORIC PROPERTY WAS PERFORMED BY ARCHITRAVE P.C., ARCHITECTS, WASHINGTON, D.C., FOR THE NATIONAL PARK SERVICE, NATIONAL CAPITAL REGION, 1999-2000. MEMBERS OF THE FIELD SURVEY TEAM INCLUDED SUSAN BUCHAN, LYNN ALSMEYER-JOHNSON, MARGARET MOOK AND MARIANNE GRAHAM.

HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 1 OF 05 SHEETS

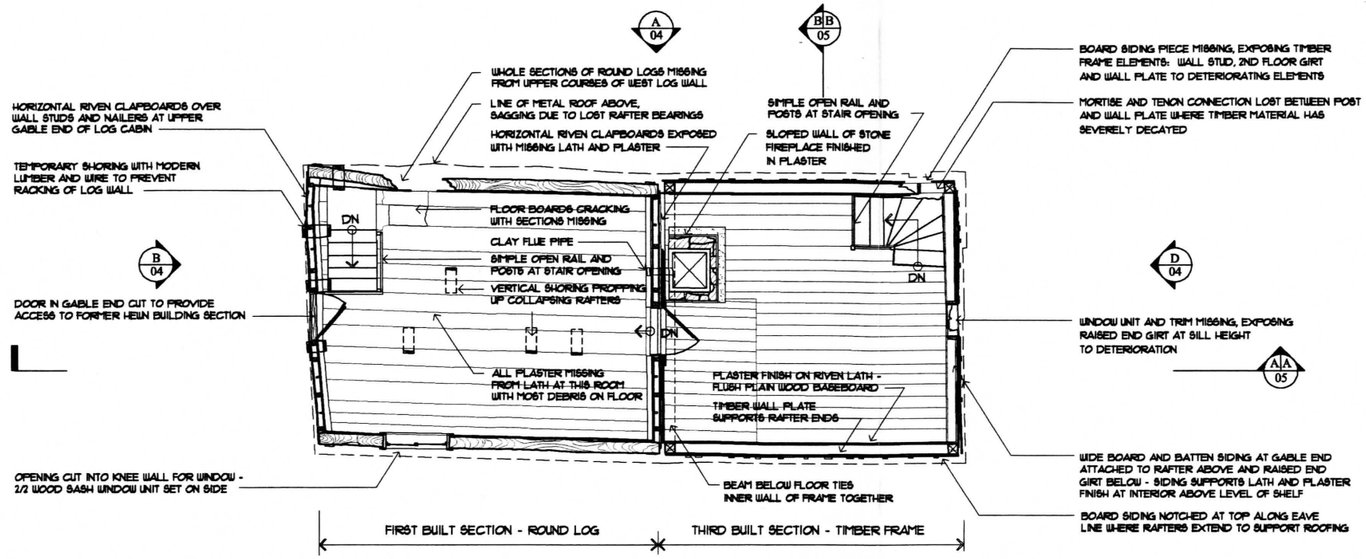
SURVEY NO. MD-90

MARY LOCHER CABIN (A. POFFENBERGER HOUSE)
ANTIETAM NATIONAL BATTLEFIELD  SHARPSBURG VICINITY  WASHINGTON COUNTY  MARYLAND

DRAWN BY: ANDREW SCOTT, MARIANNE GRAHAM

MARY LOCHER CABIN, 1999-2000
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

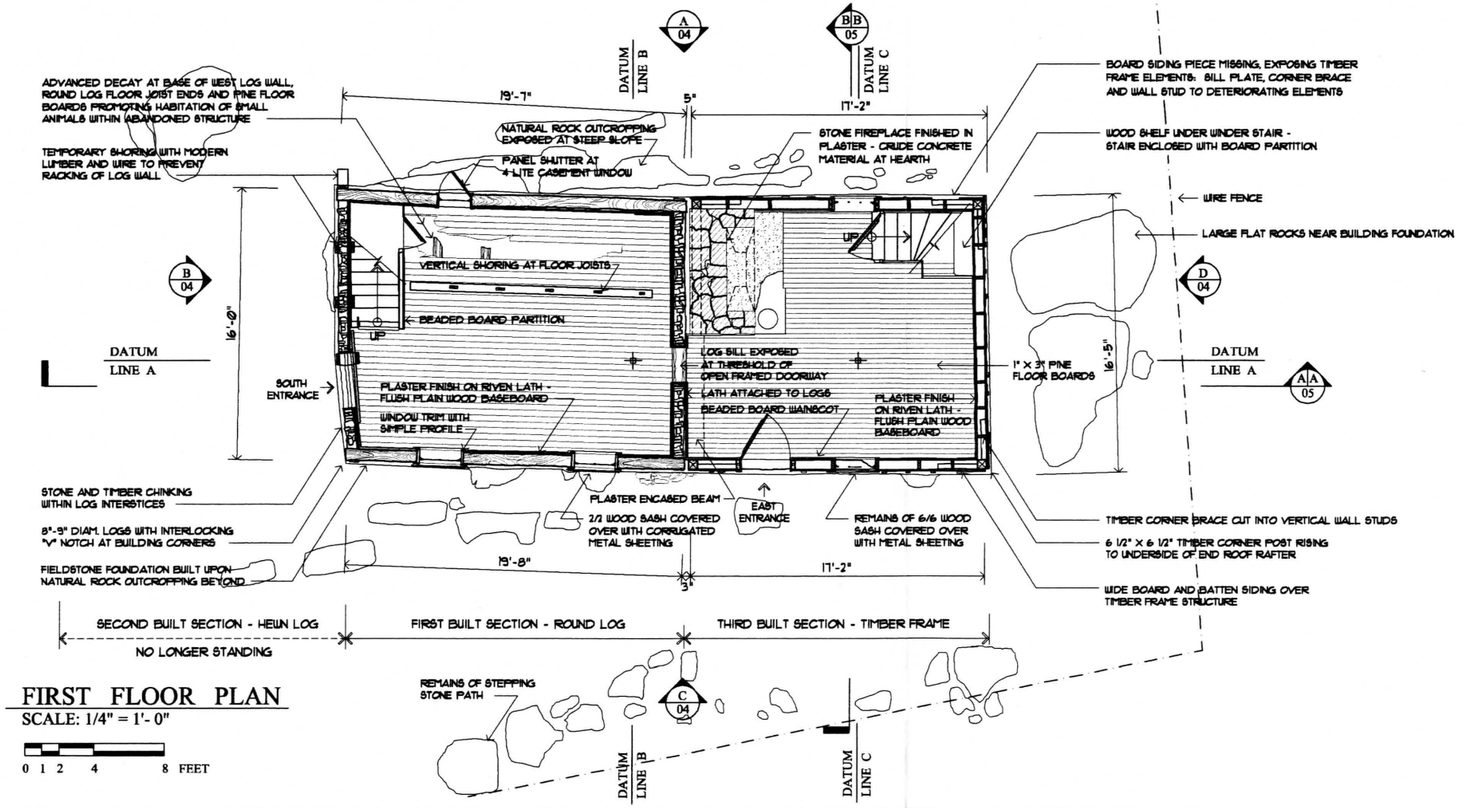
IF REPRODUCED PLEASE CREDIT THE HISTORIC AMERICAN BUILDINGS SURVEY, NATIONAL PARK SERVICE, NAME OF DELINEATOR, DATE OF DRAWING




## SECOND FLOOR PLAN

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

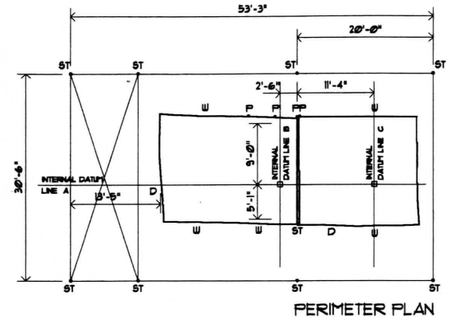
0 1 2 4 8 FEET




## FIRST FLOOR PLAN

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

0 1 2 4 8 FEET




PERIMETER PLAN

## NOTES

DUE TO THE IRREGULAR NATURE OF THE EXTANT PHYSICAL STRUCTURE, FIELD MEASURING OF THE EXTERIOR PERIMETER OF THE CABIN WAS ACHIEVED USING THE TRIANGULATION METHOD. ABOVE IS A DIAGRAM DOCUMENTING THE LOCATION OF STAKES FROM WHICH MEASUREMENTS WERE TAKEN TO PINS PLACED AT STRATEGIC POINTS, WINDOW AND DOOR JAMBS AND BUILDING CORNERS. INTERNAL DATUM LINES ARE LOCATED IN RELATION TO THESE MEASURING POINTS. DATUM LINES ARE MARKED IN DRAWINGS IF USED TO COLLECT DATA FOR PARTICULAR PLAN OR SECTION VIEW.

ST= STAKE P= PIN W= WINDOW D= DOOR

THE NATIONAL PARK SERVICE HAS TAKEN PRELIMINARY STEPS TO PROTECT THE CABIN STRUCTURE FROM IMMEDIATE COLLAPSE. TEMPORARY SHORING MEMBERS, ADDED DURING THE 1990s, ARE SHOWN WITHIN THESE DRAWINGS AS THE MOST RECENT LAYER OF THE ABANDONED DWELLING'S HISTORY.

## KEY

- ROUND LOG AT CABIN STRUCTURE
- STONE AND TIMBER CHINKING WITHIN LOG INTERSTICES - WITH TRACES OF DAUBING EXTANT ON EXTERIOR OF CABIN STRUCTURE
- HELN FRAMING STUD AT CABIN GABLE ENDS
- STRUCTURAL MEMBER OF TIMBER FRAME - PRIMARY DRESSED HEAVY TIMBER POSTS, PLATES AND GIRTS
- DRESSED TIMBER WALL STUD WITH TENON EXTENDING INTO MORTISED TIMBER SILL PLATE
- TEMPORARY SHORING MEMBER

ACTUAL NORTH

IF REPRODUCED, PLEASE CREDIT THE HISTORIC AMERICAN BUILDINGS SURVEY, NATIONAL PARK SERVICE. NAME OF DELINEATOR, DATE OF DRAWING

DRAWN BY: ANDREW SCOTT, MARIANNE GRAHAM

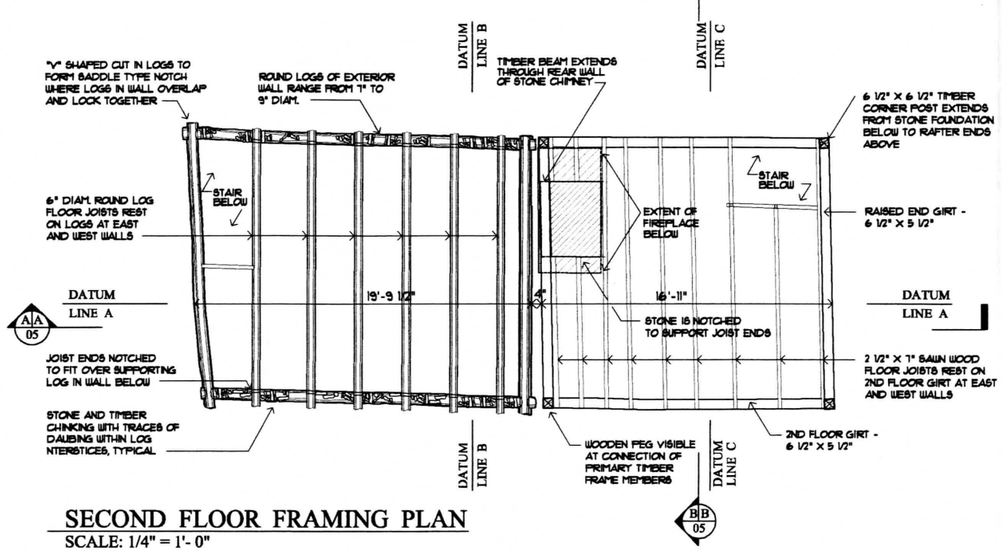
MARY LOCHER CABIN, 1999-2000
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

# MARY LOCHER CABIN (A. POFFENBERGER HOUSE)

ANTIETAM NATIONAL BATTLEFIELD — SHARPSBURG VICINITY — WASHINGTON COUNTY — MARYLAND

HISTORIC AMERICAN BUILDINGS SURVEY — SHEET 2 OF 05 SHEETS

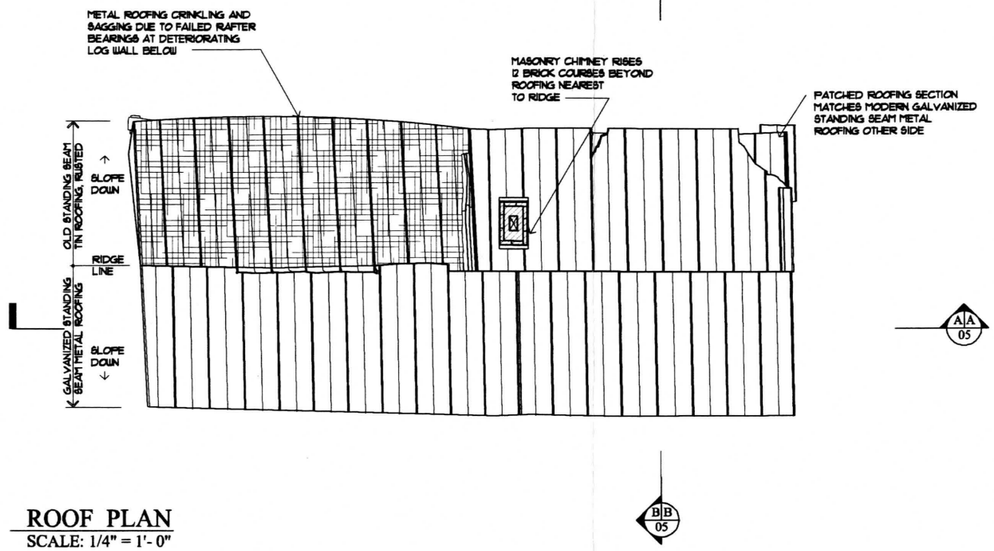
SURVEY NO. MD-90




## SECOND FLOOR FRAMING PLAN

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

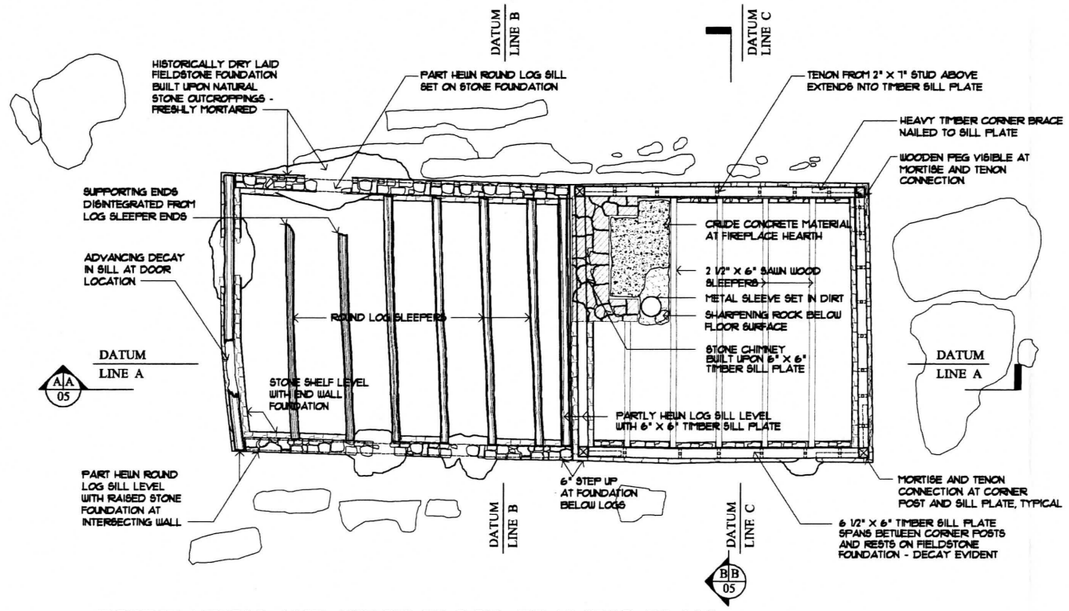
0 1 2 4 8 FEET




## ROOF PLAN

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

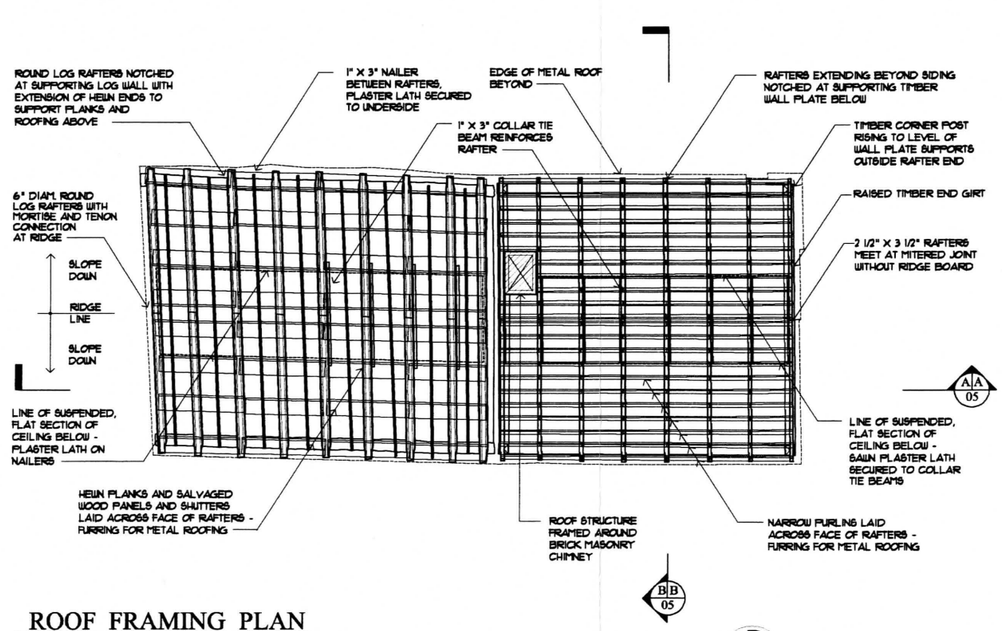
0 1 2 4 8 FEET




## FOUNDATION AND FIRST FLOOR FRAMING PLAN

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

0 1 2 4 8 FEET




## ROOF FRAMING PLAN

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

0 1 2 4 8 FEET

ACTUAL NORTH

DRAWN BY: ANDREW SCOTT, MARIANNE GRAHAM

MARY LOCHER CABIN, 1999-2000

NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

# MARY LOCHER CABIN (A. POFFENBERGER HOUSE)

ANTIETAM NATIONAL BATTLEFIELD — SHARPSBURG VICINITY — WASHINGTON COUNTY — MARYLAND

HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 3 OF 05 SHEETS

SURVEY NO. MD-90

IF REPRODUCED, PLEASE CREDIT THE HISTORIC AMERICAN BUILDINGS SURVEY, NATIONAL PARK SERVICE, NAME OF DELINEATOR, DATE OF DRAWING

BRICK MASONRY CHIMNEY TOP WITHOUT COVER

OLD STANDING SEAM TIN ROOFING WITH RUSTING FINISH

SIDING NOTCHED FOR EXTENDED RAFTER ENDS

WIDE BOARD AND BATTEN SIDING OVER TIMBER FRAMED STRUCTURE

NATURAL ROCK OUTCROPPING AND FIELDSTONE FOUNDATION

OLD STANDING SEAM TIN ROOFING, SAGGING DUE TO FAILED RAFTER BEARINGS AT DETERIORATING LOG WALL

ROUND LOG WALLS WITH SOME STONE AND TIMBER CHINKING AND TRACES OF DAUBING EXTANT WITHIN INTERSTICES

EXTENSION OF SECOND FLOOR ROUND LOG JOISTS

TEMPORARY SHORING MEMBER

PART HEWN LOG SILL PLATE

NATURAL ROCK OUTCROPPING AND FIELDSTONE FOUNDATION

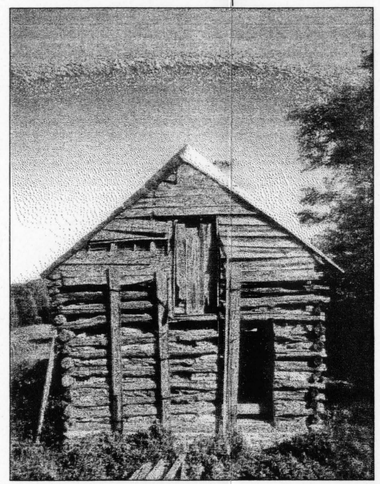
17'-2" | 5" | 19'-7"

BB 05

## A WEST ELEVATION

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

0 1 2 4 8 FEET



STANDING SEAM TIN ROOFING

HORIZONTAL RIVEN CLAPBOARDS ON STUD FRAMING AT UPPER GABLE END

INTERIOR DOORWAY TO FORMER HEWN LOG SECTION

BOARD DOOR OFF HINGES

ROUND LOG WALLS WITH SOME STONE AND TIMBER CHINKING AND TRACES OF DAUBING EXTANT WITHIN INTERSTICES

NATURAL ROCK OUTCROPPING AND FIELDSTONE FOUNDATION

16'-0"

AA 05

## B SOUTH ELEVATION

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

0 1 2 4 8 FEET

STANDING SEAM TIN ROOFING WITH GALVANIZED FINISH

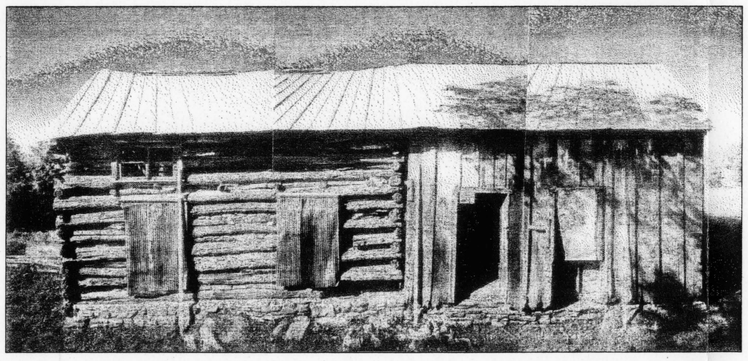
ROUND LOG ROOF RAFTERS NOTCHED AT TOP LOG WITH VISIBLE HEWN ENDS

EXTENSION OF SECOND FLOOR ROUND LOG JOISTS

ROUND LOG WALLS WITH SOME STONE AND TIMBER CHINKING EXTANT WITHIN INTERSTICES

PART HEWN LOG SILL PLATE

NATURAL ROCK OUTCROPPING AND FIELDSTONE FOUNDATION



STANDING SEAM TIN ROOFING

SIDING NOTCHED FOR EXTENDED RAFTER ENDS

WIDE BOARD AND BATTEN SIDING OVER TIMBER FRAMED STRUCTURE

WINDOW OPENINGS COVERED OVER WITH METAL SHEETING AT BOTH BUILDING SECTIONS, SIDING MISSING BELOW WINDOW TO EXPOSE WALL CAVITY AT TIMBER FRAMED SECTION

NATURAL ROCK OUTCROPPING AND FIELDSTONE FOUNDATION

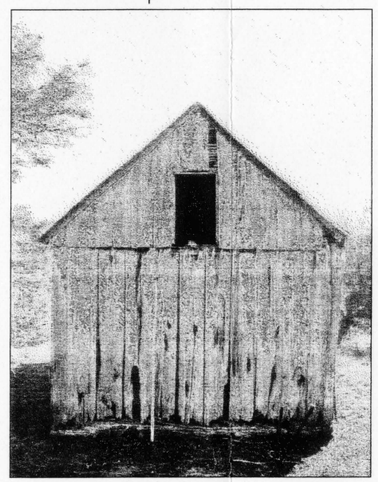
19'-8" | 3" | 17'-2"

BB 05

## C EAST ELEVATION

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

0 1 2 4 8 FEET



PLAIN FASCIA BOARD

WIDE BOARD AND BATTEN SIDING AT UPPER GABLE END

MISSING WINDOW UNIT

OVERLAP OF SIDING OCCURS AT HEIGHT OF END GIRT BEYOND

WIDE BOARD AND BATTEN SIDING OVER TIMBER FRAMED STRUCTURE

NATURAL ROCK OUTCROPPING AND FIELDSTONE FOUNDATION

16'-5"

AA 05

## D NORTH ELEVATION

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

0 1 2 4 8 FEET

### NOTES

SCALE OF PHOTOGRAPHS IS ONLY ACCURATE IN MAIN PLANE OF RESPECTIVE BUILDING ELEVATIONS. SIGNIFICANT DISTORTION OCCURS BEYOND THIS PLANE. ELEVATIONS PHOTOGRAPHED BY JUDY DAVIS OF HOACHLANDER DAVIS PHOTOGRAPHY, WASHINGTON, D.C.

DRAWN BY: ANDREW SCUTT, MARIANNE GRAHAM

MARY LOCHER CABIN, 1999-2000

NATIONAL PARK SERVICE

UNITED STATES DEPARTMENT OF THE INTERIOR

# MARY LOCHER CABIN (A. POFFENBERGER HOUSE)

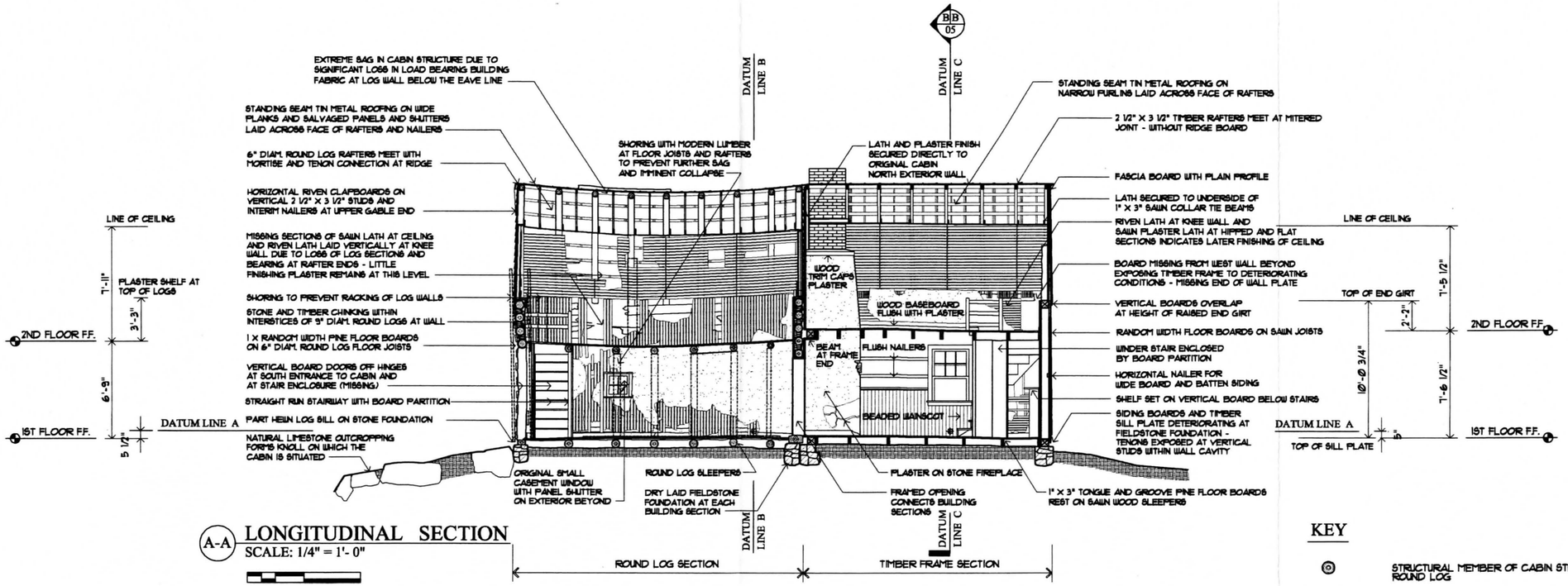
ANTIETAM NATIONAL BATTLEFIELD SHARPSBURG VICINITY WASHINGTON COUNTY MARYLAND

HISTORIC AMERICAN BUILDINGS SURVEY

SHEET 4 OF 05 SHEETS

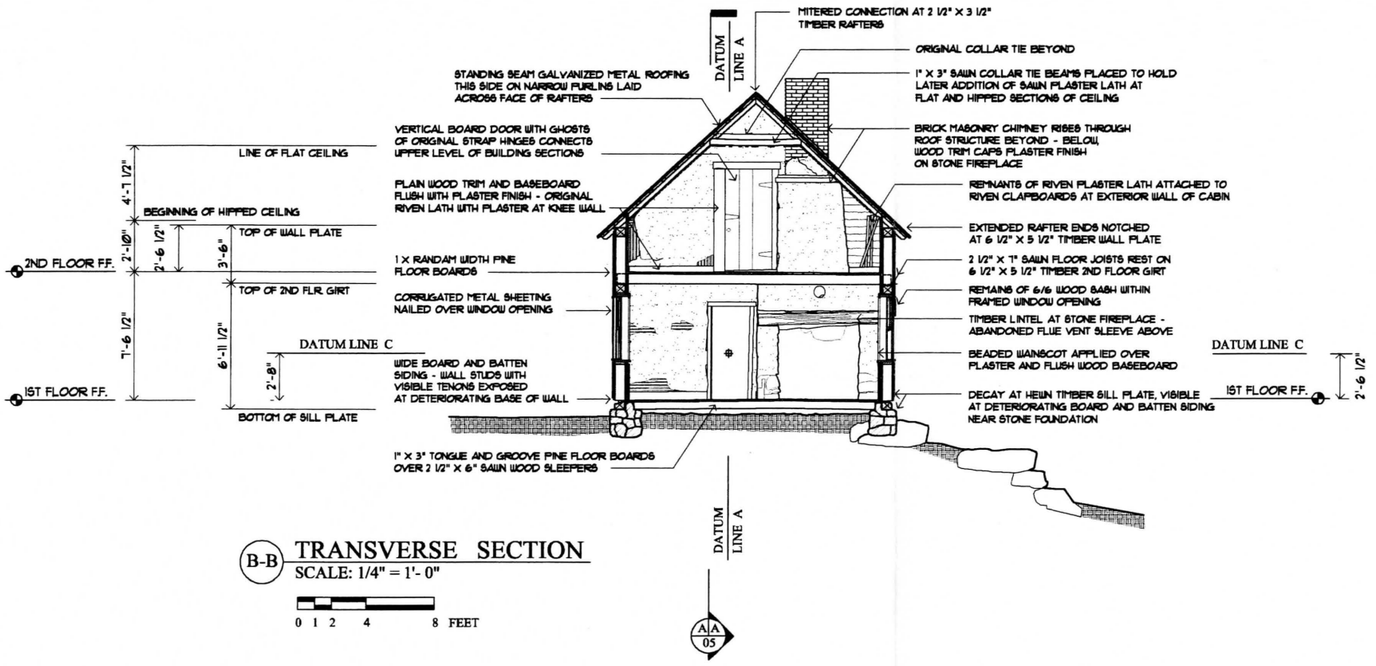
SURVEY NO. MD-90

IF REPRODUCED, CLEARLY CREDIT THE HISTORIC AMERICAN BUILDINGS SURVEY, NATIONAL PARK SERVICE, NAME OF DELINEATOR, DATE OF DRAWING




## A-A LONGITUDINAL SECTION
SCALE: 1/4" = 1'- 0"

0 1 2 4 8 FEET




## B-B TRANSVERSE SECTION
SCALE: 1/4" = 1'- 0"

0 1 2 4 8 FEET

## KEY

- STRUCTURAL MEMBER OF CABIN STRUCTURE ROUND LOG
- STRUCTURAL MEMBER OF CABIN STRUCTURE ROUND LOG WITH FLAT HEWN SURFACES
- STONE AND TIMBER CHINKING WITHIN LOG INTERSTICES WITH TRACES OF DAUBING EVIDENT ON EXTERIOR
- STRUCTURAL MEMBER OF TIMBER FRAME - PRIMARY DRESSED HEAVY TIMBER POSTS, PLATES AND GIRTS
- STRUCTURAL MEMBER OF TIMBER FRAME - SECONDARY SAWN TIMBER JOISTS, RAFTERS AND SLEEPERS
- RIVEN CLAPBOARD
- PLASTER ON HORIZONTALLY LAID LATH, RIVEN OR SAWN AS NOTED
- PLASTER ON VERTICALLY LAID LATH, RIVEN OR SAWN AS NOTED
- REMNANT OF FINISHING PLASTER
- TEMPORARY SHORING MEMBER

## NOTES

THE NATIONAL PARK SERVICE HAS TAKEN PRELIMINARY STEPS TO PROTECT THE CABIN STRUCTURE FROM IMMEDIATE COLLAPSE. TEMPORARY SHORING MEMBERS, ADDED DURING THE 1990s, ARE SHOWN WITHIN THESE DRAWINGS AS THE MOST RECENT LAYER OF THE ABANDONED DWELLING'S HISTORY.

DRAWN BY: ANDREW SCOTT, MARIANNE GRAHAM

MARY LOCHER CABIN, 1999-2000
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

# MARY LOCHER CABIN (A. POFFENBERGER HOUSE)
ANTIETAM NATIONAL BATTLEFIELD — SHARPSBURG VICINITY — WASHINGTON COUNTY — MARYLAND

HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 5 OF 05 SHEETS

SURVEY NO. MD-90

IF REPRODUCED, PLEASE CREDIT THE HISTORIC AMERICAN BUILDINGS SURVEY, NATIONAL PARK SERVICE, NAME OF BUILDING(S), DATE OF DRAWING

# Part 2.

# Treatment and Use

# A. Ultimate Treatment and Use

**As stated by the National Park Service within the Scope of Work for this project:**

> *The ultimate goal for this building and site is to preserve the Mary Locher Cabin through stabilization. Structural stabilization, weatherproofing, and exterior preservation of the cabin will help conserve the historic scene and contribute to the building's long-term existence. The building will not be used for human occupancy, so it will not be heated or cooled and only minimal electrical service is required for security systems, lighting, and light maintenance activities.*
>
> *At some point in the distant future, the National Park Service may desire to undertake further restoration on this structure when and if funds for such a purpose become available.*

**Comments on intended use, suitability and opportunities for interpretation:**

The Grove-Locher/Poffenberger Farmstead, currently the only parcel of land west of Hagerstown Pike owned by the NPS and under public land conservation, is not visually distinguishable by visitors as contained within Antietam National Battlefield. The site is not physically accessible to the visitor either on foot on within an automobile (currently fenced) and only moderately visible as a feature in the landscape, primarily in the winter months when foliage is sparse. Minor references are made to the role of the farm property in the battle as the far position of Division flanks during troop advancements through the West Woods, as stated on commemorative plaques erected along Maryland Route 65.

According to Richard H. Brown, Sr., Chief in charge of Cultural Resources Management for Antietam National Battlefield, the NPS has restored or is in the process of restoring the numerous Civil War era farmhouses located within the interpreted area to their respective morning of September 17, 1862 appearance. As the goal to gradually restore the West Woods landscape to an historic farm woodlot appearance is realized, the Farmstead property will appropriately serve as a scenic buffer to this focal West Woods historic setting. The questions remain to what extent should this peripheral parcel, including the dwelling known as the *Mary Locher Cabin*, woodlot and fields, be returned to its 1862 appearance, as is the goal for the balance of the battlefield, and to what level should the property be interpreted and accessible to the visitor? At most historic buildings contained within the battlefield area, the visitor experiences the physical qualities of the historic setting from the vantage of the outdoors, rather than from building interiors. This interpretive approach is suitable for the *Mary Locher Cabin* site as it is to be conserved as a feature within the cultural landscape of the battlefield, serving as a visual reference point to the progressive events of the morning phase of the battle.

As a landscape feature, from what vantage point should this historic resource, once stabilized and/or restored, be viewed? The dwelling is easily missed from an automobile traveling along Maryland Route 65 with speeds set for conventional highway use. The property is beyond sight

of the road to the east of the West Woods, the official tour route that follows the original alignment of the Sharpsburg-Hagerstown Turnpike. Furthermore, how will the West Woods be experienced by the visitor in the future, as it nears the historic 1862 appearance? It would be inappropriate to further introduce automobiles into this ecologically sensitive historic setting. Established paths for better low tech modes of transportation within the battlefield region, both by foot and by bicycle, are successful in providing nondestructive means for visitation. The addition of accessible footpaths would grant the opportunity for visitors to experience the landscape as the soldiers did the morning of September 17, 1862. Currently, the West Woods is a sensitive conservation area and is only available to visitors by staff lead interpretive walks. This program would lend itself to expansion across the highway, including the Farmstead in the tour. In the future, unobtrusive paths may be extended from the West Woods to the NPS lands west of Hagerstown Pike so that self-guided tours will become possible. These factors should be considered in decisions regarding the level of preservation treatment to be received by this structure and this rural site, both immediately and in the future.

**Cultural Landscape**

Restoration of the dwelling to the period of significance would not be complete without creating a contextual setting, visually representing the farmstead's appearance during the battle. Management of the building would be expanded to include the management of the landscape, including built features. Using historic maps and documentary sources as a guide, especially journals written by soldiers at the time of the battle, features such as the well, orchard, rail fences, farm lanes, outbuildings and woodlots would be restored. Refer to the sketch suggesting a Cultural Landscape Plan, page 123, which poses to recreate the site features as represented on the Hotchkiss Map, among others.

**Historic Interpretation of the Farm Site**

It is suggested if full restoration of the dwelling exterior, beyond strengthening and stabilization, is ultimately sought by the NPS, that the battlefield provide full public access to the building exterior and seize the opportunity for an interactive architectural and agricultural exhibit. The restoration of the structure could become a work in progress with the visitor witnessing traditional methods of vernacular construction with local materials and hand tools commonly used by the ordinary farmer. The farm property possesses the potential to convey the subsistence level agrarian/domestic economy that dominated Western Maryland during the 19th century. The site also presents the opportunity to further interpret the dramatic burden inflicted on the farmers, some owners and some tenants, and their families by the battle events.

Also, if restoration of the battlefield's architectural resources is targeted to represent the morning of the battle in 1862, then full restoration of the *Mary Locher Cabin* to its historic exterior appearance would imply both the restoration of the extant two cell structure and the reconstruction of the missing hewn timber cell, standing at the time of the battle. Photographic documentation of the southernmost section still standing during the 1930s NPS survey and inventory of the battlefield sites, exists for use in recreating this building element. If feasible, this may be an appropriate project for the battlefield to initiate under a cooperative partnership with the Historic Preservation Training Center, located within easy travel distance of the site.

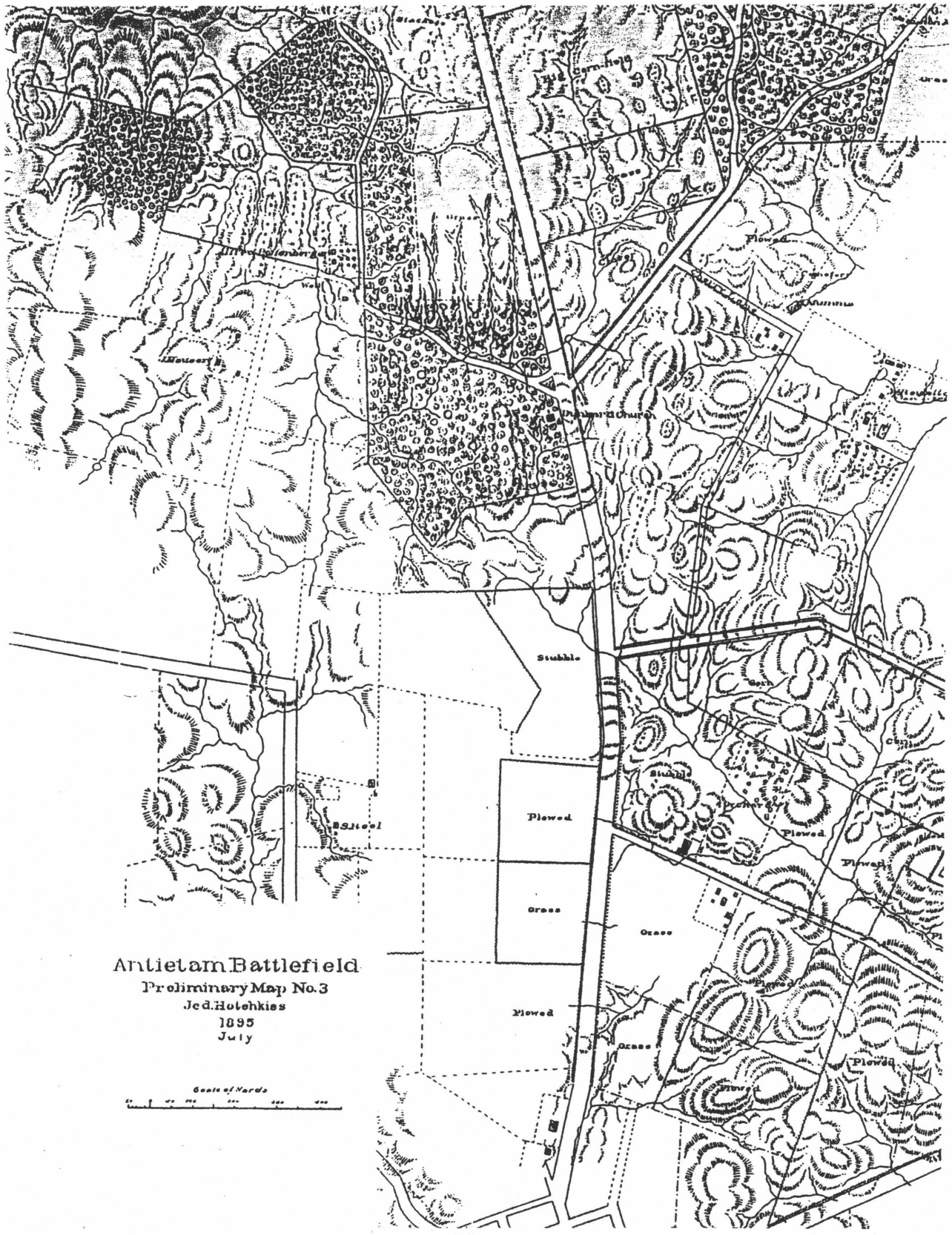



Figure 30. *Hotchkiss Map (1895) of Antietam Battlefield showing natural features and homesites.*

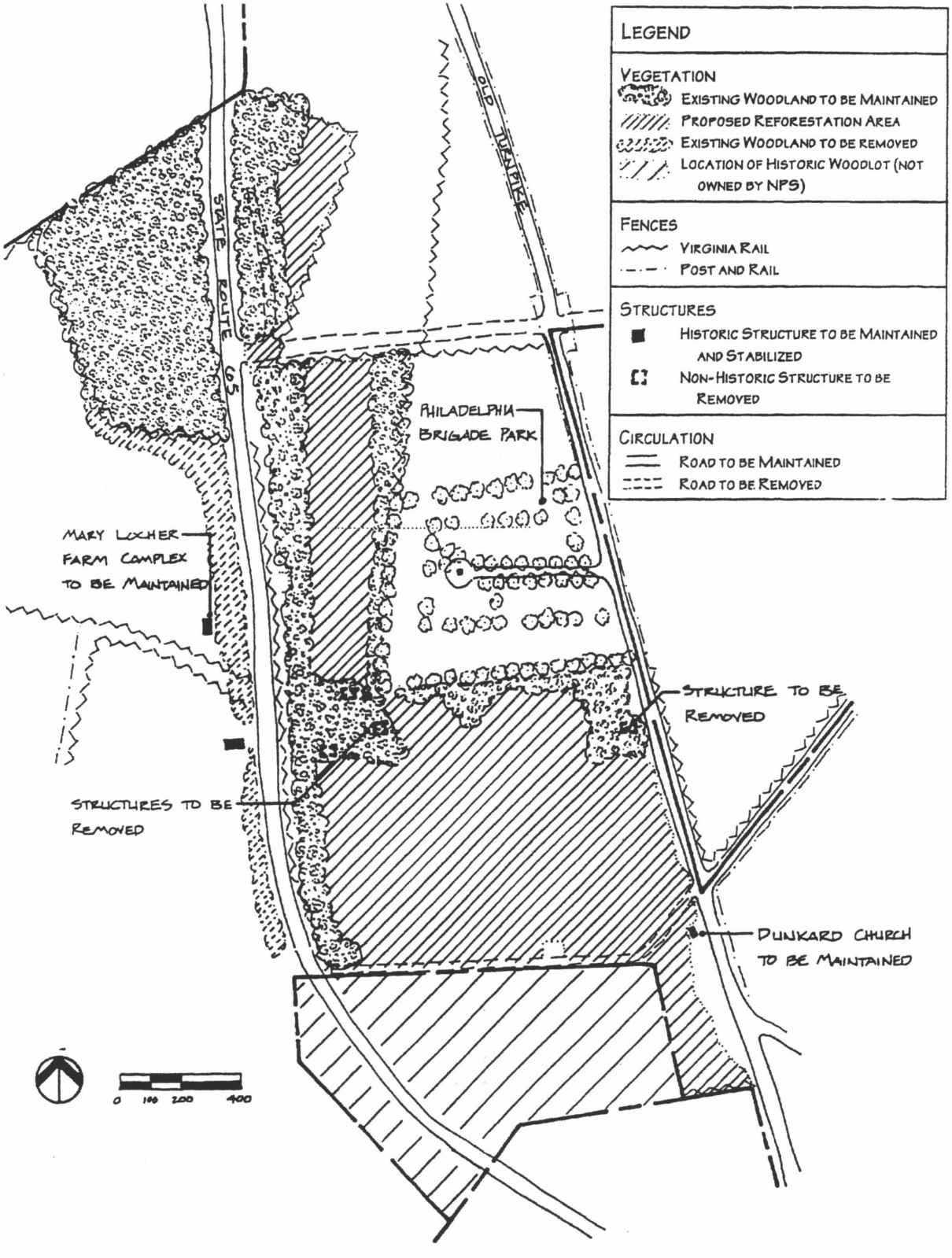



Figure 31. *Sketch by M. DeLay Joseph (1994) showing conceptual plan for reforestation of West Woods.*

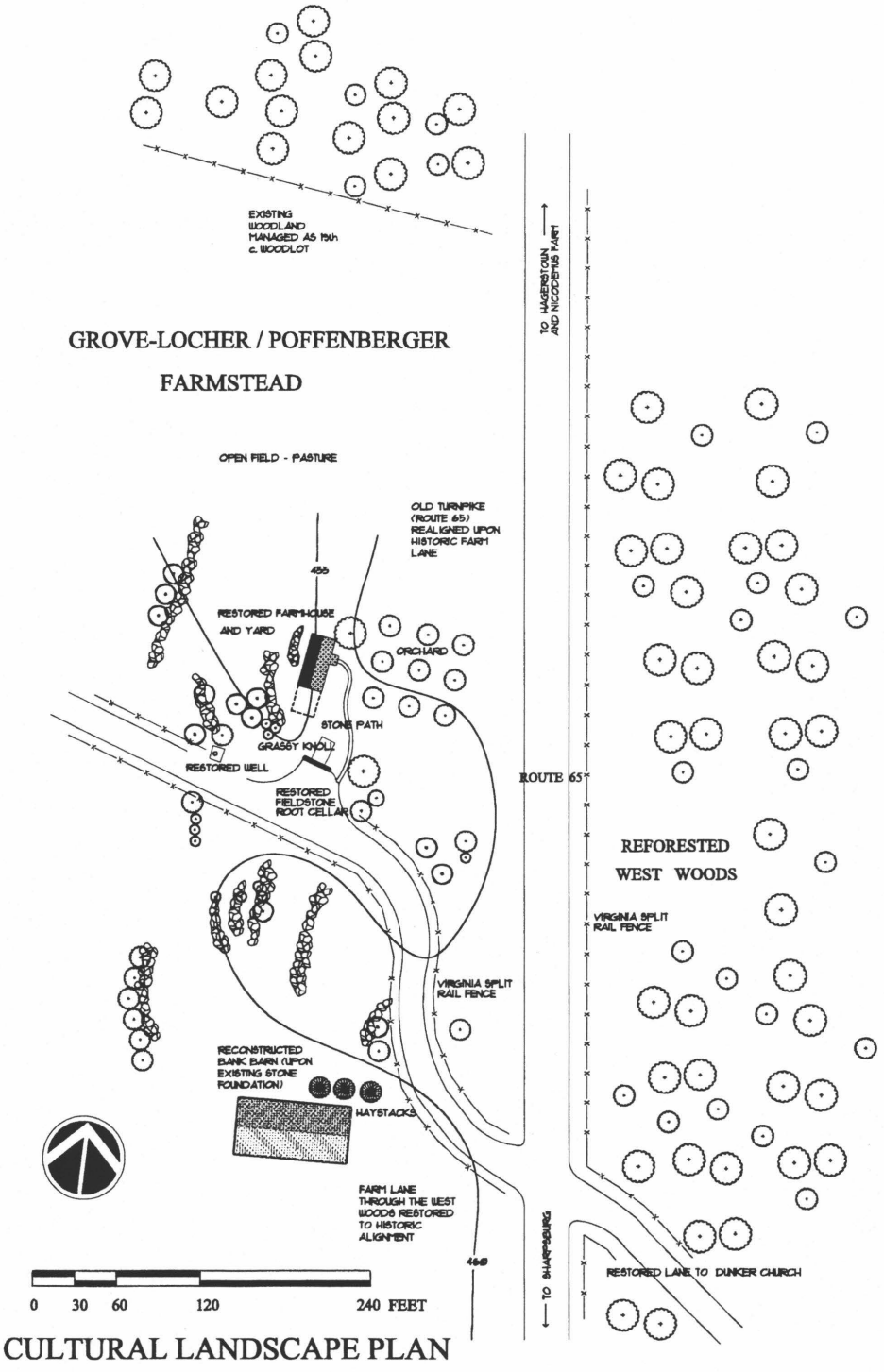



Illustration 5. *Sketch proposal for restoration of Civil War era Site Elements to Locher Poffenberger Farmstead for purpose of historic interpretation.* by architrave p.c., architects

# B. Requirements for Treatment

## Functional Requirements

The NPS goal for the abandoned structure known as the *Mary Locher Cabin* is to guarantee its continuance as a protected feature within the West Woods landscape. According to project objectives, the structure will not be required to serve a specific purpose other than as a broad visual and historical reference for visitors to the Antietam National Battlefield. Actual visitation of the site and structure by visitors will not be encouraged by the National Park Service at this time, due to the physical hazards posed by the unstable structure. Nor will the structure be utilized by battlefield staff for a field office or storage. Although there is no function planned for this facility including human habitation, the structure must be improved to meet basic structural load requirements in order to remain standing over time, and to provide structural stability for protection of NPS staff and other workers who must enter or otherwise work on the building.

## Codes, regulations and impact of compliance on historic fabric

**Life Safety and Fire Protection**

With no human habitation planned for this structure, upgrades are not required for compliance with these code requirements. However, wayward visitors may discover the abandoned structure and be curious about the extraordinary construction methods of this early dwelling. Unauthorized entrance to the structure, which is not presently secured, may pose dangers to the visitor due to structural instability, unsound floor boarding, and presence of flaking lead-containing paint within the interior rooms. To improve conditions ensuring life safety to the NPS non-employee, limiting liability, doors and windows must be present within exterior openings (or otherwise enclosed and secured), with locking mechanisms introduced with minimal damage to historic fabric.

Due to the absence of on-site presence of NPS staff on a daily basis, it would be advisable to install fire/heat detectors with remote surveillance. This would improve the ability for fire crews to be alerted early, arriving in time to save the log and timber structure from the imminent doom of undetected fire. However, full catastrophic loss if the historic resource was destroyed by fire, will be somewhat reduced upon the completion of historic recordation to HABS Standards of the property as part of this project.

**Hazardous Materials Abatement**

Refer to Appendix B2 of this report for the full survey report and recommendations, prepared by Mantech Environmental Corporation. As a result of materials testing, no asbestos containing materials were identified in the structure. A number of paint samples from the cabin interior identified the presence of lead; however, no lead-containing paint was found on the cabin exterior. Therefore, with no human habitation planned for this structure, hazardous materials

abatement is not required to be performed at this time. If, however, under the process of stabilizing and/or restoring this structure, these hazardous materials are either disturbed or removed, established handling and disposal procedures must be followed by professionally qualified and licensed crews.

**Universal Accessibility**

Universal access describes the need to provide for enjoyment of public property by everyone, from children in strollers, to toddlers, to grandparents, to the wheelchair bound and otherwise mobility impaired, to persons with grasping, visual, and hearing impediments, to fully abled visitors. The Americans with Disabilities Act (ADA) mandates access for the disabled and includes the highly specific range of detailed provisions that are to be made to provide access. The National Park Service and the National Forest Service have developed guidelines for providing access for public landscapes. The Federal Government has developed their own standards, called the *Uniform Federal Accessibility Standard* (UFAS). These guidelines, with ADA requirements, should be used to develop a comprehensive plan to provide as complete access to the site as is practical and consistent with the historic fabric of this historic structure if public access is provided.

Until the final objectives of this project are realized with stabilization and/or restoration of this currently unsafe structure, visitors will not be allowed entrance into this property. Upon restoration, the accessibility of visitors to the site and the exterior setting of the historic cabin should be re-evaluated by the NPS and battlefield staff. With no future plans to allow visitors within the interior of the stabilized structure, even upon full exterior restoration, there is no legal requirement or obligation to physically alter the building in order to provide "universal accessibility" for visitors. Provisions for universal accessibility to the site as a public landscape, may be required if the farmstead becomes a primary part of the Antietam National Battlefield interpretation plan in the future. Parking facilities and the substantial slope from Maryland Route 65 to the existing structure would present the greatest challenges in meeting these requirements. The site, however, would lend itself to a low-impact visitation approach with battlefield interpretive staff leading small groups to the farm on foot paths and along historic road beds through the West Woods. The protection (from fast moving traffic) of a group of visitors attempting a physical crossing of Maryland Route 65 on foot remains an issue.

**Structure (loading)**

Refer to the structural evaluation prepared by McMullen & Associates, Inc. contained within the body and Appendix B1 of this report. As documented by the structural engineers, the building's log walls have seriously deteriorated to the point where portions of the building are in danger of collapse. This immediate problem should be addressed first, by shoring and second, by rebuilding the load bearing walls. The remainder of the floor and roof framing needs to be supported, strengthened or repaired in order to adequately support dead loads and the addition of any significant live loads. Although no regular human habitation is planned for this structure, nor additional loads posed from the weight of stored materials, these steps must be taken to ensure the preservation of the resource as a standing structure within the landscape.

**Mechanical, Plumbing and Electrical**

The structure has not been upgraded to include mechanical or plumbing equipment, and it is not recommended that modern service be introduced. Because of the nature of historic construction of this kind (i.e. highly permeable) it is generally not desirable to create a thermally controlled interior due to issues of condensation. With no plans to store materials or to restore the cabin interior, this is not an issue.

The mere stabilization of the *Mary Locher Cabin* will continue to allow a free, passive flow of air through the historic exterior building materials, limiting a build up of trapped moisture, and will not require the introduction of mechanically operated ventilation systems. The full restoration of the building exterior to its historic appearance may seal the building envelope to the extent that mechanical measures may be preferable over a passive system, if installed with minimal damage to the historic fabric. Beyond ventilation, there are no mechanical requirements for the structure. Heating and cooling systems are not required for any treatment alternative posed in this report.

It is recommended that underground electrical and minor communications service be provided to this structure in the future if stabilized and/or restored. Currently, an electrical generator is required for any power requirements at the structure. The site beyond is serviced with an overhead electrical line running from a power pole near the access gate to the barn. To connect this service to the dwelling will require trenching approximately 300 feet, the distance from the barn on the opposite side of the abandoned farm lane. However, the rocky conditions of the site may prove difficult during the excavation of a trench. To avoid potential archeological resources, minimal digging of the site would be necessary with a monitor present on the site while work is being performed.

Electrical service would allow use of power tools for maintenance and repair beyond the construction work required to stabilize the structure. Communications service would allow security and fire monitoring. Motion detectors, however, would not be useful due to the high travel of deer and other small animals through the site and around the structure. All outlets for electric supply and communications on the interior should be located as discreet as possible.

# C. Alternatives for Management and Treatment Options

## Alternative 1: Managing the Structure as a Ruin

This alternative requires no significant intervention, but without immediate steps to stabilize the former dwelling, it will eventually collapse and disintegrate over time. This approach allows the structure to decay unabated and the site to gradually return to its natural state with no active management strategies. Upon collapse of the dwelling, no longer a "standing ruin" but a pile of collapsed timbers and stone, this alternative does not meet NPS preservation objectives. As a National Register eligible resource, this alternative would represent demolition by neglect, and non-compliance with mandated obligations for federal agencies to preserve important public-held historic and architectural resources under their jurisdiction, as required by law under the National Historic Preservation Act of 1966, as amended. However, mitigation for non-preservation is being performed under this project with recordation of the "cabin" to HABS standards, ensuring that important historic information about the structure is effectively preserved.

The NPS has recently taken steps to remove individual safety hazards such as the collapsing entrance canopy once located at the timber frame section, but the open doors and windows invite entrance into the unsafe, failing structure. These physical openings and significant missing sections of floor boards have allowed birds and small burrowing animals to enter and live within the structure unabated, adding another aspect to the hazardous conditions inherit to the building. The structure as it stands today requires enclosure, padlocking and the installation of security fencing on the site in order to limit threat of public or NPS staff injury or death due to impending structural failure. Personal liability becomes a primary issue with the selection of this alternative (perhaps by default), making it important to limit public awareness of the resource. Therefore, historic interpretation of the structure and site would not be advisable.

**Steps to Secure Structure and Site**

1. Remove ground animals that are physically living within the structure and prevent the ability for birds to fly through without restriction. Install plywood panels over holes in flooring and on the interior walls where significant gaps are present due to decaying logs and missing siding. Install screened hood at chimney top. Broom clean waste matter from floor surfaces.
2. Close door and window openings with plywood panels, secure with locking mechanisms – safety rather than historical accuracy is primary issue with this treatment approach.
3. Retain existing wood shoring members.
4. Repair joints and finish coat existing metal roof material to extend protection to structural members. Retention of the metal roofing, installed after the structure's period of significance, is acceptable with this treatment approach that is focused on safety.

5. Install security fencing around the perimeter of the structure. Locate an 8 foot high chain link fence around the building set at 5 feet from the walls, and post warning signs indicating danger and no trespassing. Note that fencing material, meeting legal requirements, is visually obtrusive to the natural setting and installation procedures may disturb archeological artifacts. Also, the prevalence of rock outcroppings along the west side of the building will make the location and installation of fence posts near the structure difficult.

**Interpretive Strategies**

- None. Inclusion of historic information about the site and structure in general written material about the battlefield and at the Visitor's Center is preferred over on-site interpretation.

**Associated Construction Costs**

Refer to Estimate of Probable Construction Cost - Appendix C – for detailed report
Indirect Costs include 15% General Conditions, 10% Prime Contractor Overhead & Fee, 20% Design Allowance and 4% Escalation Allowance.
*Cost study prepared by Project Cost, Inc.*

Alternative 1: Managing the Structure as a Ruin

| | |
|---|---|
| Labor Total | $ 5,061 |
| Material/Equipment Total | $ 8,490 |
| Subcontract Total | None |
| Direct Costs Total | $ 13,551 |
| With Indirect Costs Total | $ 21,394 |

# Alternative 2: Managing the Structure as a Stabilized Building

This alternative involves moderate intervention to immediately reinforce the structural elements of the two building sections, and additional steps to slow the decaying process that is naturally acting upon the structure in its current state. The immediate addition of a wood bracing system within the building interior is the first recommended action. This permanent shoring system will provide critical support to structural members, and lessen the load on wall systems, without adversely affecting the exterior appearance. Additional interior bracing to directly reinforce existing log wall members and protect against racking action will further assist in slowing movement in the structure. However, it is difficult to achieve a stabilized wall section with a high degree of structural integrity without performing a significant level of repair and restoration to the load bearing log walls and the posts and beams of the timber frame section. In accordance with the Secretary of the Interior's Standards, repair of salvageable historic material is always preferred over wholesale replacement if "preservation" can be achieved. Furthermore, a reasonable effort to represent historic conditions when new or replacement materials are required for stabilization purposes is recommended, but not required by this management approach.

The NPS has begun the stabilization process by adding shoring members to sagging and stressed structural elements both on the interior and exterior of the dwelling. These props are viewed as temporary bracing members and will be recommended for removal from the structure upon the completed construction of the interior shoring system.

**Alternative 2** is essentially *mothballing* the building and is an acceptable preservation treatment under the Secretary of the Interior's Standards for the Treatment of Historic Properties. Upon stabilization, a program of regular inspections is required to monitor conditions in and around the building.

**Steps of "Preservation" Level Treatment - Work Required to stabilize/slow deterioration**

General

1. Remove ground animals that are physically living within the structure and prevent the ability for reentry and for birds to fly through structure without restriction by performing the following: Install plywood panels over holes in flooring and on the interior walls where significant gaps are present due to decaying logs and missing siding. Install visually discreet screened hood at chimney top. Upon enclosure, broom clean waste matter from floors.
2. Clear other loose building materials from the structure's interior, including fallen lath and remnants of plaster. This material harbors moisture against the floorboards and will advance deterioration. Because the log section's upper level is not safely accessible prior to the installation of an interior shoring system, this step could only be safely achieved in this location from the top of the SW corner stairway or the 2nd level doorway from the timber section.
3. Save and inventory architectural building elements that are currently stored within the building, including door and window units that may have been removed from exterior openings.

4. Treat building for wood destroying insects – apply pesticide treatment to surfaces near ground level or inject directly into timbers and inspect yearly for evidence of insects.
5. Secure building against weather by repairing materials of building envelope – water infiltration is currently permitted at the roof, chimney top, chimney flashing, walls, door and window openings.

Structural Stabilization and Reinforcement

1. Perform Phase I - Interior Shoring: Immediate structural strengthening is required to obtain a sufficient level of structural integrity to protect against building collapse Refer to following section in report for proposed plan, sections and details of **Structural Stabilization Plan for the Mary Locher Cabin**.
2. Splice in new post and girt/plate sections from second floor level to roof structure (matching seasoned qualities of original material) at Northwest corner of Timber Frame building section. Restore connections between post and beams. Refer to typical splice diagram.
3. Inspect soundness of roof rafters and connections to determine requirements for additional sister members. Install sister members and reinforce connections prior to upgrading of roofing treatments – allowing for live load of workers potentially accessing roof for materials repair and/or replacement.
4. Perform Phase II – Interior Bracing of Log Walls: Concurrent with repair and partial restoration of log walls, install vertical bracing members on interior of log walls according to **Stabilization Plan**. Adjust supporting steel cable sections to provide adequate tension, keeping logs in a vertical plane rather than current racked position.

Roof (following Phase I: Structural Stabilization)

1. Replace missing sections, repair joints and finish coat existing metal roofing material.
   Option: Replace with in-kind material with factory applied protective coating to extend life of material and reduce cyclical maintenance.
   Note: Retention of the metal roofing, installed after the structure's period of significance, is acceptable with this treatment approach, focused on stabilization.

Wall Repair at Log Section (following Phase I: Structural Stabilization/concurrent with Phase II)

1. Repair partly hewn log Sill Plate by splicing in new sections (selected to resemble seasoned appearance) to replace severely deteriorated material, and inject epoxy consolidation material and ecologically safe pesticide treatment into salvaged sections. Refer to splicing details using epoxy materials and methods outlined in Appendix B of this report.
2. Undertake log repair where severe deterioration threatens building stability, avoiding full log replacement when possible to effectively achieve "preservation." Retain existing log sections that remain sound, extract decayed material, and replace by splicing in new log sections or "dutchman" repair. Select replacement material to match diameter and resemble seasoned qualities of original wood log. Use aluminum or fiberglass rods to reinforce the connection between old and new material and utilize an appropriate epoxy as an adhesive for the connection. Refer to splicing details using epoxy materials in Appendix B of this report.
   **Note:** Based on the advanced deterioration of entire logs rather than sections of logs, the application of this "patch" repair method is limited at this log structure. "Repair by replacement" utilizing in-kind material in the log walls will achieve a higher degree of structural strength which is critical to ensure stability of these load bearing elements.

3. Reinforce salvaged log sections with epoxy consolidant when the condition of the log warrants. This repair treatment will only be successful at log members with a moderate level of deterioration.
4. Cap log crowns by removing decayed materials, cutting back to sound wood, and installing new crowns cut to match. Use aluminum or fiberglass rods to reinforce the connection between old and new material and utilize an appropriate epoxy as an adhesive for the
   Note: Based on the advanced deterioration of entire log sections rather than just end sections, the application of this repair method is limited at this log structure.
5. Replace chinking with suitable local materials (clay, stone, seasoned timber pieces) to infill gaps and locations where chinking is totally absent from log interstices. Fit material tightly into gaps, because daubing material may not be applied for additional reinforcement. Refer to *Chinking Repair Recipe* in Appendix B of this report.
   **Option:** Replace daubing material between log interstices on exterior surface of chinking for purpose of improving structural integrity of composition wall rather than for aesthetics of exterior. Refer to *Chinking Repair Recipe* in Appendix B of this report.

Wall Repair at Timber Frame Section (following Phase I: Structural Stabilization/concurrent with Phase II)

1. Repair timber Sill Plate by splicing in new sections to replace severely deteriorated material at the posts and beams of the timber frame. Select hewn material to match dimensions and resemble seasoned appearance of original timbers. Refer to splicing details using epoxy materials and methods outlined in Appendix B of this report.
2. Inject epoxy consolidation material and ecologically safe pesticide treatment to existing post and beam sections to remain in place.
3. Repair Board & Batten siding to extent required to enclose building envelope. Patch openings where major vertical boards are missing with like material. Although this building element is not structural, it provides a diagonal bracing to the structural frame and keeps weather and animals from entering the building.
   Note: Historical accuracy is not demanded by this treatment approach.

Doors and Windows

1. Secure door and window openings with marine plywood panels with locking mechanisms, attached in such a way to limit damage to historic fabric while preventing unauthorized entry by persons (and animals). Install vent panels in plywood sheets to allow passive air flow within structure. If extant historic unit (door or window frame/sash) is removed from opening to provide security panel, inventory and store unit within secured building.
2. Paint exterior of plywood panels to slow deterioration. Provide image on each security panel of respective appearance of individual historic unit based on physical evidence of extant doors and windows. This enhances the exterior appearance of the stabilized dwelling as viewed from a distance.

Inspection Program

- Establish a regular inspection schedule (seasonal at a minimum) to monitor stabilization measures.

**Interpretive Strategies for "Preservation" Level Treatment**

- This alternative meets specific NPS project objectives for building lay-away, but opportunities for historic interpretation are minimal with the selection of this level of treatment. The structure and the site would likely remain inaccessible to the public, intended for viewing only from a distance due to liability issues and safety concerns.
- Occasional, limited exterior visitation by the public may be allowed if visitors are accompanied by battlefield staff. Improved means of accessibility would not be required by this level of treatment, and the site would continue to be managed in its natural state. Note: The *mothball* method of "preservation" is not generally understood by the public, equating the lack of "beautification" to abandonment, and would require explanation by staff.
- The erection of an interpretive panel at an appropriate lookout point near the highway could relay important historic information to visitors (touring independently) regarding the site and structure, such as its secondary role both in the morning phase of the battle, and as Jackson's field hospital in the days following the battle. The safest position of this panel would be at the edge of the West Woods, on the east side of Maryland Route 65, across from the farmstead and "cabin" location, due to the lack of safe parking near the site.

**Associated Construction Costs**

Refer to Estimate of Probable Construction Cost - Appendix C – for detailed report
Indirect Costs include 15% General Conditions, 10% Prime Contractor Overhead & Fee, 20% Design Allowance and 4% Escalation Allowance.
*Cost study prepared by Project Cost, Inc.*

Alternative 2: Managing the Structure as a Stabilized Building

| | |
|---|---|
| Labor Total | $111,944 |
| Material/Equipment Total | $ 39,622 |
| Subcontract Total | 15,000 |
| Direct Costs Total | $166,567 |
| With Indirect Costs Total | $262,962 |

# Alternative 3: Managing the Extant Structure as a Restored Building (to Historic Exterior Appearance, c. 1940)

This alternative involves major intervention with steps taken first to stabilize the structural elements of the dwelling, followed by steps to restore the building exterior to its period of significance. Exterior restoration would therefore replicate the significant features, materials, and details of the "cabin" during the Civil War. The dilemma with this alternative involves the non-extant hewn log section that was standing integral to the extant round log and timber sections at the time of the battle. Restoration of the extant two-cell structure alone will not be a true representation of the historic exterior appearance the morning of September 17, 1862.

As in Alternative 2, the immediate addition of a wood bracing system within the building interior will provide critical support to structural members, and lessen the load on wall systems, allowing the restoration of the walls to be performed. Full wall restoration with this alternative by means of repair, replacement and reconstruction of historic wall elements, will provide the best means of slowing movement in the structure. Existing features and materials are restored to documented historic conditions under this treatment approach, or if deterioration warrants, replaced with new materials matching the old in texture, color, form and detail. Providing the means for visitation by the public and a level of historic interpretation that promotes a truer understanding of the historic context of the resource, are central issues with this approach. An aggressive inspection program to monitor site safety and building conditions is required with this alternative, due to the lack of day to day NPS staff presence at the building site. This alternative is an acceptable preservation treatment under the Secretary of the Interior's Standards for the Treatment of Historic Properties if documentary and photographic evidence provide the framework for making treatment decisions.

**Steps of "Restoration" Level Treatment – Work Required to stabilize structure and replicate historic appearance**

General

(Following steps 1 – 4 are identical to Alternative 2: General 1 – 4)

1. Remove ground animals that are physically living within the structure and prevent the ability for reentry and for birds to fly through structure without restriction by performing the following: During restoration process, install temporary plywood panels over holes in flooring and on the interior walls where significant gaps are present due to decaying logs and missing siding. Install visually discreet screened hood at chimney top. Upon enclosure, broom clean waste matter from floors.
2. Clear other loose building materials from the structure's interior, including fallen lath and remnants of plaster. This material harbors moisture against the floorboards and will advance deterioration. Because the log section's upper level is not safely accessible prior to the installation of an interior shoring system, this step could only be safely achieved in this location from the top of the SW corner stairway or the 2nd level doorway from the timber section.

3. Save and inventory architectural building elements that are currently stored within the building, including door and window units that may have been removed from exterior openings.
4. Treat building for wood destroying insects – apply pesticide treatment to surfaces near ground level or inject solution directly into timbers and inspect yearly for evidence of insects.
5. Secure building against weather while restoration is in progress – water infiltration is likely permitted at roof, chimney, flashing, walls, door and window openings. Utilize plywood panels or sheet metal goods - install with minimal damage to extant historic fabric.

Structural Stabilization and Reinforcement

Following steps 1 – 4 are identical to Alternative 2: Structural Reinforcement 1 - 4

1. Perform Phase I - Interior Shoring: Immediate structural strengthening is required to obtain a sufficient level of structural integrity to protect against building collapse Refer to following section in report for proposed plan, sections and details of **Structural Stabilization Plan for the Mary Locher Cabin**.
2. Splice in new post and girt/plate sections from second floor level to roof structure (matching seasoned qualities of original material) at Northwest corner of Timber Frame building section. Restore connections between post and beams. Refer to splicing details using epoxy materials and methods outlined in Appendix B of this report.
3. Inspect soundness of roof rafters and connections to determine requirements for additional sister members. Install sister members and reinforce connections prior to upgrading of roofing treatments – allowing for live load of workers potentially accessing roof for materials repair and/or replacement.
4. Perform Phase II – Interior Bracing of Log Walls: Concurrent with repair and partial restoration of log walls, install vertical bracing members on interior of log walls according to **Stabilization Plan**. Adjust supporting steel cable sections to provide adequate tension, keeping logs in a vertical plane rather than current racked position.

Building Systems

1. Install underground electrical supply to structure.
2. Upon full restoration of exterior, introduce mechanical means for ventilation, due to tightening of building envelope. Intake air vents for fan(s) to be placed at gable end panel door locations at South and North ends should be discreet and finished with color that increases camouflage qualities. Utilize chimney as exhaust shaft.
3. Install hard-wired smoke detectors (one each room) and provide set-up for off-site monitoring/surveillance. Locate units in discreet locations (shielded from exterior).

Masonry

1. Restore former corbelled top at brick chimney, repoint joints.
2. Repair mortar joints at stone foundation when required.
   Note: The stone foundation was recently repointed by the NPS and is in good condition – however, the historic condition of the foundation was likely dry laid without mortar.

Roof (following Phase I: Structural Stabilization)

1. Restore roof to (likely) Civil War era material and appearance. Install cedar wood shingles on extant purlins and additional furring members as required, laid across top of rafters. Match historic photographic documentation (c.1930 – metal roofing was introduced on west side during 1940s).

Wall Restoration at Round Log Section (following Phase I: Structural Stabilization/concurrent with Phase II)

Following steps 1 – 4 are closely identical to Alternative 2: Wall Restoration at Round Log Section 1 – 4, but more effort is taken to match physical qualities of historic materials and historic connection techniques

1. Repair/restore partly hewn log Sill Plate by splicing in new sections (selected to match dimension and seasoned appearance) to replace severely deteriorated material, and inject epoxy consolidation material and ecologically safe pesticide treatment into salvaged sections. Refer to splicing details using epoxy materials and methods outlined in Appendix B of this report.
2. Undertake log repair where severe deterioration threatens building stability, avoiding full log replacement when possible to effectively achieve "restoration." Retain existing log sections that remain sound, extract decayed material, and replace by splicing in new log sections or "dutchman" repair. Select replacement material to match diameter and seasoned qualities of original wood log. Use aluminum or fiberglass rods to reinforce the connection between old and new material and utilize an appropriate epoxy as an adhesive for the connection. Refer to splicing details using epoxy materials and methods outlined in Appendix B of this report.
   **Note:** Based on the advanced deterioration of entire logs rather than sections of logs, the application of this "patch" repair method is limited at this log structure. "Repair by replacement" utilizing in-kind material in the log walls will achieve a higher degree of structural strength which is critical to ensure stability and ultimate restoration of these load bearing elements.
3. Reinforce salvaged log sections with epoxy consolidant when the condition of the log warrants. This repair treatment will only be successful at log members with a moderate level of deterioration.
4. Cap log crowns by removing decayed materials, cutting back to sound wood, and installing new crowns cut to match, matching new material to existing. Use aluminum or fiberglass rods to reinforce the connection between old and new material and utilize an appropriate epoxy as an adhesive for the connection. Refer to typical splicing detail.
   **Note:** Based on the advanced deterioration of entire log sections rather than just end sections, the application of this repair method is limited at this log structure.
5. Restore chinking to log interstices, matching placement patterns and materials (clay, stone and timber pieces) of extant historic chinking as documented in existing condition photographs. Fit material tightly into gaps between log (this must be done after structural load is removed from wall with installation of interior shoring). Refer to *Chinking Repair Recipe* in Appendix B of this report.
6. Restore daubing material to the surface of the chinking between the logs, following traditional techniques as outlined in *Chinking Repair Recipe*. Final built-up surface will approach the full depth of the exterior face of the logs.

7. Apply whitewash finish to exterior exposed surfaces of logs and daubing materials, replicating historic formula. Refer to *Chinking Repair Recipe.*

Wall Restoration at Timber Frame Section (following Phase I: Structural Stabilization/ concurrent with Phase II)
Following steps 1 – 3 are closely identical to Alternative 2: Wall Restoration at Timber Frame Section 1 – 3, but more effort is taken to match physical qualities of historic materials and historic connection techniques used at the structure

1. Restore timber Sill Plate by splicing in new sections to replace severely deteriorated material at the posts and beams of the timber frame. Select hewn material to match dimensions and seasoned appearance of original extant timbers. Refer to typical splicing detail.
2. Inject epoxy consolidation material and ecologically safe pesticide treatment to existing post and beam sections to remain in place.
3. Restore extant members of Board & Batten siding when existing condition warrants. Provide new boards, matching qualities of historic material, to replace missing and severely deteriorated boards and battens.
4. Apply whitewash finish to exterior exposed surfaces of restored siding, replicating historic formula. Refer to *Chinking Repair Recipe* in Appendix B.
5. Reconstruct missing Entrance Canopy and Columnar support at Timber Frame Section East side, based on historic photographs (c.1930-40).

Window Restoration

1. Restore extant or refabricate all window units to operable historic condition, matching historic appearance in photographs of dwelling c.1930-40 (utilize evidence of extant units to reconstruct missing elements or entire units). Reglaze all sash with historically appropriate glazing materials and paint exterior surfaces of sash and trim. Refer to *Historic Finishes Report* in Appendix B for paint color corresponding to interpretation period.
   **Note:** There is no clear evidence of historic surface hardware such as locks or pulls at the extant window units, but restored units must be discreetly secured in place.
2. Install narrow frame magnetically fixed storm panels at window exteriors to limit opportunity for vandalism. Match frame color to window unit and provide clear polycarbonate material in panel to limit discoloration and clouding.

Door Restoration

1. Restore extant or refabricate exterior door units to operable historic condition, matching historic appearance in photographs of dwelling c.1930-40 (utilize evidence of extant units to reconstruct missing elements or entire units and evidence of extant hinges and shadows of missing hardware to replicate hardware). Paint exterior surfaces of door and trim. Refer to *Historic Finishes Report* in Appendix B for color corresponding to interpretation period.
2. Provide durable, theft-proof locking devices for the 2 ground level doors that are visually unobtrusive.

**Interpretive Strategies for "Restoration Level Treatment"**

- This alternative meets NPS short term and long range goals, and may be accomplished in stages. However, immediate structural stabilization is required for building to remain standing. Upon completion of exterior restoration (the final phase), the building exterior and site at a minimum should be accessible to the public by the least invasive means possible – a footpath meeting requirements of "Universal Accessibility" is recommended.
- The inclusion of the Mary Locher Cabin and the Locher-Poffenberger Farmstead in the primary interpretive plan of Antietam Battlefield becomes viable with the realization of this alternative. This alternative corresponds to the treatment approach and interpretive period for the other historic farmhouses located within the boundaries of the battlefield. These properties, restored (or in the process of restoration) to their respective morning of September 17, 1862 appearance (prior to damage or destruction by day of battle), are generally viewed by visitors from the exterior with only a few completely restored to Civil War era appearance on the interior.
- The portion of the farm property that is currently held by the NPS could be gradually returned to its Civil War era appearance, with restoration of the woodlot, and the planting of crops corresponding to historic records and maps. The landscape immediately surrounding the "cabin" should be gradually returned to its 1862 appearance, which implies that the second growth woods dividing the "cabin" from the highway would be cleared and the orchard, fencing and paths would be restored as documented. The Phase II archeological investigation of the site near the "cabin" also provides valuable information that would guide this effort.
- At the point where visitors are allowed to visit the site as a self-guided experience - as an extension of the West Woods foot tour - interpretive panels could be erected to convey information about the historic setting and its specific role in the battle, the general role of the farm in the Valley, and the people and families of Sharpsburg connected with the property. Any modern feature, such as these panels, should be located to avoid visual intrusion into the recreated historic setting.

**Associated Construction Costs**

Refer to Estimate of Probable Construction Cost - Appendix C – for detailed report
Indirect Costs include 15% General Conditions, 10% Prime Contractor Overhead & Fee, 20% Design Allowance and 4% Escalation Allowance.
*Cost study prepared by Project Cost, Inc.*

Alternative 3: Managing the Structure as a Restored Building

| | |
|---|---|
| Labor Total | $192,517 |
| Material/Equipment Total | $ 83,856 |
| Subcontract Total | 12,000 |
| Direct Costs Total | $288,372 |
| With Indirect Costs Total | $455,257 |

# Alternative 4: Managing the Civil War era Structure as a Restored/Reconstructed Building (Historic Exterior Appearance, c. 1862)

If reconstruction is based on solid documentary evidence such as historical photographs, rather than conjecture, this alternative is an acceptable preservation treatment under the Secretary of the Interior's Standards for the Treatment of Historic Properties.

**Steps of "Restoration" Level Treatment (Extant Structure)**

Refer to Alternative 3 for detailed steps

**"Reconstruction" Level Treatment (Re-creation of Missing Hewn Log Section)**

Detailed steps to be developed in the future in cooperation with the Historic Preservation Training Center and craftsmen who are both knowledgeable in historic building materials and methods. The particular materials would be selected based on matching the physical qualities of the features, materials and details as represented in historic photographs and by physical evidence at the structure. The methods of dressing the timbers, joinery and erection of the log section would be selected to replicate the processes that were utilized historically at the time of its 19th c. construction. This treatment would be undertaken as a final stage following restoration of the extant structure as outlined in Alternative 3, and its final completion would likely be accomplished over an extended period of time, with the actual erection of this missing element, a primary feature of the historic interpretation of the dwelling.

**Interpretive Strategies**

- This alternative is the longest range in scope, and could be accomplished in stages. The structure (exterior) and site would be accessible to the public by least invasive means possible – footpath meeting requirements of Universal Accessibility.
- This alternative corresponds to the treatment approach and interpretive period for the other historic farmhouses located within the NPS boundaries of the battlefield. These properties, restored to their respective morning of 17 September 1862 appearance (prior to damage or destruction by day of battle), are generally viewed by visitors from the exterior with only a few completely restored to Civil War era appearance on the interior.
- This alternative offers the opportunity to present to the visitor the restoration and reconstruction process of an historic structure as a work in progress – or a learning laboratory engaging visitors with interactive exhibits. The craft of vernacular construction, typically carried out by the farmer with materials gathered from on site erected following regional trends, would be the focus of this battlefield site. This approach could extend into the

landscape with visitors having access to farming means and methods in a farm landscape restored to Civil War era appearance.

- The segregation of this site from the balance of the battlefield to the East of Hagerstown Pike, allows the interpretation of this structure and site to add a new dimension to the visitor experience following emerging trends, without distracting from other exhibits or diminishing the historic integrity of the existing monumental park, considered itself historic.

**Associated Construction Costs**

Refer to Estimate of Probable Construction Cost - Appendix C – for detailed report

Indirect Costs include 15% General Conditions, 10% Prime Contractor Overhead & Fee, 20% Design Allowance and 4% Escalation Allowance.

*Cost study prepared by Project Cost, Inc.*

Alternative 4: Managing the Structure as a Restored/Reconstructed Building

| | |
|---|---|
| Labor Total | $300,702 |
| Material/Equipment Total | $167,515 |
| Subcontract Total | 16,000 |
| Direct Costs Total | $484,216 |
| With Indirect Costs Total | $764,440 |

# Immediate Stabilization through Structural Strengthening

**The following methods of Structural Stabilization were considered by the Project Team:**

- Injection of epoxy consolidant into deteriorated wooden logs and timbers
- Use of dutchmen to replace critical sections of deteriorated logs and structural timbers
- Use of sisters to reinforce individual existing load-carrying members (rafters, joists)
- Use of whole log and timber replacement with "in-kind" material for advanced decay
- Use of new, internal shoring structure to reinforce floor joists and rafters, providing an alternative structure from which to "hang" and reinforce support for existing, inadequate structural members
- Use of new, direct internal bracing of exterior log walls, hung from the shoring structure
- Use of new, direct external bracing of exterior log walls - considered least desirable due to intrusive adverse visual effect

**Methodology for Proposed Structural Stabilization Plan for the Mary Locher Cabin**

An interior bracing system constructed of modern treated lumber was selected as the best approach to stabilization due to the endurance of the materials and the ability for the design to provide direct support to the most critical structural members, with loads transferred directly to the ground. This strengthening can be accomplished while minimizing damage to extant historic fabric and visual intrusions on the building exterior. The new post and beam system carries the load of the roof framing system, reinforced with sistered members as required, and the Second Floor joists so that much of the load is lifted from the structural components in the wall systems, whether log or timber. At some places in the log section of the structure and at one corner of the timber framed section, the structural wall/framing system is nearing failure. Selective whole log and timber replacement at these locations and careful "splicing in" of new sections at less critical areas of decay is also critical to the success of the proposed plan. Once these building elements are repaired/restored, direct wood bracing on the interior is proposed with steel cables applying tension to keep logs in the vertical plane. This subsequent step to the interior shoring system is required for the log walls and timber frame to retain structural integrity. Therefore, the interior bracing system is proposed as an immediate step, or as the **First Phase** in the stabilization scheme with repair/restoration of the wall systems accomplished as a follow-up **Second Phase,** after much of the stresses are relieved.

**Historic Precedent for Interior Bracing**

The location of posts and the level of beams within the first floor of the building especially, are engineered to avoid the position of exterior wall openings as much as possible. This limits the view of the modern system from the exterior by the visitor. Although, the introduction of this new, comprehensive structural element into this building can be accomplished without destroying the interior character and unique, rustic qualities of the space and materials. The design of the interior bracing system was drawn from historic precedent in the context of American rural architecture, specifically in the New World adaptation of the "Dutch Barn." As illustrated in the following sketch, the vertical posts of the post and beam frame provide balance points for rafters, set at steep pitches, to rest on. The seemingly independent structural frame makes possible the long spans which define the character of the barn's open interior.

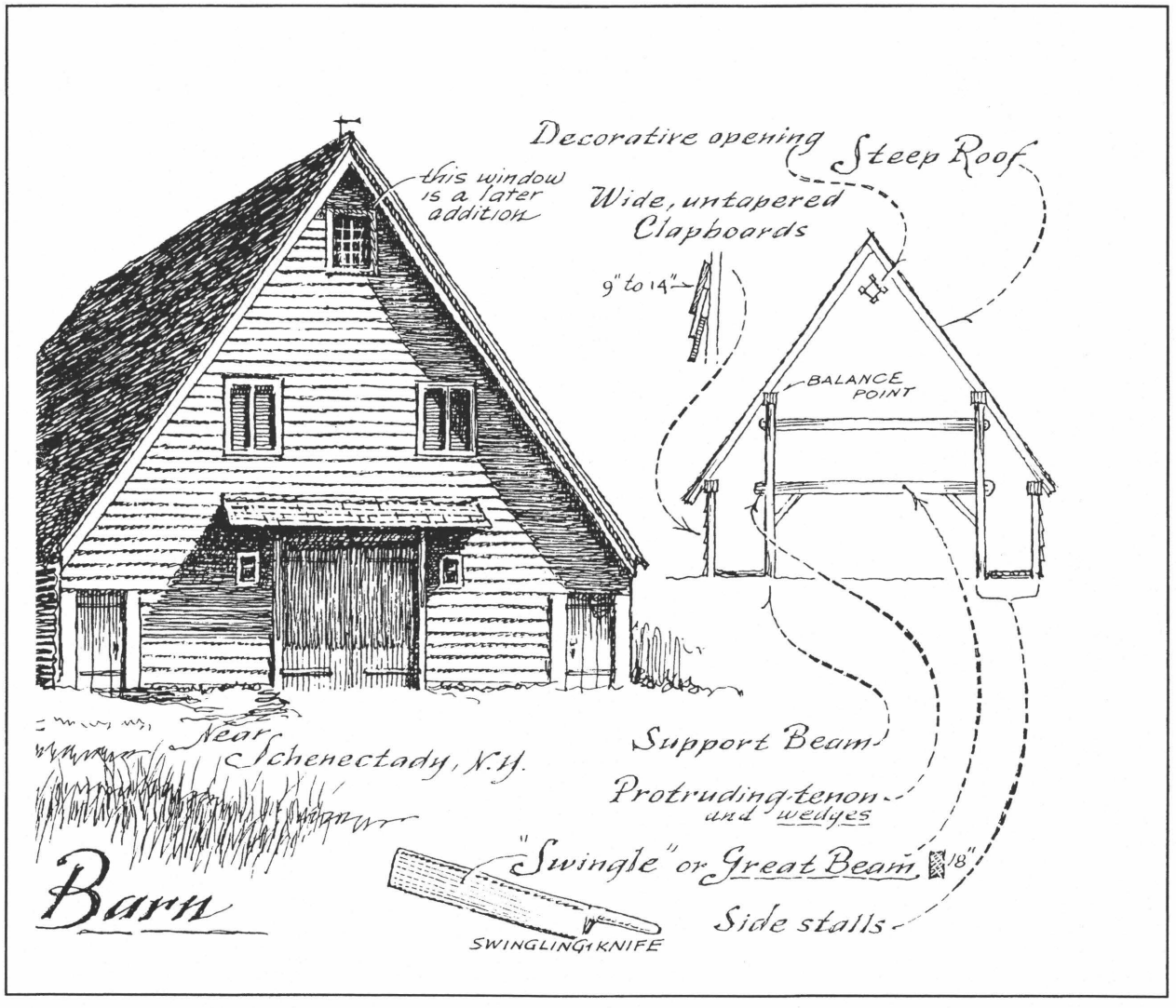



Figure 32. *Illustration - "The Dutch Barn" – taken from An Age of Barns by Eric Sloane.*

**Phase I - Structural Stabilization**

- The installation of the interior bracing system can be accomplished prior to the final selection of the treatment alternative by the NPS for this building. This level of support is critical to the success of either the "Stabilization" Level or "Restoration" Level Treatments.
- The completion of Phase I is required for making the building safe to the extent required for an architectural survey crew to completely measure the Second Floor of the Log Section and finish historic documentation of the building to a higher level of accuracy. All measuring and survey work for this portion of the building had to be accomplished from the stairway location in the SW corner, and the connecting doorway on the North side of the room. At this time, the extensive plaster debris is obscuring the floor, and soft spots and/or cracked floorboards are indistinguishable.. After the bracing system is installed, providing critical support to the sagging round log floor joists, and the plaster and lath debris is removed from the upper floor either temporary plywood sheeting or planks can be laid across the floor for safe access into the space. The HABS level graphic documentation of this structure is a primary objective of this project, required in order to lessen the catastrophic loss if this building were to collapse without warning

**Phase II - Structural Stabilization**

- The limited use of epoxy consolidants, the splicing in of "dutchmen" sections, and the complete replacement of some log and timber members are all necessary methods required for exterior wall repair and restoration
- The addition of interior bracing members, located on the interior to specifically provide support to the exterior log wall members, would be put in place concurrent with the repair and restoration of the walls, according to the treatment alternative selected.

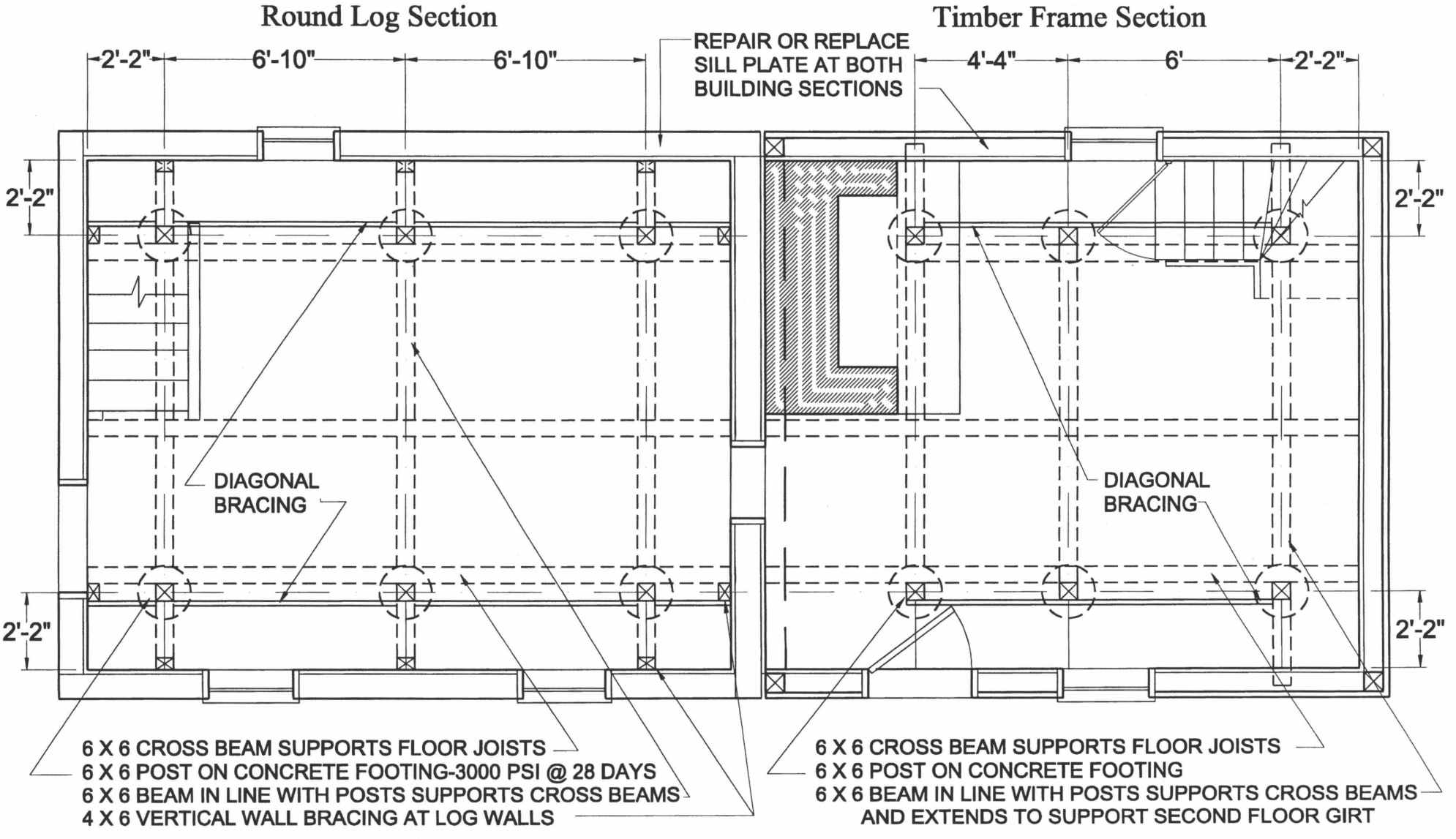
**Diagram of Structural Stabilization Plan for the Mary Locher Cabin**

Refer to following Schematic Plans, Sections, Details and Notes for additional information:

| | | |
|---|---|---|
| **Phase I and II:** | **First Floor Plan –** | **Scale: 1/4 inch = 1 foot** |
| **Phase I and II:** | **Second Floor Plan –** | **Scale: 1/4 inch = 1 foot** |
| **Phase I and II:** | **Section at Round Log Section** | **Scale: 1/4 inch = 1 foot** |
| **Phase I and II:** | **Section at Timber Frame Section** | **Scale: 1/4 inch = 1 foot** |
| **Phase II:** | **Shoring Detail of Log Wall** | **Scale: 1/2 inch = 1 foot** |

Also see Structural Report in Part 1: Section E and Appendix B1 for additional description of materials and connections.

Also see Appendix B5 for general and technical description of epoxy materials, methods, and special instructions. Review includes appropriate applications for epoxy consolidant, epoxy non-structural patch, epoxy structural repair, and epoxy adhesive used with reinforcing bars for "dutchmen" type repairs.

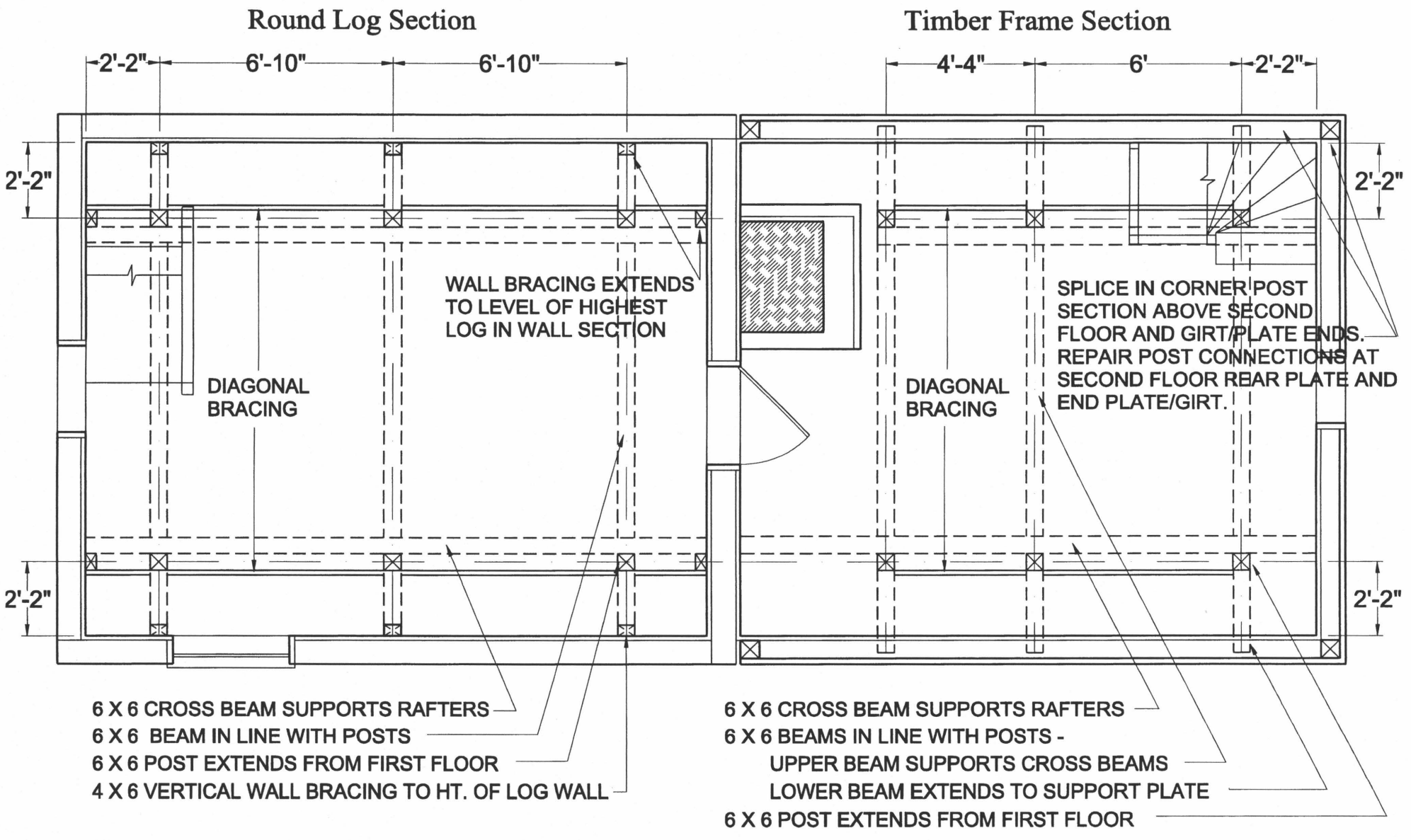



NOTES: ALL 4 X 6 AND 6 X 6 SHORING MEMBERS TO BE SOUTHERN PINE SELECT STRUCTURAL
OTHER BRACING MEMBERS TO BE PRESSURE TREATED SOUTHERN PINE NO. 2
ALL FASTENERS TO BE GALVANIZED OR STAINLESS STEEL
PLACE WALL BRACING @ LOG SECTION AFTER INTERIOR SHORING COMPLETE-CONCURRENT WITH WALL RESTORATION

FIRST FLOOR PLAN

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

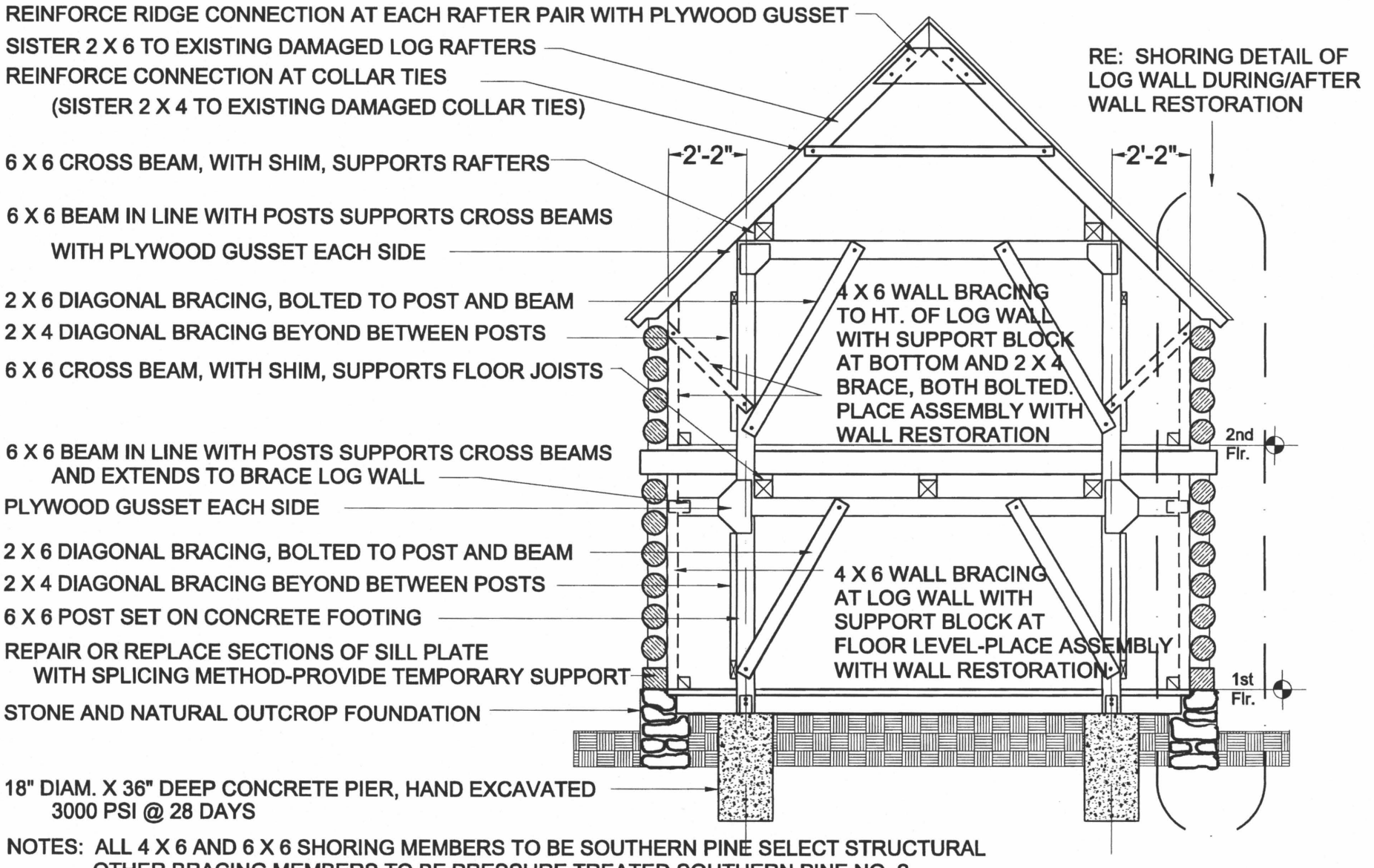
# DIAGRAM OF STRUCTURAL STABILIZATION PLAN FOR MARY LOCHER'S CABIN




NOTES: ALL 4 X 6 AND 6 X 6 SHORING MEMBERS TO BE SOUTHERN PINE SELECT STRUCTURAL
OTHER BRACING MEMBERS TO BE PRESSURE TREATED SOUTHERN PINE NO. 2
ALL FASTENERS TO BE GALVANIZED OR STAINLESS STEEL
PLACE WALL BRACING @ LOG SECTION AFTER INTERIOR SHORING COMPLETE-CONCURRENT WITH WALL RESTORATION

SECOND FLOOR PLAN SCALE: 1/4" = 1'-0"

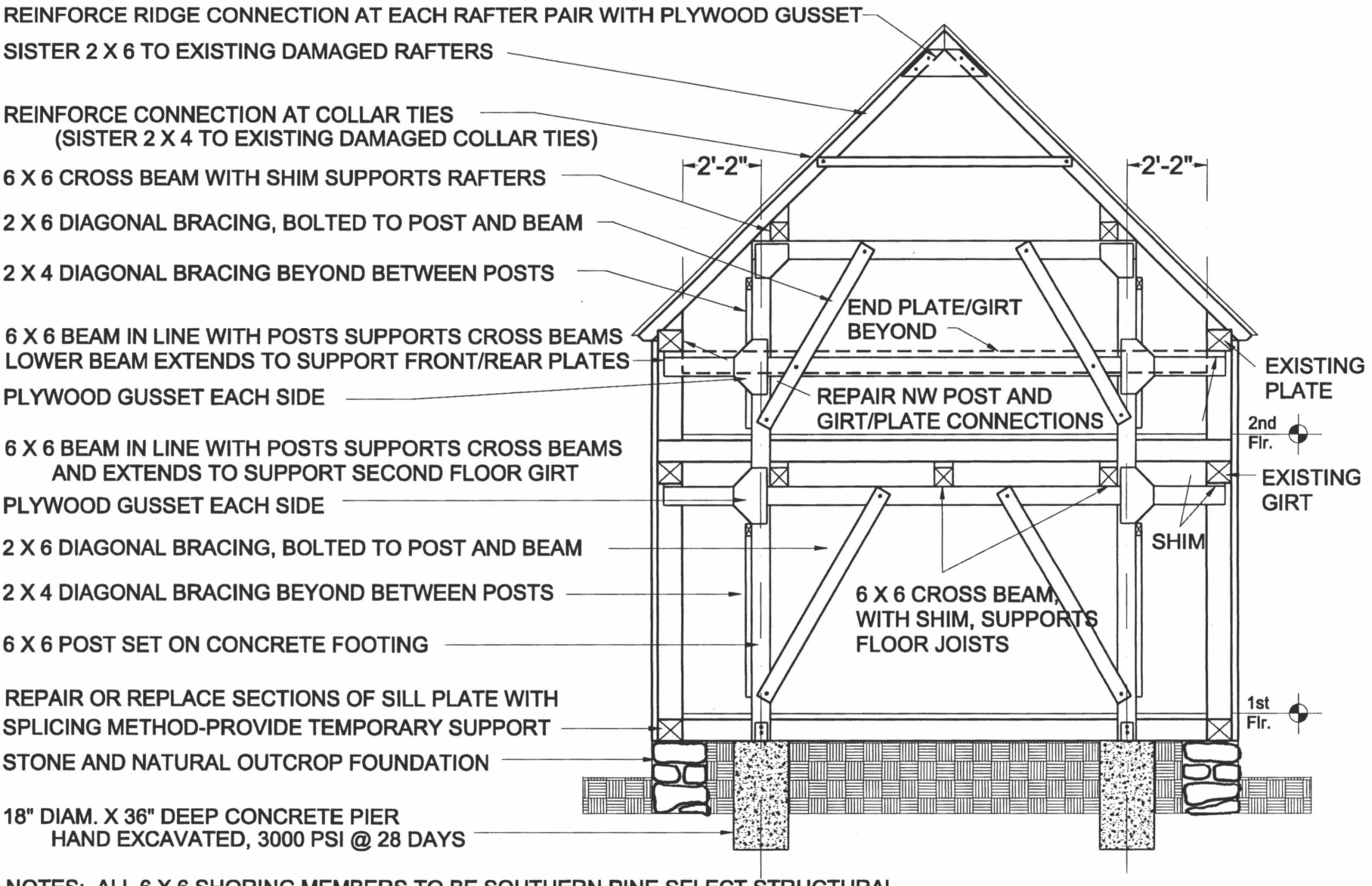
# DIAGRAM OF STRUCTURAL STABILIZATION PLAN FOR MARY LOCHER'S CABIN




NOTES: ALL 4 X 6 AND 6 X 6 SHORING MEMBERS TO BE SOUTHERN PINE SELECT STRUCTURAL
OTHER BRACING MEMBERS TO BE PRESSURE TREATED SOUTHERN PINE NO. 2
ALL FASTENERS TO BE GALVANIZED OR STAINLESS STEEL
PLACE WALL BRACING @ LOG SECTION AFTER INTERIOR SHORING COMPLETE-CONCURRENT WITH WALL RESTORATION

SECTION OF INTERIOR SHORING SYSTEM AT ROUND LOG SECTION SCALE: 1/4" = 1'-0"

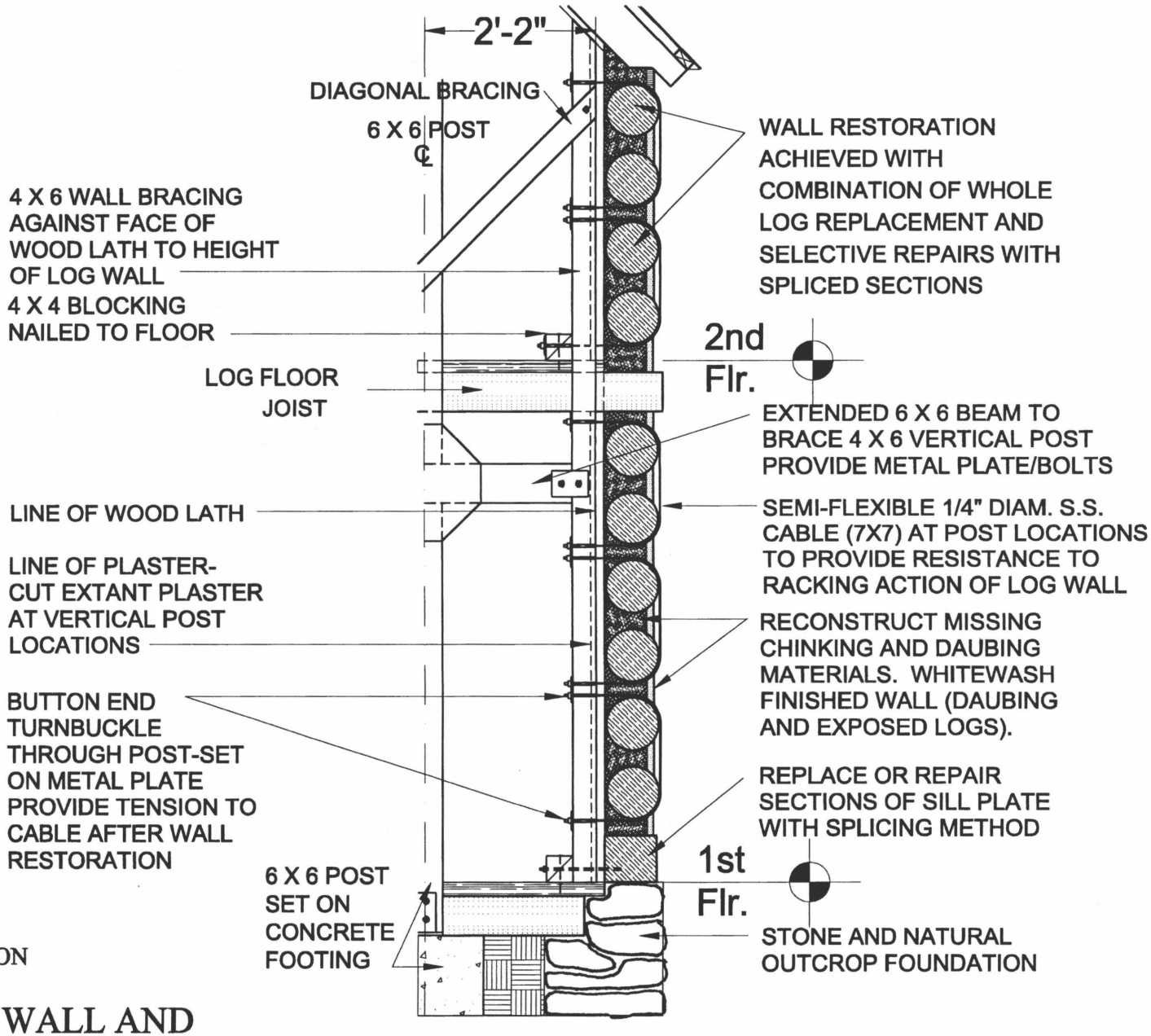
# DIAGRAM OF STRUCTURAL STABILIZATION PLAN FOR MARY LOCHER'S CABIN




NOTES: ALL 6 X 6 SHORING MEMBERS TO BE SOUTHERN PINE SELECT STRUCTURAL
OTHER BRACING MEMBERS TO BE PRESSURE TREATED SOUTHERN PINE NO. 2
ALL FASTENERS TO BE GALVANIZED OR STAINLESS STEEL

SECTION OF INTERIOR SHORING SYSTEM AT TIMBER FRAME SECTION SCALE: 1/4" = 1'-0"

# DIAGRAM OF STRUCTURAL STABILIZATION PLAN FOR MARY LOCHER'S CABIN




NOTES:

4 X 6 POSTS TO BE SOUTHERN PINE SELECT STRUCTURAL

ALL FASTENERS TO BE GALVANIZED OR STAINLESS STEEL (S.S.)

ADJUST PLACEMENT OF POSTS IN THE FIELD TO AVOID JOISTS

PHASE II: STRUCTURAL STABILIZATION

# SHORING DETAIL OF LOG WALL AND WALL RESTORATION

SCALE: 1/2" = 1'-0"

# D. Recommendations for Further Study and Evaluation

- Inventory of Individual Building Wall Elements: Prepare working diagram of building elevations with inventory of each log and timber frame member, identifying required extent of replacements and spliced-in sections for purposes of wall repair/restoration. This detailed study and documentation is required to proceed with Phase II of the Stabilization.

- Dendrochronology: Perform on all members that have intact bark, both logs and weatherboards. There are several techniques for dendrochronology. We recommend the less invasive method of using cores drilled from members rather than sawn sections. This process could help with dating the two extant sections of the structure.

- Oral History: Conduction of interviews with Poffenberger family members remaining in the region of Sharpsburg and the battlefield north of town. Oral histories handed down through generations of the family may provide valuable historical and visual information about the structure's development and use. This local farming family has been associated with the structure through occupancy and ownership from the mid 1800s to recent years.

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Warfield, Sandra K. and DeVore, Ralph. *A Newspaper History of Life in Washington County: 1820-1835, The Coming of the C & O Canal.* Hagerstown, Md.: Washington County Free Library, 1990.

Williams, Thomas J. C. *A History of Washington County, Maryland, From the Earliest Settlements to the Present Time*, Volume II: Biographical Record of Representative Families. Baltimore, Md.: Regional Publishing Company, 1968.

## Materials related to Mary Locher Cabin and Antietam National Battlefield

NPS Memorandum:

From NPS Associate Architect Thomas T. Waterman to Acting Chief of Planning, dated 30 March 1940 with 3 photographs (part of HABS Collection MD-90-A).

From Chief Historian, NCR, Cultural Resource Services Division Gary Scott, to Superintendent Antietam and Monocacy National Battlefields, Subject: XXX form 630-95-04, dated February 23, 1995.

Archeological Investigation: Memorandum, Paper and Draft Reports (in chronological order):

Manning-Sterling, Elise H and Sterling, Bruce B., "Battlefield and Farmstead, The West Woods Survey, Antietam, paper presented at the Conference of the Society for Historical Archaeology, Cincinnati, Ohio, January 4, 1996 (11 pages).

Memorandum From: Archeologists Elise H. Manning-Sterling and Bruce B. Sterling to Regional Archeologist Stephen Potter and Robert Sonderman, Subject: "Recent disturbances from stabilization efforts at the Locher/Poffenberger cabin site," dated October 14, 1996.

Manning-Sterling, Elise H.; Brown, Marvin A.; and Klein, Terry H. *First Phase of Archeological Investigations: West Woods, Antietam National Battlefield, Sharpsburg Maryland.* U.S. Department of the Interior, National Park Service, National Capital Region, 1995.

Manning-Sterling, Elise H. and Sterling, Bruce B. with contributions by George L. Miller and Marvin A. Brown. *Antietam, Battle on an Agrarian Landscape: A Study in Archeology.* U.S. Department of the Interior, National Park Service, National Capital Region, 2000.

Cultural Landscape Report:

Joseph, Maureen DeLay. *Historic Woodlot Restoration: West Woods, Antietam National Battlefield, Sharpsburg, Maryland.* U.S. Department of the Interior, National Park Service, Eastern Team, Falls Church, Denver Service Center, 1994.

Historic American Buildings Survey (HABS) Collection:

Library of Congress, Prints and Photographs Division, Shelf No. MD 22 ANTI-V 2 – Digitized Image Files of Photos and Data Sheets available over the Internet at the Library of Congress American Memory Web Site: http://memory.loc.gov: A. Poffenberger Farm, Log House MD-90 (1940 and 1989 Addendum) and A. Poffenberger Barn MD-90-A (1989 Addendum).

National Register of Historic Places Nomination Update Final Draft:

Reed, Paula S. *National Register Nomination Update: Antietam National Battlefield, Sharpsburg, Maryland* RQ # 1443RQ300098027, 1999.

## Antietam National Battlefield Park Collections

Manuscripts:
Preliminary Building Survey conducted by NPS, 1934.

Cross, Fred W. *Antietam, September 17, 1867.* Paper written in 1921 including photographs - based on visits to Antietam between 1919 and 1920. (Historian from Massachusetts primarily researching roll of local Massachusetts Divisions in battle).

Photographs:
Photographs from Building Inventory conducted by NPS, 1938.
4 views of dwelling titled "George Poffenberger House"
(Front, Back, Landscape, Landscape showing root cellar)

UNLABELED landscape from 1934 Survey, titled "Mary Locher Dwelling (A. Poffenberger resided here during battle)," view of dwelling from SE
ANTI (P) 09D12 (1958), no title, view of dwelling from SW
ANTI (P) 09D21 (1970), no title, view of dwelling from SE
ANTI 05(P) 09A01 (Landscape), titled on front: "Log cabin behind the West Wood. Center of McLaw's Advance," on back of cardboard mount is written "Alfred Poffenberger's Farm House, Confederate Ave., Antietam"

Color Reproduction of Color Photograph taken from Holiday Magazine – November 1947 (Vol. 2, No. 11), page 47. Submitted to Battlefield archives by local historian, David A. Foltz; February 12, 2000. Caption reads "This log cabin, near Antietam Battlefield, has bullet holes from bloody Civil War battle." This unidentified cabin had been mistaken for the A. Poffenberger Log House/Mary Locher Cabin when photograph was acquired, but the image remains a good photographic record of a regional hewn log cabin that survived the Battle into the 20th century.

# Appendix A

1940 "Thomas Waterman" NPS Memorandum
with HABS Photographs-1940
HABS Photographs-1989 Addendum

D-17

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
WASHINGTON

ADDRESS ONLY
THE DIRECTOR, NATIONAL PARK SERVICE

March 30, 1940.

MEMORANDUM for the Acting Chief of Planning.

In accordance with instructions to visit the early houses on Antietam National Battlefield Site I left Washington at half past eight the morning of Thursday, March 28, arrived at Antietam about 10:30, and called upon Superintendent Beckenbaugh at his office. He then took me to see the Poffenberger house, which is a log dwelling, now abandoned, of indeterminate date. It is an attractive feature on the landscape, set on a little rocky hill. It was evidently built in three units, the oldest perhaps being the middle. Another log unit was added at one end and a framed section at the other. It is a story and a half high, with low gabled roof. The end log section has fallen, the timbers still being on the site. Architecturally the house is of little value. It is of the period in log construction when fine technique had given way to hit or miss methods. Artistically, however, it is very attractive, and on account of its associations with the battle it seems too bad that it should disappear.

We then visited the barn on a neighboring farm owned by a family of the same name. This is a fine and large structure with stone foundations and framed and sheathed superstructure. It is a characteristic Pennsylvania type of barn, set on the side of a hill, the lower elevation being used for stabling horses and stock. The framed superstructure is cantilevered out about eight feet across the lower side to form protection for the animals. The interior of the upper part is beautifully framed in oak, and the entire structure is in excellent repair.

The site of the Dunkard church was also visited, but of course nothing remains of this building except the foundations, which are now covered by a modern building. Superintendent Beckenbaugh later showed me photographs which indicated that it had been a low-gabled building with simple rectangular window-openings and two doors at one end.

Superintendent Beckenbaugh said that very little was left of the Antietam ironworks and that he did not believe the ruins would be of interest to the Survey. We therefore did not visit the site.

However, I inquired if there were any other early buildings in the area, and he said the Roulette farm was the oldest and in the best condition of those remaining. We visited this farm, which is attractively located away from the highway in a little valley through which a brook flows. The house stands on a pronounced eminence with a fine view and is of considerable architectural interest. It was built in two sections, the northerly section being the oldest and probably dating from 1770. It has one large room with the loft over and a huge end chimney. To the south was added about 1825 a larger section with one large room, a hall, two small rooms, and a shed in the back. The growth of the house is expressed on the exterior. The effect is extremely picturesque, and the building has the great virtue of being practically unaltered yet still in excellent repair. Its low roof, diminutive dormer windows, and porches and stoops give it a peculiar charm. To the north end, stepping down the hill, are smokehouse, meathouse, and springhouse, all of which are contemporary and in good repair. Not far away stands a very fine early barn. The completeness of the group and its attractive setting make it particularly valuable from architectural and historical points of view.

It is my feeling that the Poffenberger house is not worth a complete HABS recording unless it is desired purely to preserve a record of the early buildings on the Battlefield Site. Due to our small staff I would regret seeing this done at the present time. I would recommend, however, a complete photographic survey. I took three pictures with our 5 x 7 camera, but since the light was poor they will not show the house to best advantage.

The barn is a fine example but so closely parallels the Lee barn at Leetown, West Virginia, recorded by the Survey in 1937, that I do not believe it would be worth while to survey it except by photography.

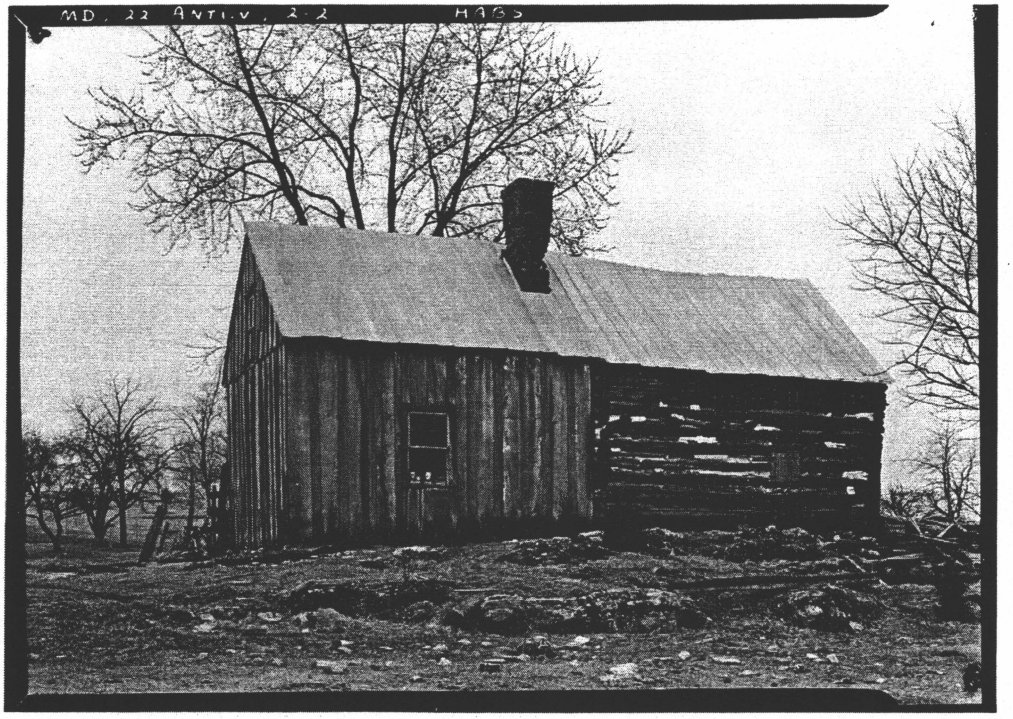
On the other hand, the Roulette group, unusual as a type and preserving its original features almost intact, would make an excellent priority. It might well be undertaken when we have an opportunity.

Thomas T. Waterman

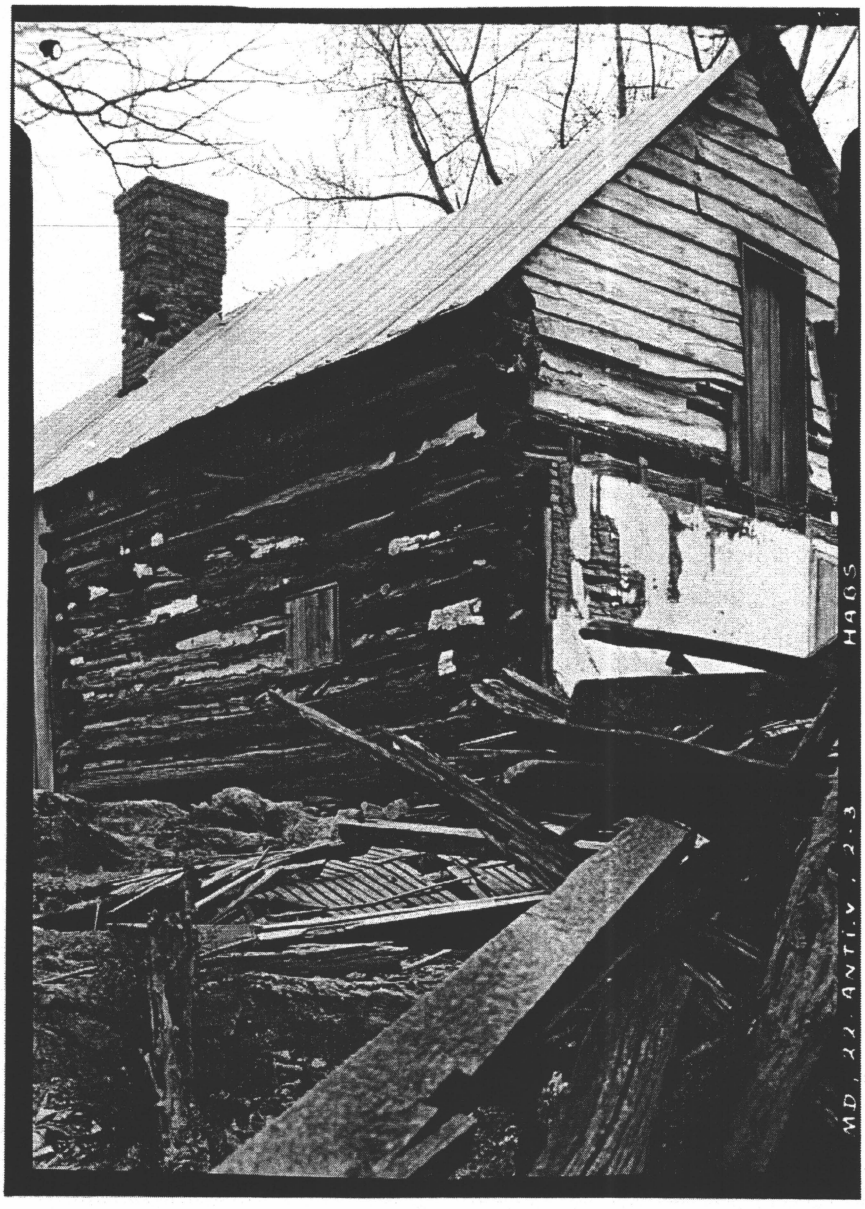
Thomas T. Waterman,
Associate Architect.

cc: The Director.
Superintendent Beckenbaugh.
Supervisor of Historic Sites.

**Detail of Front** **MARY LOCHER CABIN**
(A. POFFENBERGER LOG HOUSE) HABS No. MD-90-1
*Photographer: Thomas T. Waterman, NPS Associate Architect – March 28, 1940*

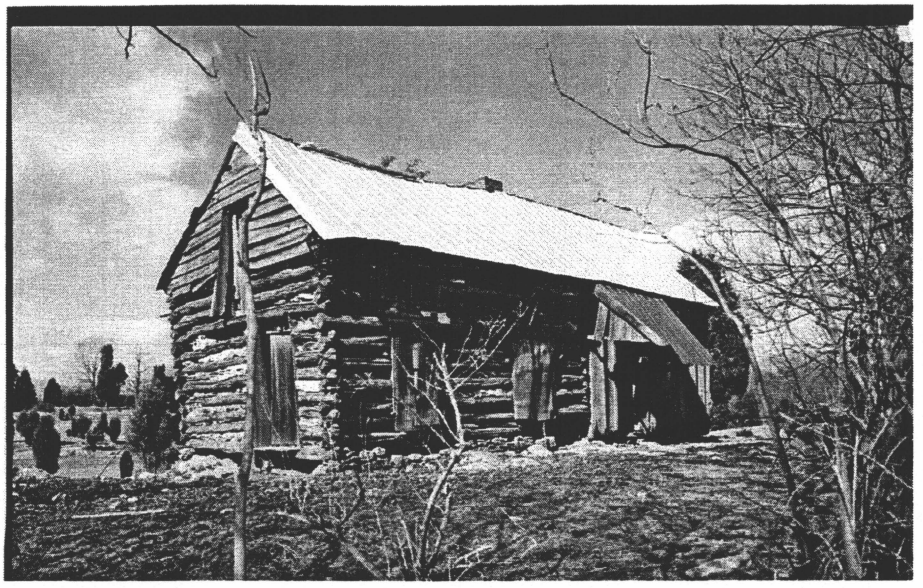



**General View of Rear** **MARY LOCHER CABIN**
(A. POFFENBERGER LOG HOUSE) HABS No. MD-90-2
*Photographer: Thomas T. Waterman, NPS Associate Architect – March 28, 1940*

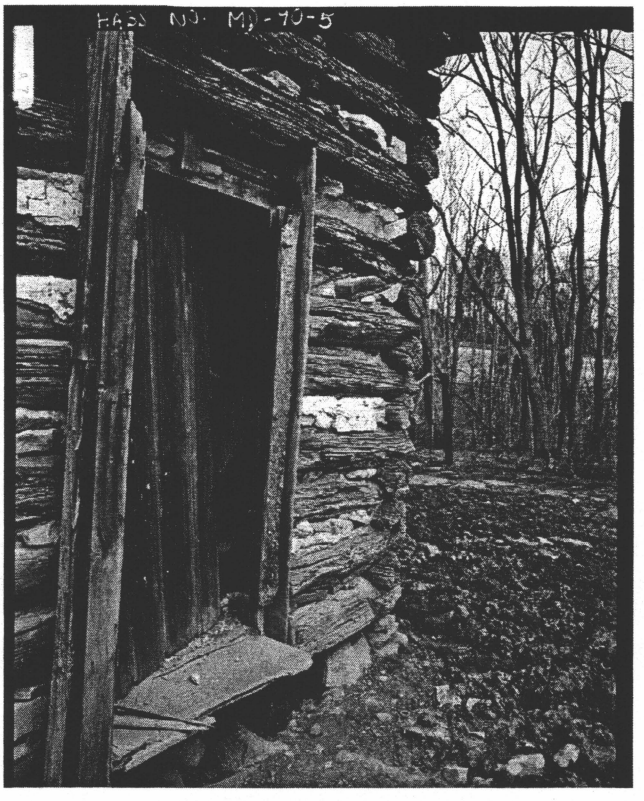



**Detail of Rear Wall** **MARY LOCHER CABIN**
(A. POFFENBERGER LOG HOUSE) HABS No. MD-90-3
*Photographer: Thomas T. Waterman, NPS Associate Architect – March 28, 1940*

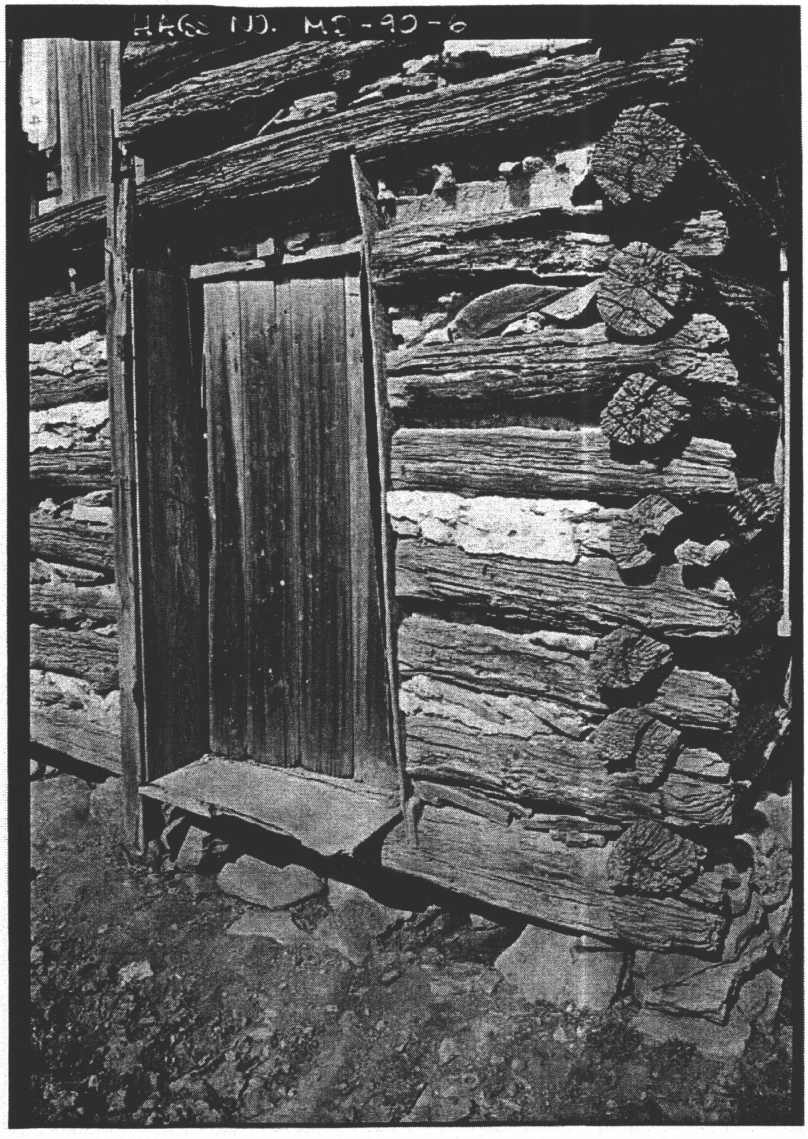
See Library of Congress Shelf No. MD 22 ANTI-V 2 for these 1940 photos and photo captions transmitted previously of Poffenberger Barn and Log House under HABS No. MD-90, Antietam National Battlefield, Sharpsburg Vicinity, Washington County, Maryland. In 1989, an Addendum to the above file of Waterman Photographs, including 4 additional Historic American Buildings Survey Photographs of the Log House by Jack E. Boucher, was transmitted to the Library of Congress Prints and Photographs HABS Collection.



**Perspective View of East (Front) and South Side MARY LOCHER CABIN**
(A. POFFENBERGER LOG HOUSE) Addendum: HABS No. MD-90-4
*Photographer: Jack E. Boucher, HABS Photographer – 1989*

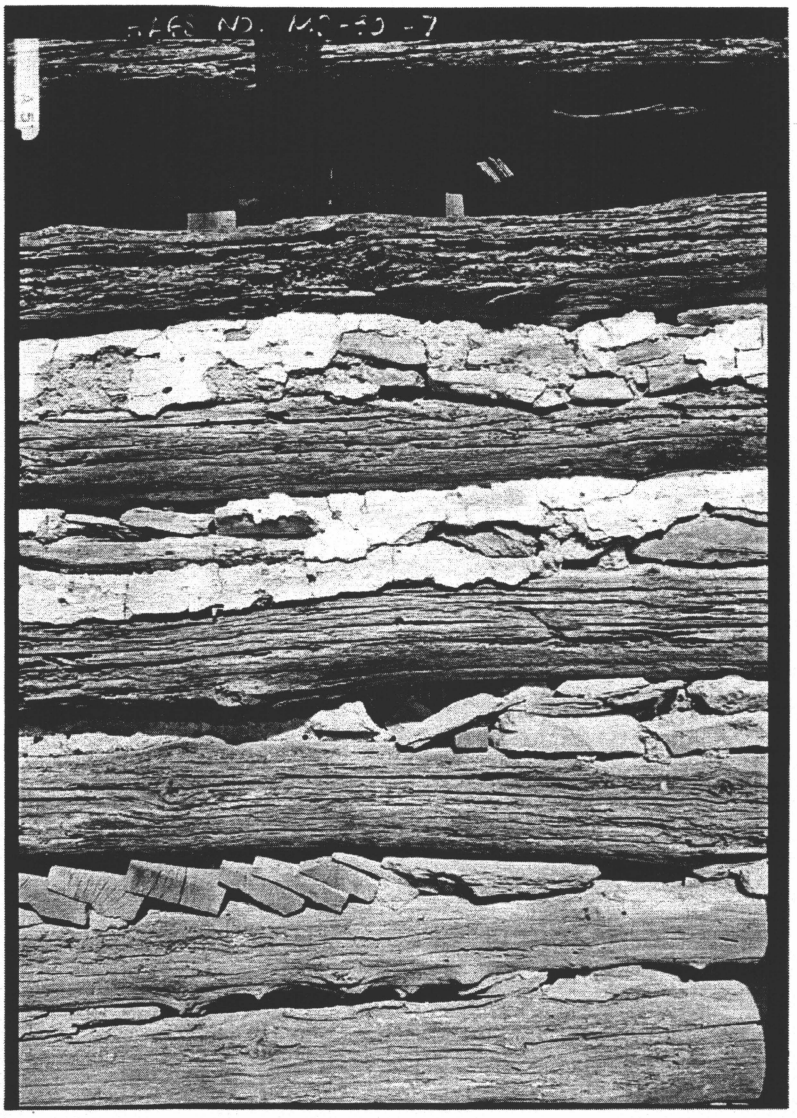



**Detailed Perspective View of South Entrance MARY LOCHER CABIN**
(A. POFFENBERGER LOG HOUSE) Addendum: HABS No. MD-90-5
*Photographer: Jack E. Boucher, HABS Photographer – 1989*




**Detailed Perspective View of Southeast Corner,
Shows Log Joining and Notching
MARY LOCHER CABIN**

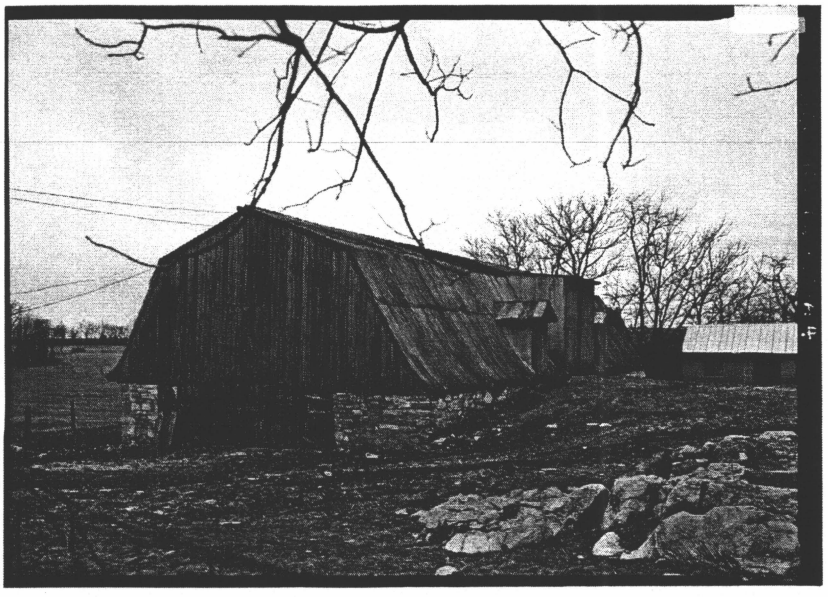
(A. POFFENBERGER LOG HOUSE) Addendum: HABS No. MD-90-6
*Photographer: Jack E. Boucher, HABS Photographer – 1989*



**Detailed View of South (Front) Facade;**
**Shows Stone Wood Block, Note Lath Through Logs**
**MARY LOCHER CABIN**

(A. POFFENBERGER LOG HOUSE) Addendum: HABS No. MD-90-7
*Photographer: Jack E. Boucher, HABS Photographer – 1989*

The Barn near the Mary Locher Cabin (aka A. Poffenberger Farm, Log House and Barn) was photographed by HABS Photographer Jack Boucher in 1989 – transmitted into collection as Addendum to MD-90-A. However photographic views 1-3 are misidentified and are perhaps of another bank barn located in the vicinity of Antietam Battlefield.



**Perspective View of North (Front) and East Side**
A. POFFENBERGER BARN Addendum: HABS No. MD-90-A-4
*Photographer: Jack E. Boucher, HABS Photographer – 1989*

**Perspective View of South (Rear) and East Side**
A. POFFENBERGER BARN Addendum: HABS No. MD-90-A-5
*Photographer: Jack E. Boucher, HABS Photographer – 1989*

# Appendix B

## Building Testing and Fabric Analysis Reports

1. Structural System Analysis
2. Hazardous Materials Survey
3. Historic Finishes Analysis
4. Chinking Repair Recipe
5. Reference Material on Epoxy Materials/Methods

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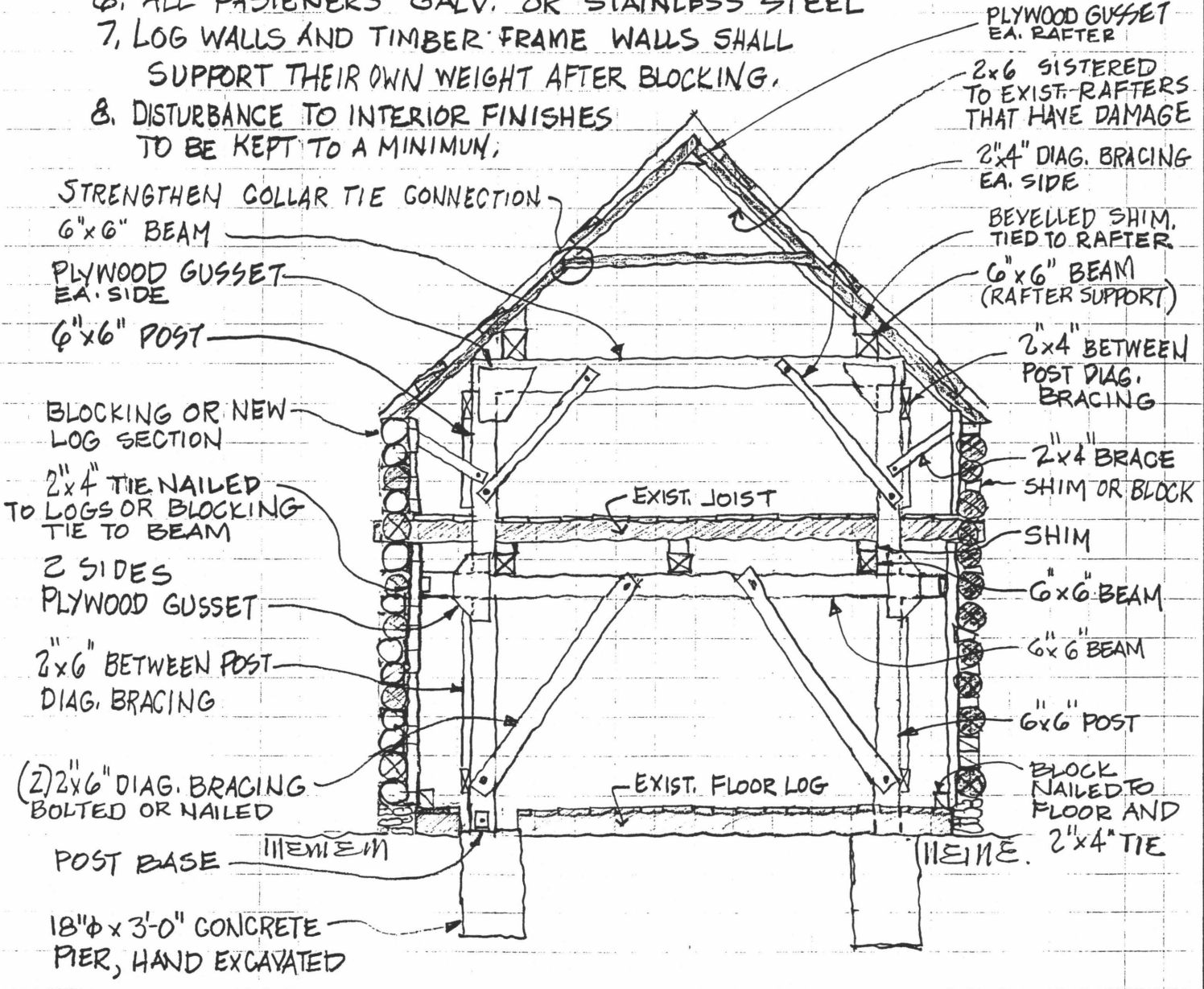
# NOTES

1. SECTION APPLIES @ 6 LOCATIONS ALONG LENGTH OF BULDING SEE SUGGESED POST LOCATION SKETCH BY ARCHITRAVE.
2. EXTERIOR WALL BLOCKING AND 2"x4" TIE OCCUR ONLY IN LOG CABIN
3. SIZES ARE PRELIMINARY AND SHOULD BE VERIFIED BY FINAL DESIGN.
4. CONCRETE IS 3000 PSI @ 28 DAYS
5. LUMBER IS PRESSURE TREATED SOUTHERN PINE NO 2.
6. ALL FASTENERS GALV. OR STAINLESS STEEL
7. LOG WALLS AND TIMBER FRAME WALLS SHALL SUPPORT THEIR OWN WEIGHT AFTER BLOCKING.
8. DISTURBANCE TO INTERIOR FINISHES TO BE KEPT TO A MINIMUN.




## INTERNAL SHORING SECTION

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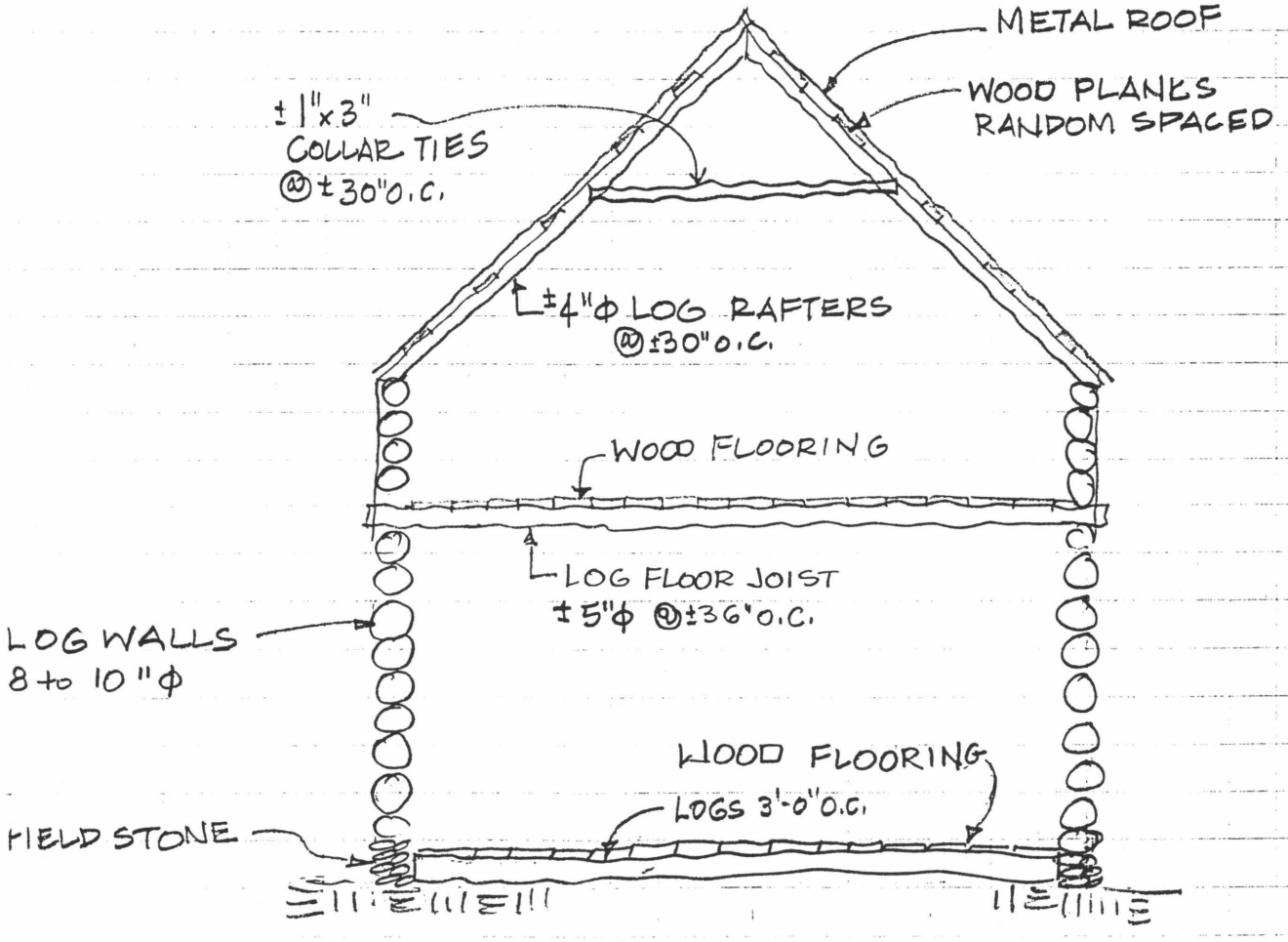


# SECTION THRU LOG CABIN

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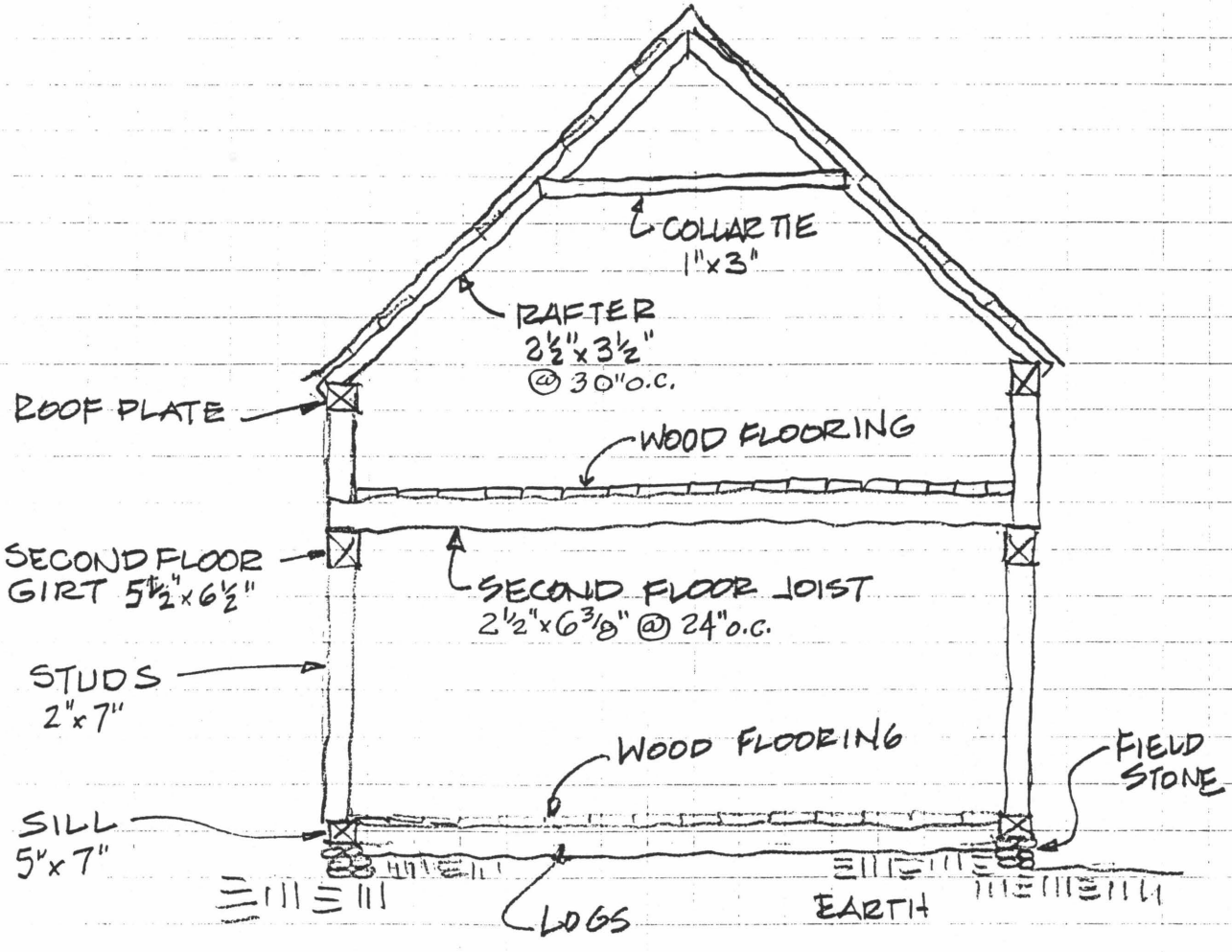


SECTION THRU TIMBER FRAME

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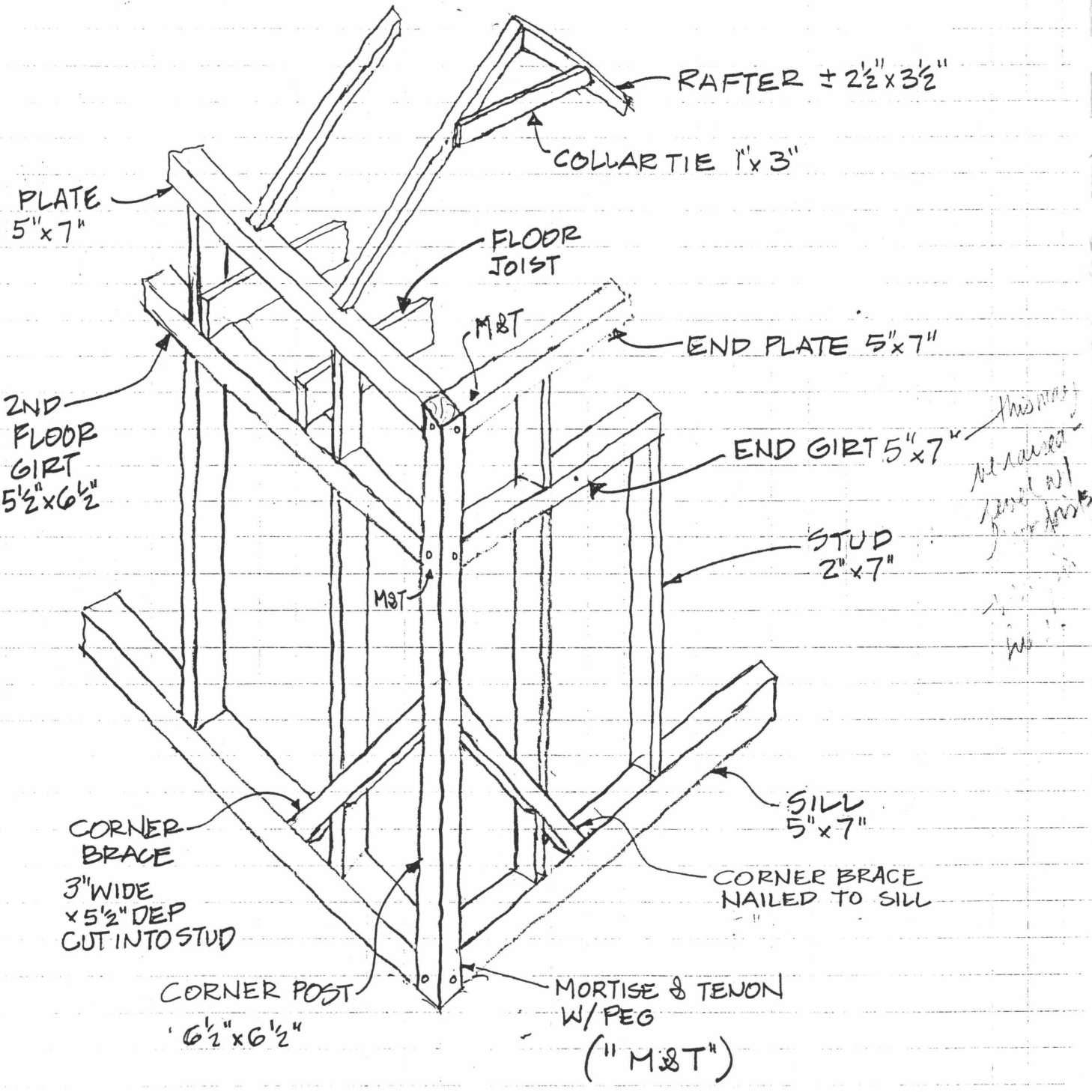


PERSPECTIVE VIEW OF TIMBER FRAME

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# GRAVITY LOADS

## ROOF

| | |
|---|---|
| METAL ROOFING | 2 PSF |
| SHEATHING 1x (RANDOM) | 2 PSF |
| FRAMING (RAFTER + C.J.) | 2 PSF |
| WOOD LATHE (W/O PLASTER) | 2 PSF |
| | 8 PSF |

## 2ND FLOOR

| | |
|---|---|
| PLASTER DEBRIS 1" (LOG CABIN) | 5 PSF |
| SUBFLOOR | 4 PSF |
| JOISTS | 4 PSF |
| | 13 PSF |

W/O PLASTER 8 PSF

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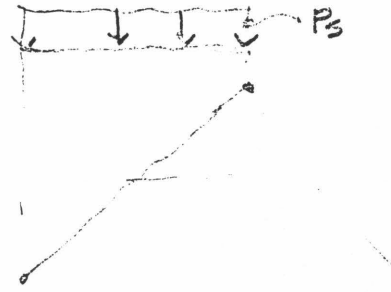



## BUILDING WEIGHTS & LOADS

ROOF L.L. (BOCA)

$P_G = 35$ PSF

ROOF SLOPE = 40°

$C_S = 1 - \left(\frac{40-30}{40}\right) = 0.75$

$I = 0.8$ (BUILDING REPRESENTS LOW HAZARD TO HUMAN LIFE IN EVENT OF FAILURE BOCA TABLE 1609.5)

$C_e = 0.7$

$P_f = 0.7(0.8)(35) = 19.6$ PSF

$P_S = 19.6\,(0.75) = 14.7$ psf

NOTE: MIN. ROOF LOAD OF 16PSF (BOCA 1607.3) GOVERNS

USE $P_S = 16$ PSF

WIND EXPOSURE C

$I = 0.9$

$P = 12.5$ psf (70 mph WIND)

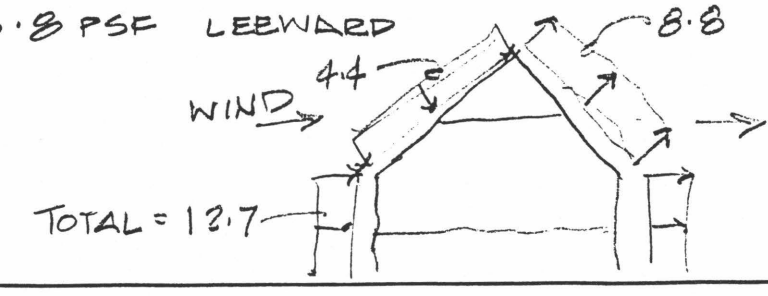
WALLS:

$P = 12.5(0.9)\left[0.87(1.29)(.8+.5)\right] = 12.7$ PSF

ROOF

$P = 12.5(0.9)(0.35)(0.87)(1.29) = 4.4$ PSF WINDWARD

$P = 4.4\left(\frac{.7}{.35}\right) = -8.8$ PSF LEEWARD



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SECOND FLOOR JOISTS - LOG CABIN LOGS

LOGS @ 24" O.C. → WHAT IS MIN. SIZE REQ'D?

$w = (13 + 30)\,3' = 129$ PLF

$M = 129(14.67)^2 \frac{1}{8} = 3470$ FT-LB

$V = 129(14.67)\frac{1}{2} = 946$ LB > 300 LB MIN.

ASSUME 1000 PSI ALLOWABLE BENDING STRESS

$S_{REQ'D} = \frac{M}{F_b'} = \frac{3470 \times 12}{1000 \times 1.15} = 36.2\ in^3$

$S_x = .785\,R^3$ $R_{REQ'D} = 3.58"$ OR 7 1/8" ϕ LOG

ASSUME 70 PSI SHEAR

$f_v' = \frac{4V}{3A}$ $A = \frac{\pi r^2}{4}$ FOR ROUND LOG

$r^2 = \frac{4V}{(F_v')3\pi}$ $r = \sqrt{\frac{4(940)}{90(3)\pi/4}} = 4.12"$ OR 8 1/2" ϕ LOG

CHECK ACTUAL LOGS AVG. 5 1/2" ϕ. $S_x = 16.3\ in^3$

$w = \frac{8(16.3 \times 1000 \times 1.15)/12}{(14.67)^2\ 3\ \text{FT O.C.}} = 19$ PSF

$W_{LL} = 19$ PSF − 13 PSF DL = 6 PSF
(OR 5 W/O PLASTER = 14 PSF

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CHECKED BY _____ DATE _____

## SECOND FLOOR JOISTS CONT'D

$A = 16.9 in^2$
$S_x = 18.98 in^3$

TYP. AVG SIZE ~ $2\frac{1}{2} \times 6\frac{3}{4}$ → CALC LL.

ASSUME $F'_b = 1000 psi \times 1.15 = 1150$

$M = f'_b S_x = (18.98)(1150)/12 = 1818$ ft-lb

$w = \frac{8M}{L^2} = \frac{8(1818)}{(14.67)^2} = 68$ PLF

BASED ON SHEAR: ASSUME $f'_v = 90$ PSI

$f'_v = \frac{3}{2}\frac{V}{A}$ $\quad V_{max} = \frac{2}{3}(90)(16.9) = 1019$ LBS

$w = \frac{2V}{L} = \frac{2(1019)}{14.67} = 139$ PLF

∴ BENDING CONTROLS

DEAD LOAD = 8 PSF (2') = 16 PLF

MAX LL = 68 − 16 = 52 PLF (CONTROLS)

CONC. LOAD EQUIV. TO = $\frac{2P}{L} = \frac{2(300)}{14.67} = 41$ PLF < 52 PLF

∴ MAX LL = $\frac{52 \text{ PLF}}{2 \text{ FT O.C.}} = 26$ PSF

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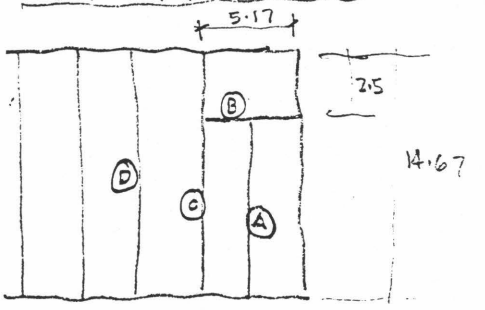
## L.L. CAPACITY JOIST (A):

SAWN FRAMING




ASSUME $F_b' = 1000$ PSI WHERE APPLICABLE, INCREASE 15% FOR REPETITION

$S_x = (6\frac{5}{8})^2 2\frac{1}{2}(\frac{1}{6}) = 18.3 \text{ in}^3$

$A = 16.6 \text{ in}^2$

$M_{max} = 1150(18.3)\frac{1}{12} = 1754 \text{ ft-lbs}$

$w = \frac{8M}{L^2} = \frac{8(1754)}{(12.17)^2(2.5 \text{ Ft. O.C.})} = 38 \text{ PSF}$

$V_{max}$ @ NOTCH ASSUME $F_v' = 90$ PSI $f_v = \frac{3}{2}\frac{V}{A}\frac{d}{d'}$

$4\frac{1}{4}"$

$R = \frac{2(16.6)}{3}90\left(\frac{4\frac{1}{4}}{6\frac{5}{8}}\right) = 637 \text{ LBS}$

$w = \frac{2(639)}{14.67(2.5\frac{1}{2} \text{ O.C.})} = 35 \text{ PSF}$ (CONTROLS)

EQUV. UNIFORM LOAD FROM CONC. LOAD $= \frac{300(2)}{12.17(2.5)} = 20 \text{ PSF}$

LL MAX = 35 PSF − 8 PSF DL = <u>27 PSF</u>

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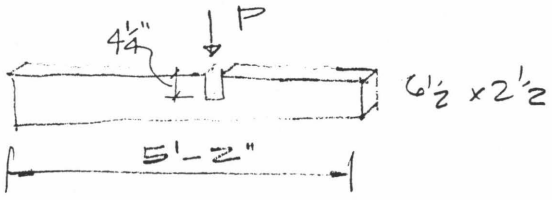
LL. CAPACITY GIRDER (B)




SECTION @ NOTCH = $\frac{(2.25)^2 2.5}{6}$ = 2.1 in³

M = Fb' $S_x$ = 1000 (2.1) $\frac{1}{12}$ = 175 FT-LBS

$P_{max} = \frac{ML}{ab} = \frac{175(5.17)}{2.5(2.67)}$ = 136 LB < 300 LB CONC. LOAD

$W = \frac{2R}{L(2.5' o.c.)} = \frac{2(136)}{12.67(2.5)}$ = 8.6 PSF

$W_{LL} = 9 - 8 =$ 1. PSF

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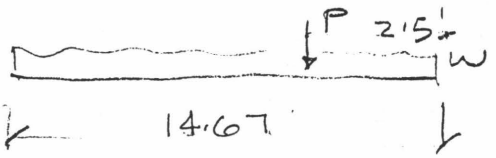
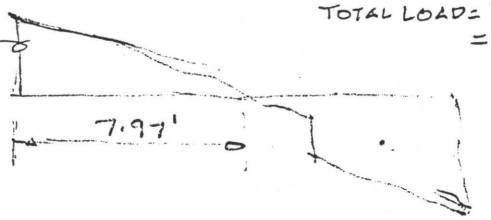
## LL. CAPACITY (C)




$$P = \frac{w\left(\frac{12.17}{2}\right)2.5'\text{o/c}}{2} = 7.6w \text{ LBS}$$

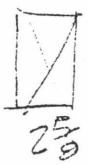



TOTAL LOAD = 7.6w + 14.67(2.4)w
= 43w

$$19.2w = \frac{14.67}{2}(2.4w) + 7.6w\,\frac{2.5}{12.67}$$

$$M = \tfrac{1}{2}(19.2w)(7.97) = 76.5w$$

$$M_{max} = 1000(19.9)\tfrac{1}{12} = 1658 \text{ FT-LBS}$$




$S_x = 19.9$
$A = 17.7$

$$w = \frac{1658}{76.5} = 22 \text{ PSF MAX}$$

$$w_{LL} = 22 - 8 = \underline{14 \text{ PSF}}$$

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CALCULATED BY D.B. DATE _____
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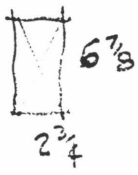
## LL CAPACITY JOIST (D)

$F_b = 1000\ (1.15) = 1150$ psi ASSUME




$A = 18.9$

$S_x = 21.7$

$$W = \frac{8M}{L^2} = \frac{8(1150)(21.7)\,1/12}{(14.67)^2} = 77 \text{ PLF}$$ ← CONTROLS

CONC. LOAD EQUIV. $= \frac{2(300)}{14.67} = 41$ PLF (CONC LOAD LESS THAN MAX LL)

SHEAR: ASSUME $F_v = 90$

$$F_v = \frac{3V}{2A} \qquad W = \frac{2AF_v}{3}\left(\frac{2}{L}\right) = 154 \text{ PLF}$$

$$W_{LL} = \frac{77}{2' \text{ o.c.}} - 8 = \underline{\underline{30 \text{ PSF}}}$$

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SHEET NO. _____ OF _____
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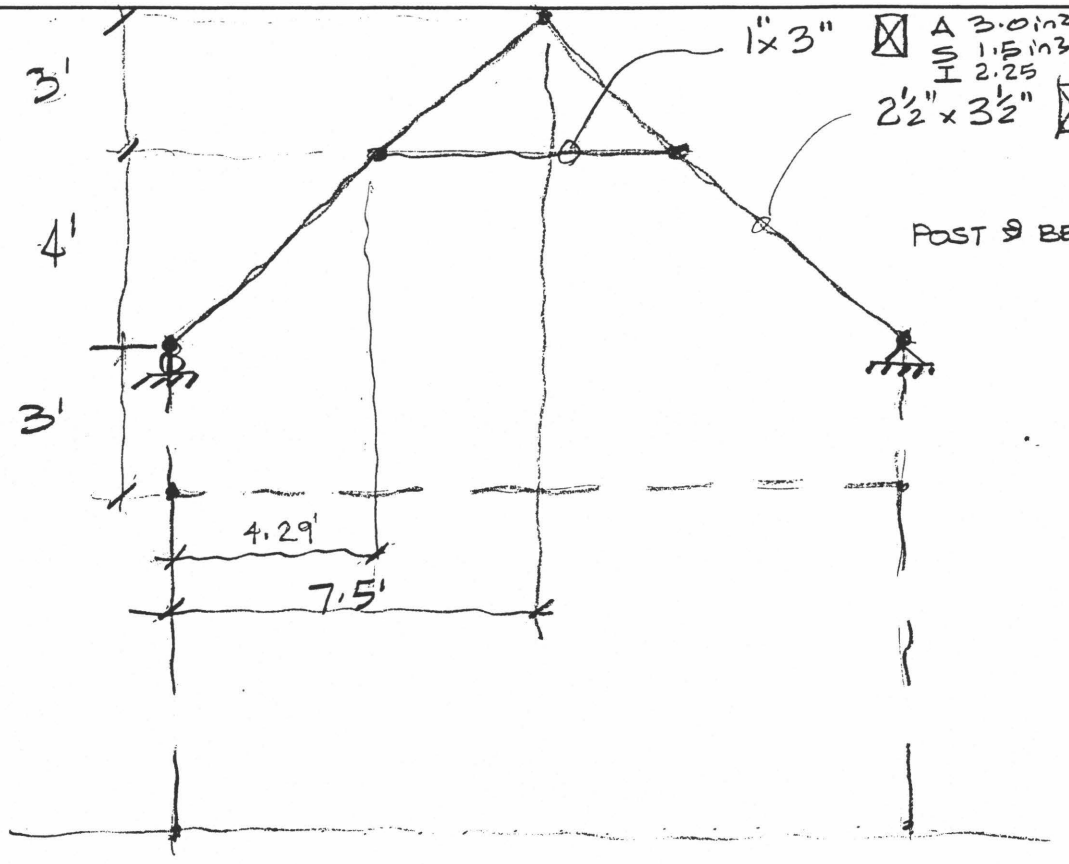



CONSIDER TWO MODELS

① PINNEND ENDS
(ROOF THRUST TAKEN BY EXT. WALLS + COLLAR TIES)

② ROLLER - PIN
(ROOF THRUST TAKEN BY COLLAR TIES)

REAL CONDITION IS SOMEWHERE IN BETWEEN

DL 8PSF(2.5FT) = 20 PLF

SL 16PSF (2.5FT) = 40 PLF

RISA-3D - [E:\D Bond Jobs\2300s\2319 Mary Locher\2319 Mary Locher.r3d]

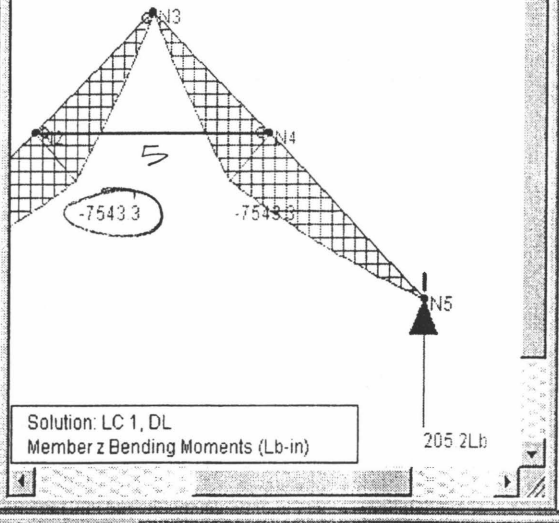
File Edit Options View Insert Modify Spreadsheets Solve Results Utilities Window Help

Tiling | BLC 1:DL

**Joint Reactions for LC 1 DL**

| | Joint Label | X [Lb] | Y [Lb] | Z [Lb] | MX [Lb... | MY [Lb... | MZ [Lb... |
|---|---|---|---|---|---|---|---|
| 1 | N1 | 0 | 205.183 | 0 | 0 | 0 | 0 |
| 2 | N5 | 0 | 205.183 | 0 | 0 | 0 | 0 |
| 3 | N3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | Totals: | 0 | 410.366 | 0 | | | |
| 5 | COG (Ft): | X: 7.517 | Y: 3.515 | Z: 0 | | | |

**Model View**



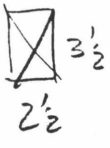

**Member Section Forces for LC 1 DL**

| | Member Label | S... | Axial[Lb] | y Shea... | z Shea... | Torque... | y-y Mo... | z-z Mo... |
|---|---|---|---|---|---|---|---|---|
| 1 | M1 | 1 | 139.925 | 150.07 | 0 | 0 | 0 | 0 |
| 2 | | 2 | 119.925 | 128.62 | 0 | 0 | 0 | -2451.981 |
| 3 | | 3 | 99.925 | 107.17 | 0 | 0 | 0 | -4526.517 |
| 4 | | 4 | 79.925 | 85.72 | 0 | 0 | 0 | -6223.609 |
| 5 | | 5 | 59.925 | 64.27 | 0 | 0 | 0 | -7543.255 |
| 6 | M2 | 1 | 247.433 | -110.971 | 0 | 0 | 0 | -7543.255 |
| 7 | | 2 | 232.433 | -127.021 | 0 | 0 | 0 | -5974.772 |
| 8 | | 3 | 217.433 | -143.071 | 0 | 0 | 0 | -4194.735 |
| 9 | | 4 | 202.433 | -159.121 | 0 | 0 | 0 | -2203.145 |
| 10 | | 5 | 187.433 | -175.171 | 0 | 0 | 0 | 0 |
| 11 | M3 | 1 | 187.433 | 175.171 | 0 | 0 | 0 | 0 |
| 12 | | 2 | 202.433 | 159.121 | 0 | 0 | 0 | -2203.145 |
| 13 | | 3 | 217.433 | 143.071 | 0 | 0 | 0 | -4194.735 |
| 14 | | 4 | 232.433 | 127.021 | 0 | 0 | 0 | -5974.772 |
| 15 | | 5 | 247.433 | 110.971 | 0 | 0 | 0 | -7543.255 |
| 16 | M4 | 1 | 59.925 | -64.27 | 0 | 0 | 0 | -7543.255 |
| 17 | | 2 | 79.925 | -85.72 | 0 | 0 | 0 | -6223.609 |
| 18 | | 3 | 99.925 | -107.17 | 0 | 0 | 0 | -4526.517 |
| 19 | | 4 | 119.925 | -128.62 | 0 | 0 | 0 | -2451.981 |
| 20 | | 5 | 139.925 | -150.07 | 0 | 0 | 0 | 0 |
| 21 | M5 | 1 | -256.547 | 0 | 0 | 0 | 0 | 0 |

10.71, 4, 0 (Ft)

Start | Exploring - ... | Inbox - Micr... | RISA-3D - ... | The Weathe... | ENERCALC... | Microsoft W... | 10:19 AM

PIN-ROLLER MODEL




$S_x = 5.1$

TOTAL DL+LL $f_b = 3640_{PSI}$ !!

STRESS IN COLLAR TIE

DL 256 LB AXAIL

W/ 80LB/NAIL (APPROX.)

3.2 NAILS REQ'D

LL $\frac{29.2}{20}(3.2) =$ 4.7 NAILS

TOTAL = 8 NAILS

RAFTER

$f_{b_{DL}} = \frac{M_{DL}}{S_x} = \frac{7543 \text{ in-lb}}{5.1} =$ 1480 PSI (TOO HIGH)

W/ 1.9" DEFLECTION

↳ OBSERVED

$f_{b_{LL}}$ $\frac{29.2}{20}(1480) =$ 2160 PSI

RISA-3D - [E:\D Bond Jobs\2300s\2319 Mary Locher\2319 Mary Locher.r3d]

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BLC 1:DL

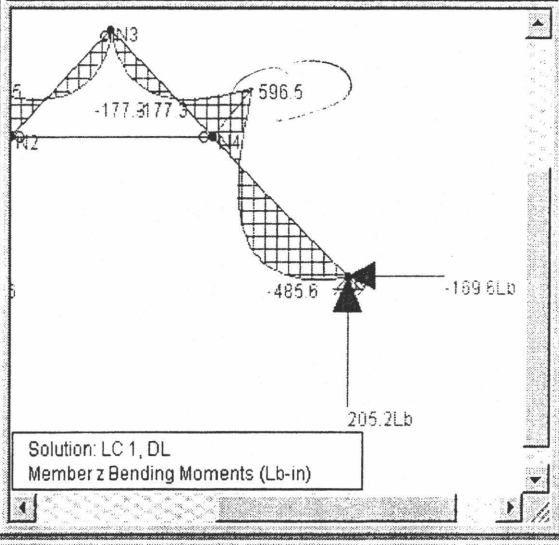
**Joint Reactions for LC 1 DL**

| | Joint Label | X [Lb] | Y [Lb] | Z [Lb] | MX [Lb... | MY [Lb... | MZ [Lb... |
|---|---|---|---|---|---|---|---|
| 1 | N1 | 169.578 | 205.183 | 0 | 0 | 0 | 0 |
| 2 | N5 | -169.578 | 205.183 | 0 | 0 | 0 | 0 |
| 3 | N3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | Totals: | 0 | 410.366 | 0 | | | |
| 5 | COG (Ft): | X: 7.517 | Y: 3.515 | Z: 0 | | | |

**Joint Deflections for LC 1 DL**

| | Joint Label | X [in] | Y [in] | Z [in] | X Rotat... | Y F |
|---|---|---|---|---|---|---|
| 1 | N1 | 0 | 0 | 0 | 0 | |
| 2 | N2 | 0.001 | -0.003 | 0 | 0 | |
| 3 | N3 | 0 | -0.002 | 0 | 0 | |
| 4 | N4 | -0.001 | -0.003 | 0 | 0 | |
| 5 | N5 | 0 | 0 | 0 | 0 | |

**Model View**

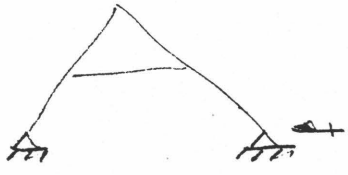



**Member Section Forces for LC 1 DL**

| | Member Label | S... | Axial[Lb] | y Shea... | z Shea... | Torque... | y-y Mo... | z-z Mo... |
|---|---|---|---|---|---|---|---|---|
| 1 | M1 | 1 | 263.954 | 34.426 | 0 | 0 | 0 | 0 |
| 2 | | 2 | 243.954 | 12.976 | 0 | 0 | 0 | -417.049 |
| 3 | | 3 | 223.954 | -8.474 | 0 | 0 | 0 | -456.652 |
| 4 | | 4 | 203.954 | -29.924 | 0 | 0 | 0 | -118.811 |
| 5 | | 5 | 183.954 | -51.374 | 0 | 0 | 0 | 596.475 |
| 6 | M2 | 1 | 82.242 | 43.413 | 0 | 0 | 0 | 596.475 |
| 7 | | 2 | 67.242 | 27.363 | 0 | 0 | 0 | 130.025 |
| 8 | | 3 | 52.242 | 11.313 | 0 | 0 | 0 | -124.87 |
| 9 | | 4 | 37.242 | -4.737 | 0 | 0 | 0 | -168.212 |
| 10 | | 5 | 22.242 | -20.787 | 0 | 0 | 0 | 0 |
| 11 | M3 | 1 | 22.242 | 20.787 | 0 | 0 | 0 | 0 |
| 12 | | 2 | 37.242 | 4.737 | 0 | 0 | 0 | -168.212 |
| 13 | | 3 | 52.242 | -11.313 | 0 | 0 | 0 | -124.87 |
| 14 | | 4 | 67.242 | -27.363 | 0 | 0 | 0 | 130.025 |
| 15 | | 5 | 82.242 | -43.413 | 0 | 0 | 0 | 596.475 |
| 16 | M4 | 1 | 183.954 | 51.374 | 0 | 0 | 0 | 596.475 |
| 17 | | 2 | 203.954 | 29.924 | 0 | 0 | 0 | -118.811 |
| 18 | | 3 | 223.954 | 8.474 | 0 | 0 | 0 | -456.652 |
| 19 | | 4 | 243.954 | -12.976 | 0 | 0 | 0 | -417.049 |
| 20 | | 5 | 263.954 | -34.426 | 0 | 0 | 0 | 0 |
| 21 | M5 | 1 | 139.134 | 0 | 0 | 0 | 0 | 0 |

10.71, 4, 0 (Ft)

Start | Exploring - ... | Inbox - Micr... | RISA-3D -... | The Weathe... | ENERCALC... | 10:15 AM



PIN-PIN MODEL
(NOT AS LIKELY)

HORZ. FORCE ALONG TOP OF WALL

$DL = \frac{170\ LB}{2.5\ FT\ O.C.} = 68\ PLF$

$SL\ OR\ LL = \frac{29.2}{20}(68) = 99\ PLF$

RAFTER

$f_{bDL} = \frac{597\ in\text{-}lb}{5.1} = \boxed{117\ psi}$

$f_{bLL} = \frac{29.2}{20}(117) = 170\ psi$

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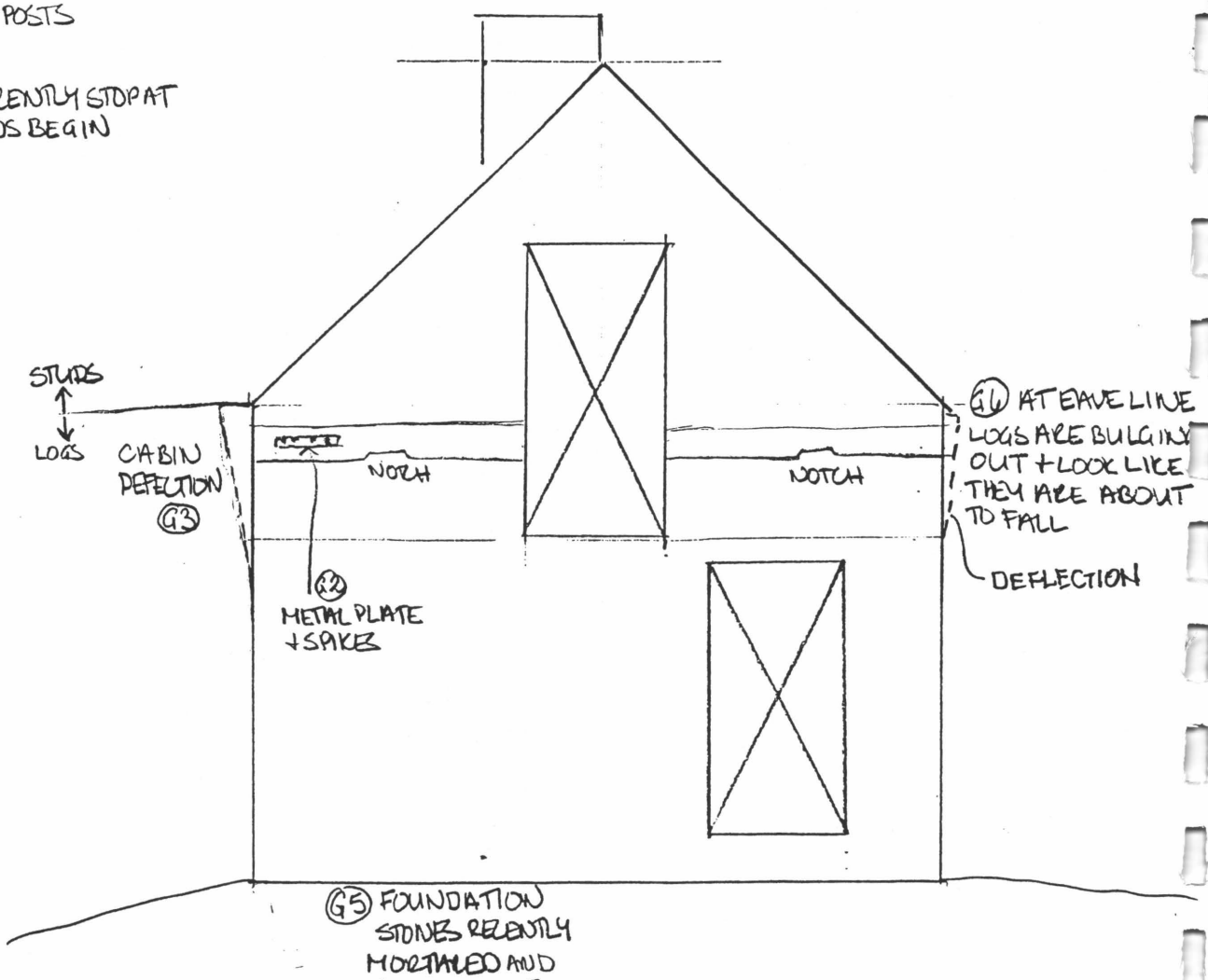
PROJECT NAME MARY LOCHER CABIN PROJ. NO. 239
SHEET NO. 4 OF
CALCULATED BY DATE NOV 4 99
CHECKED BY DATE

G2 METAL PLATE + SPIKES
G3 CABIN DEFLECTION
G4 OVERALL ELEVATION
G5 FOUNDATION STONES
G6 LOGS BULGING OUT

- THERE HAS BEEN AN ATTEMPT TO STABILIZE THE OUTWARD WALL WITH POSTS

- LOGS APPARENTLY STOP AT EAVE + STUDS BEGIN




- THERE IS MORE CHINKING REMAINING ON THIS SIDE OF THE CABIN

# SOUTH ELEVATION

A1 SILL PLATE
A2 MORTARED STONE FND.
A3 NOTCHED LOGS
A4 LEFT END OF TOP 3 LOGS MISSING
A5 FLOOR JST PROTRUDING THROUGH WALL
A6 TOP LOG BROKEN IN HALF

B1 BOWING OUT FROM EAVE TO 2ND FLOOR JST ~6"
B2 MISSING SILL PLATE
B3 DEFLECTED RIDGE
B4 8TH LOG UP OVER FLOOR JST. IS NOTCHED WHERE FLOOR JST EXPECTED
B5 4TH LOG FROM BOTTOM ~ @ MIDLINE OF WINDOW FRAME - PROBING & KNIFE SHOWS SOFT SPOTS ON MANY LOGS
B6 INSECT DAMAGE

D6 STUD 'BEARING' BELOW WINDOW

C6 WOOD SHEATHING UNDER WINDOW ABSENT
C1 NO APPARENT CONVULTION BETWEEN CABIN LOGS + CORNER POST OF SHED
C2 MORTISE + TENON JOINT WITH PEG - SILL PLATE + CORNER POST JOINT
C3 RAFTER ENDS
C4 ROOF CURVE
C5 FLOOR JST RESTING ON SHIM - TAKEN FROM INSIDE SHED

CONCERNS
- LACK OF CHINKING
- MISSING LOGS
- MISSING LOGS UNDER RAFTER BEARING - SOME RAFTERS BEARING ON PLASTER
- WOOD PLASTER LATH HOLDING UP ROOF

~12"

(B3)

- MAIN HORIZONTAL LOGS NOTCHED FOR INTERIOR LOGS TO PROTRUDE THROUGH
- 3 CLAY BRICKS BETWEEN CABIN + SHED. - UNKNOWN ORIGIN/PURPOSE, SEEM TO HAVE FALLEN
- WEIGHT OF WALL + ROOF FRAMING SUPPORTED BY WALL WHERE SOME CHINKING IS STILL IN PLACE. ONE LOG END HAS TO CANTILEVER FROM MIDDLE BECAUSE CHINKING IS MISSING + LOADS CANNOT BE TRANSFERRED TO THE SILL.
- UPPER PART OF WALL IN DANGER OF COLLAPSE WHERE ROOF RAFTER BEARS

(C4) CURVE IN ROOF FROM RIDGE TO EAVE INDICATING RAFTER DEFLECTION

- OUTSIDE SHED WALLS MADE OF BOARDS 16"X1" WITH A 3½"X1" BATON COVERING JOINT - SHEATHING BOARDS HAVE DETERIORATED ENDS
- SHED WALL STUDS MORTISE + TENONED INTO SILL

(A4) (B1) (B4) (A3) (A1) (A2)

WALL 12 LOGS HIGH

SOME LOAD MAY BE TAKEN BY FRAMES

TRIM MOLDING AROUND WINDOW

CHINKING BTWN LOGS MISSING - LOADS CAN'T BE TRANSFERRED PROPERLY.

1 LOG

±10FT

3'6"

(A6) LOG BROKEN IN HALF - NEEDS REPLACING

1 LOG STILL HAS BARK

(A5) FLOOR JST PROTRUDING THROUGH WALL, ENDS MISSING/DETERIORATED

LOGS CAN TAKE LOAD HERE

7'7"

LOG ALONG LOWER EDGE OF WINDOW CAN CANTILEVER TO TRANSFER LD.

TOP OF STONE

(B5) "AREA OF STRUCT. (B6) CONCERN"

(B2) (C1) BTM. LOG MISSING 4'6"

(C3) RAFTER ENDS PROTRUDING FROM WALL

(C5) FLOOR JOIST RESTS ON 1" SHIM (RESTING ON) GIRT

CORNER POST

1ST STUD

5½"X6½" GIRT

CORNER POST 6½"X6½"

6¾"X6½"

SILL PLATE 5"X7"

STUD 2¼" WIDE X 7½" DEEP

6'5"

WALL FRAMING COVERED

DIAG. BRACING

(C6)

(D6) SILL HEAVILY DAMAGED, FLAKES EASILY WHEN TOUCHED BY HAND

11" FROM GROUND TO TOP OF STONE

MORTISE & TENON JOINT

STUD HAS NO BEARING

OUTER 3" OF SILL PLATE ROTTED AWAY - SOME BEARING LEFT FOR WALL STUDS

STUD

SILL PLATE

STONE

LOG ON SILL LOST 70% OF X-SECTION ON END
AVE. LOG Ø: ~8"

15" FROM GROUND TO TOP OF STONE

(C2) MORTISE + TENON JNT. & PEG

- SILL FOR SHED IS 6" LOWER THAN FOR CABIN + HAS BEEN RECENTLY MORTARED

(A2) STONE FOUNDATION: RANDOM FIELD COARSED STONE. LOOKS LIKE MORTARED RECENTLY

# EAST ELEVATION

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PROJECT NAME MARYLOUTHERCABIN
SHEET NO. 1 OF
CALCULATED BY
CHECKED BY
DATE NOV 4 '99
DATE
PROJ. NO. 2319

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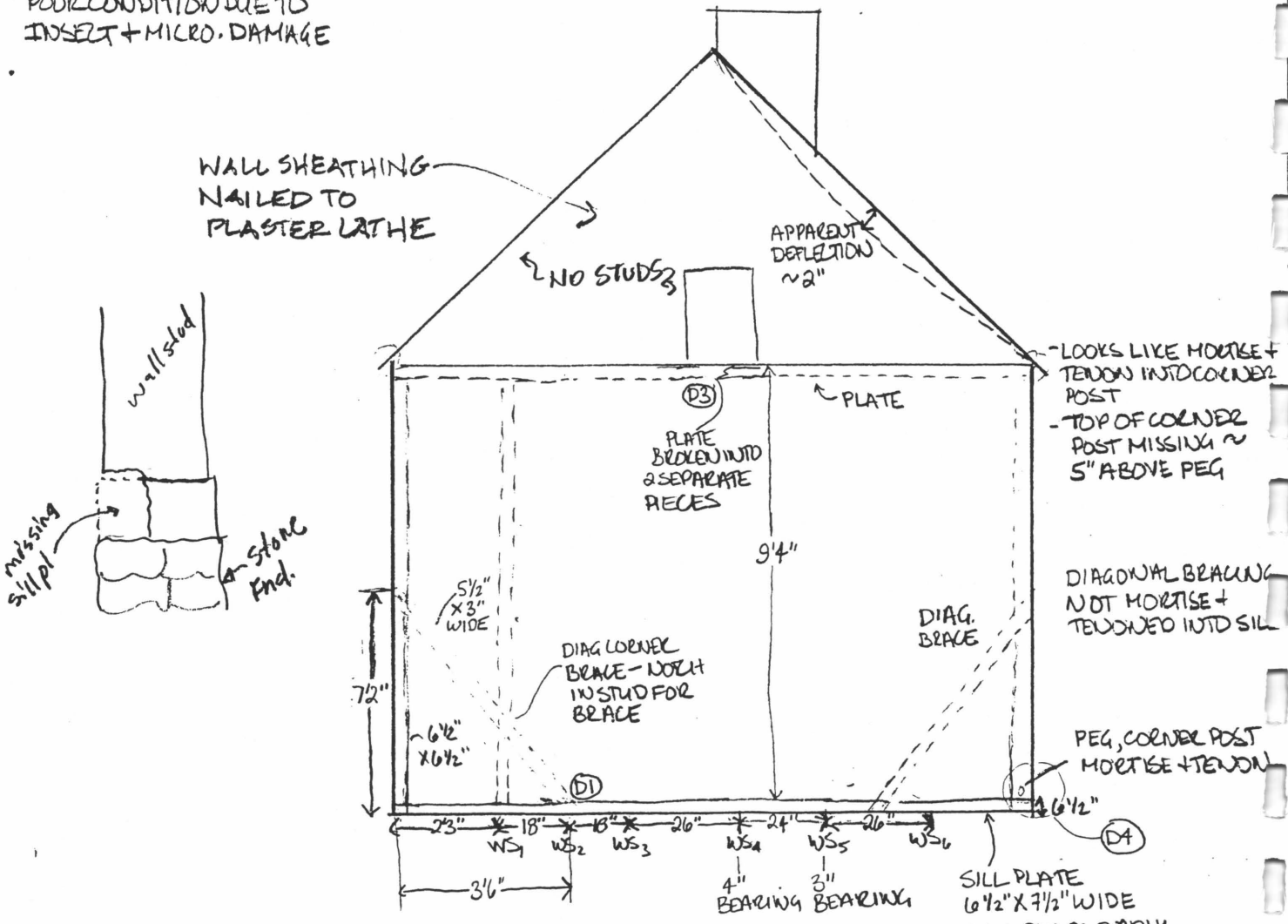
PROJECT NAME MARY LOCHER CABIN PROJ. NO. 2319
SHEET NO. 2 OF NOV 4/99
CALCULATED BY DATE
CHECKED BY DATE

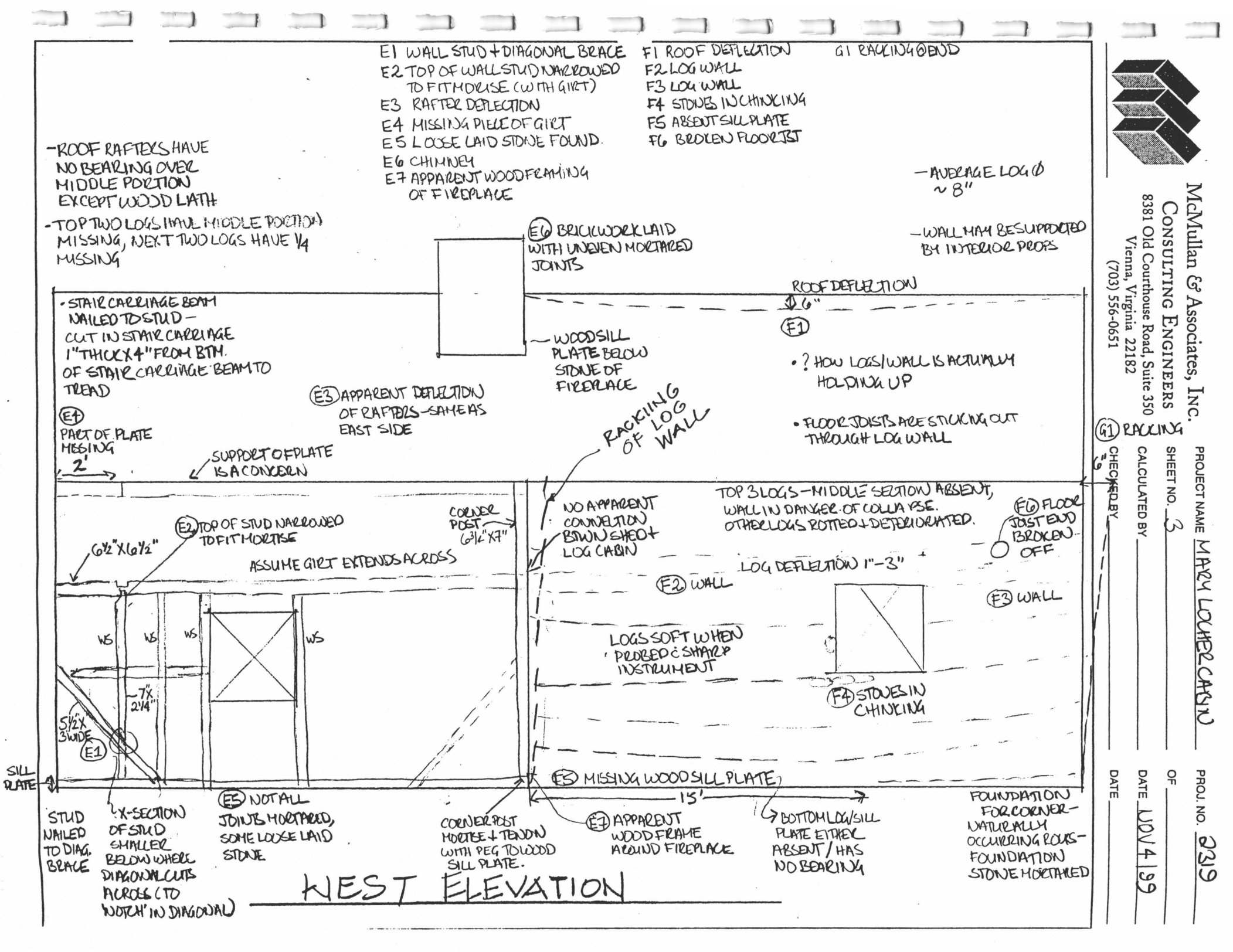
D1 CORNER BRACE HITS SILL
D2 OVERALL ELEVATION PICTURE
D3 PLATE BROKEN INTO 2 PIECES
D4 MORTISE + TENON JNT WITH PEG - CORNER POST + WOOD SILL PLATE
D5 SILL PLATE CONDITION - POOR CONDITION

* WEIGHT BEING CARRIED BY WALL STUDS + INTERIOR PLASTER
- IN GENERAL, SIDING IN POOR CONDITION DUE TO INSECT + MICRO. DAMAGE




WS WALL STUD
WS1 NOTCHED INTO SILL 2½", HAS BEARING
WS2 HAS BEARING
WS3 HAS BEARING
WS4 HAS 4" BEARING
WS5 HAS 3" BEARING
WS6 HAS NO BEARING

# NORTH ELEVATION

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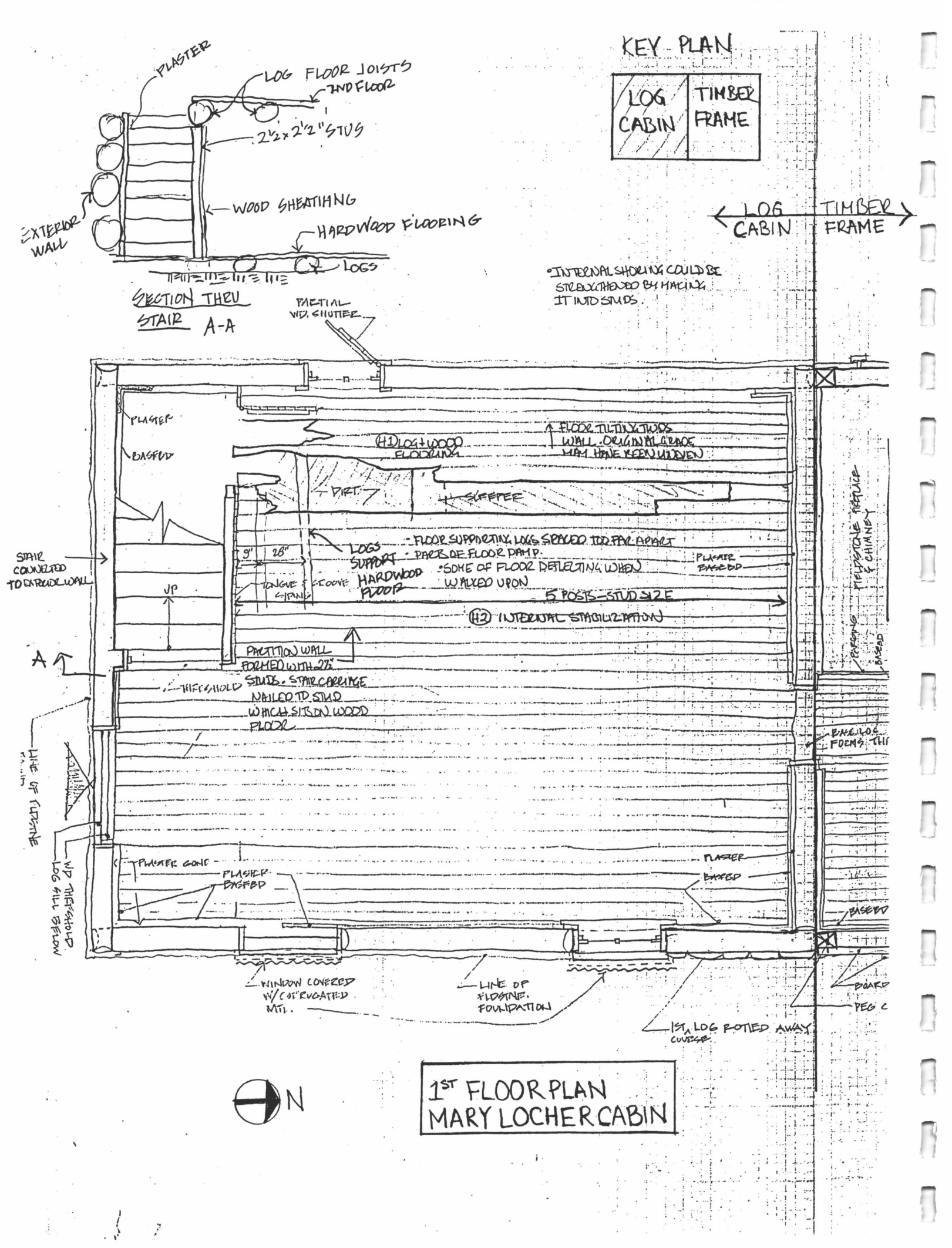
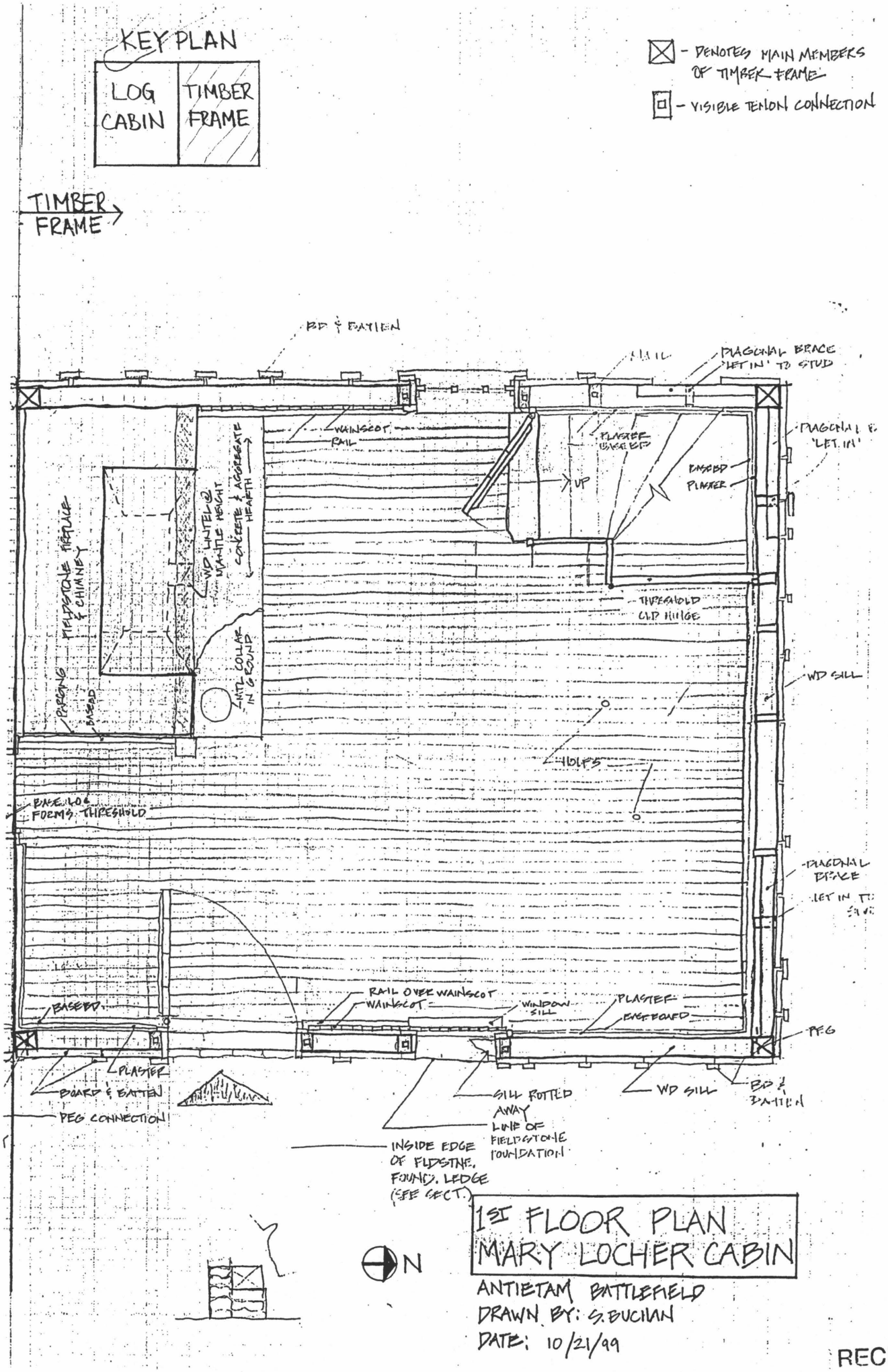
PROJECT NAME MARY LOUHER CABIN
SHEET NO. 3 OF
CALCULATED BY
CHECKED BY
DATE NOV 4 | 99
DATE
PROJ. NO. 239


KEY PLAN
LOG CABIN
TIMBER FRAME
LOG CABIN TIMBER FRAME
PLASTER
LOG FLOOR JOISTS
2ND FLOOR
2½x2½" STUS
WOOD SHEATHING
HARDWOOD FLOORING
EXTERIOR WALL
LOGS
SECTION THRU STAIR A-A
*INTERNAL SHORING COULD BE STRENGTHENED BY HACING IT INTO STUDS.
PARTIAL WD. SHUTTER
PLASTER
BASEBD
(H1) LOG+WOOD FLOORING
FLOOR TILTING TWDS WALL. ORIGINAL GRADE MAY HAVE BEEN LOWERED
DIRT
SLEEPER
LOGS SUPPORT HARDWOOD FLOOR
FLOOR SUPPORTING LOGS SPACED TOO FAR APART
PARTS OF FLOOR DAMP.
SOME OF FLOOR DEFLECTING WHEN WALKED UPON
9"
28"
TONGUE & GROOVE CEDAR
JP
5 POSTS-STUD SIZE
(H2) INTERNAL STABILIZATION
STAIR CONNECTED TO ENTRANCE WALL
A
PARTITION WALL FORMED WITH 2" STUDS. STAIR CARRIAGE NAILED TO STUD WHICH SITS ON WOOD FLOOR
THRESHOLD
PLASTER BASEBD
PLASTER COVE
PLASTER BASEBD
WD THRESHOLD
LOG SILL BELOW
WINDOW COVERED W/ CORRUGATED MTL.
LINE OF FLOATING FOUNDATION
1ST LOG ROTTED AWAY
COURSE
BOARD
PEG
N
1ST FLOOR PLAN
MARY LOCHER CABIN




# 1ST FLOOR PLAN MARY LOCHER CABIN

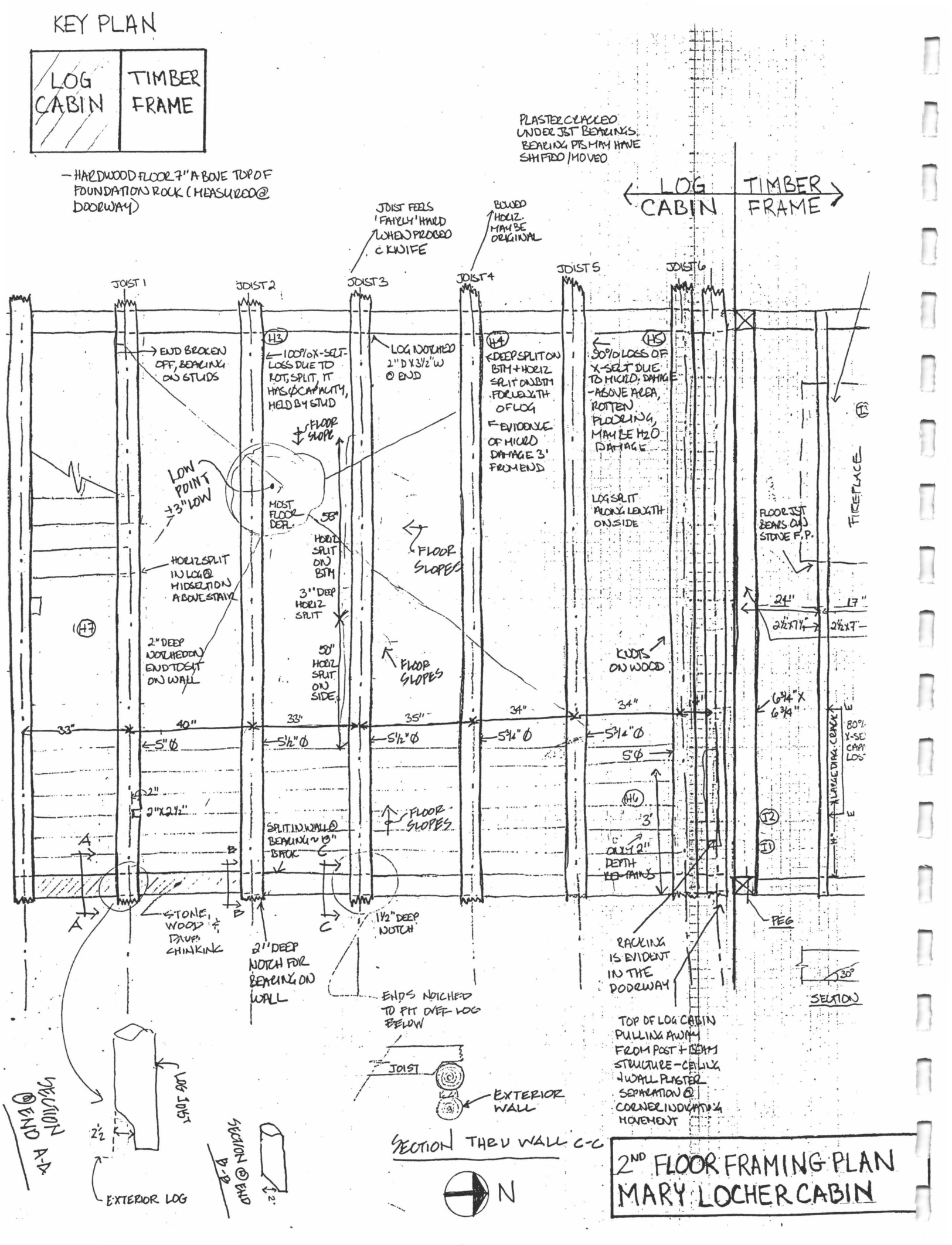
ANTIETAM BATTLEFIELD
DRAWN BY: S. BUCHAN
DATE: 10/21/99

RECEIVED

KEY PLAN

| LOG CABIN | TIMBER FRAME |
|---|---|

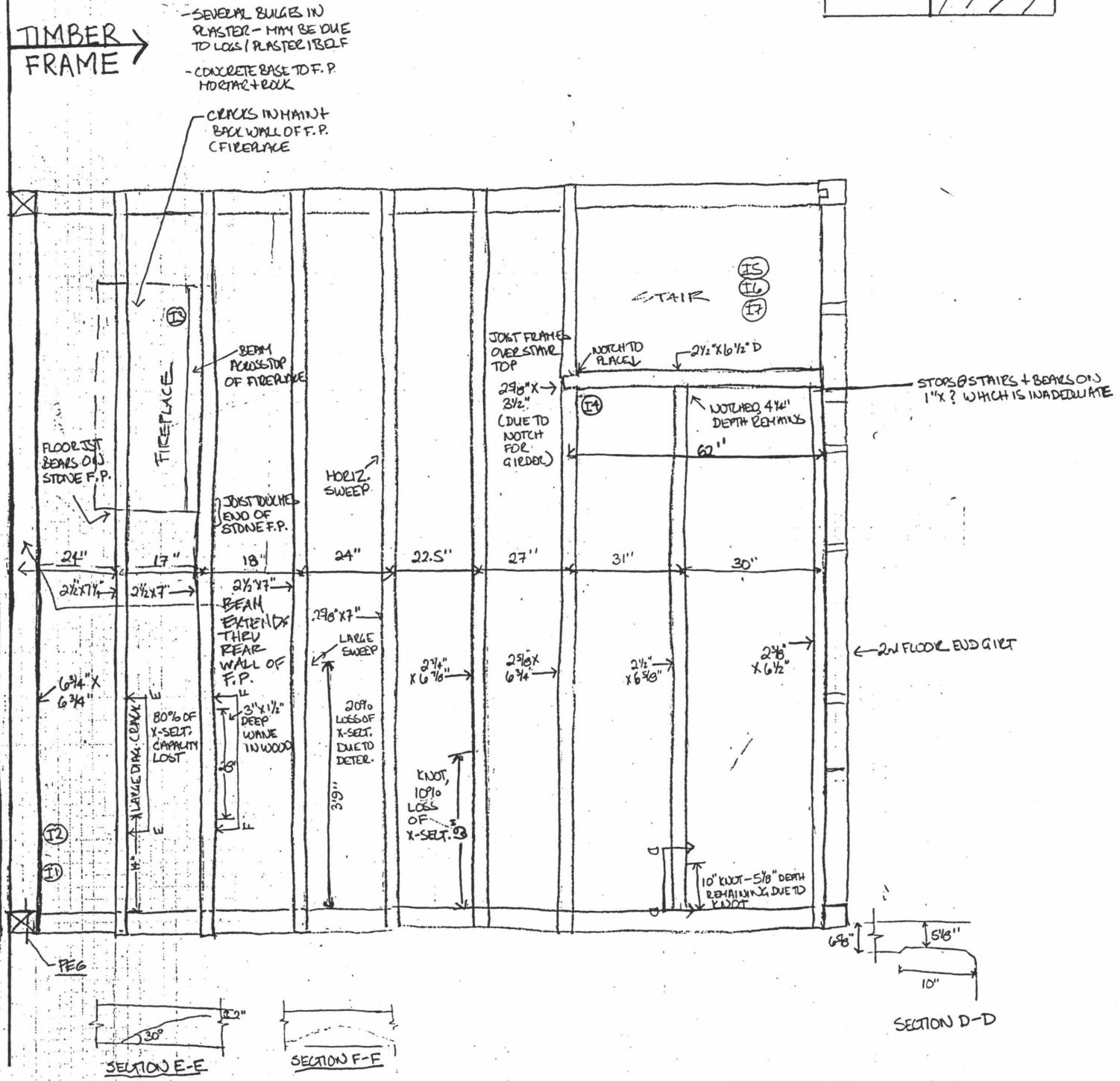
– HARDWOOD FLOOR 7" ABOVE TOP OF FOUNDATION ROCK (MEASURED @ DOORWAY)




# 2ND FLOOR FRAMING PLAN MARY LOCHER CABIN

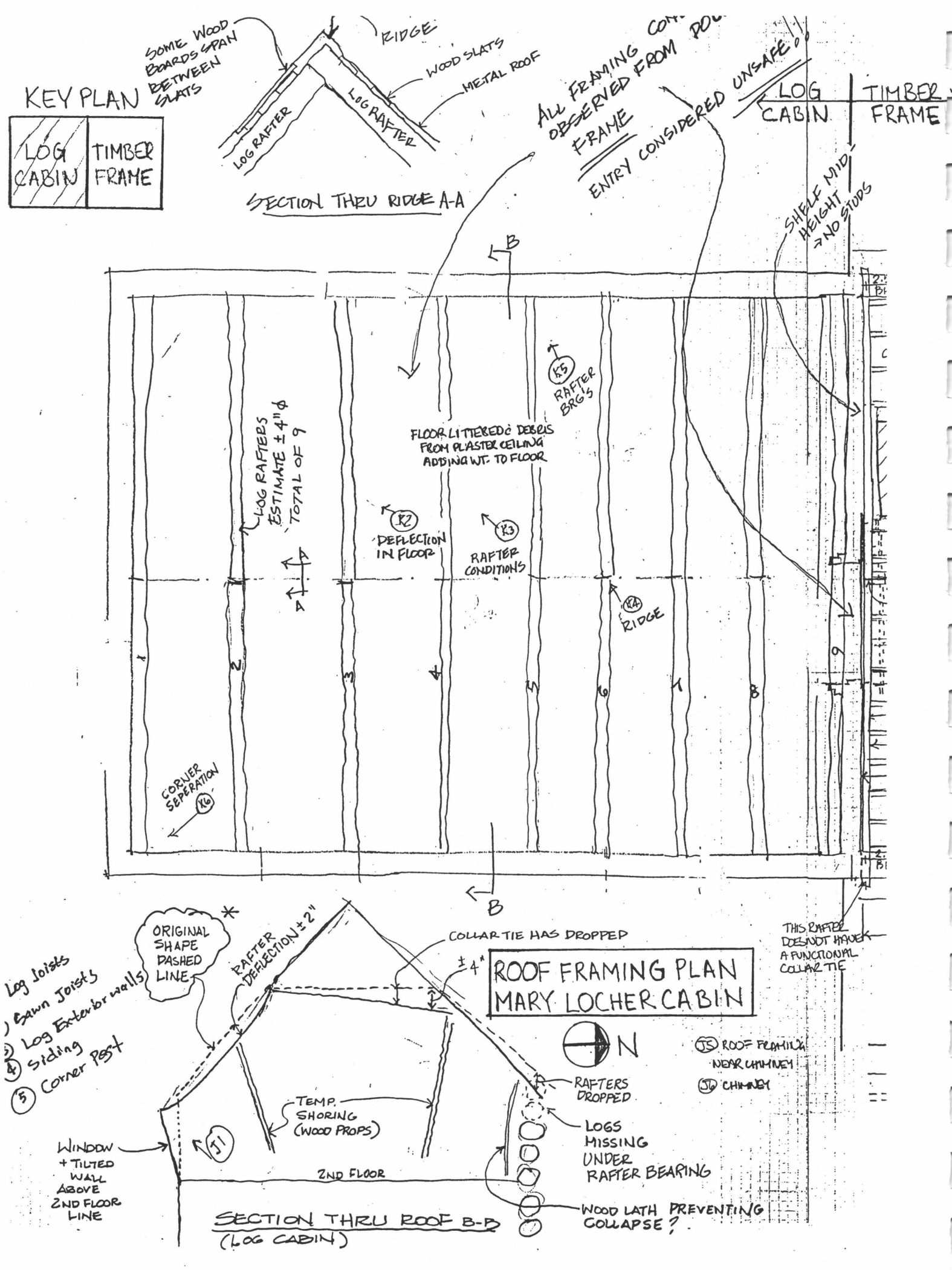
KEY PLAN

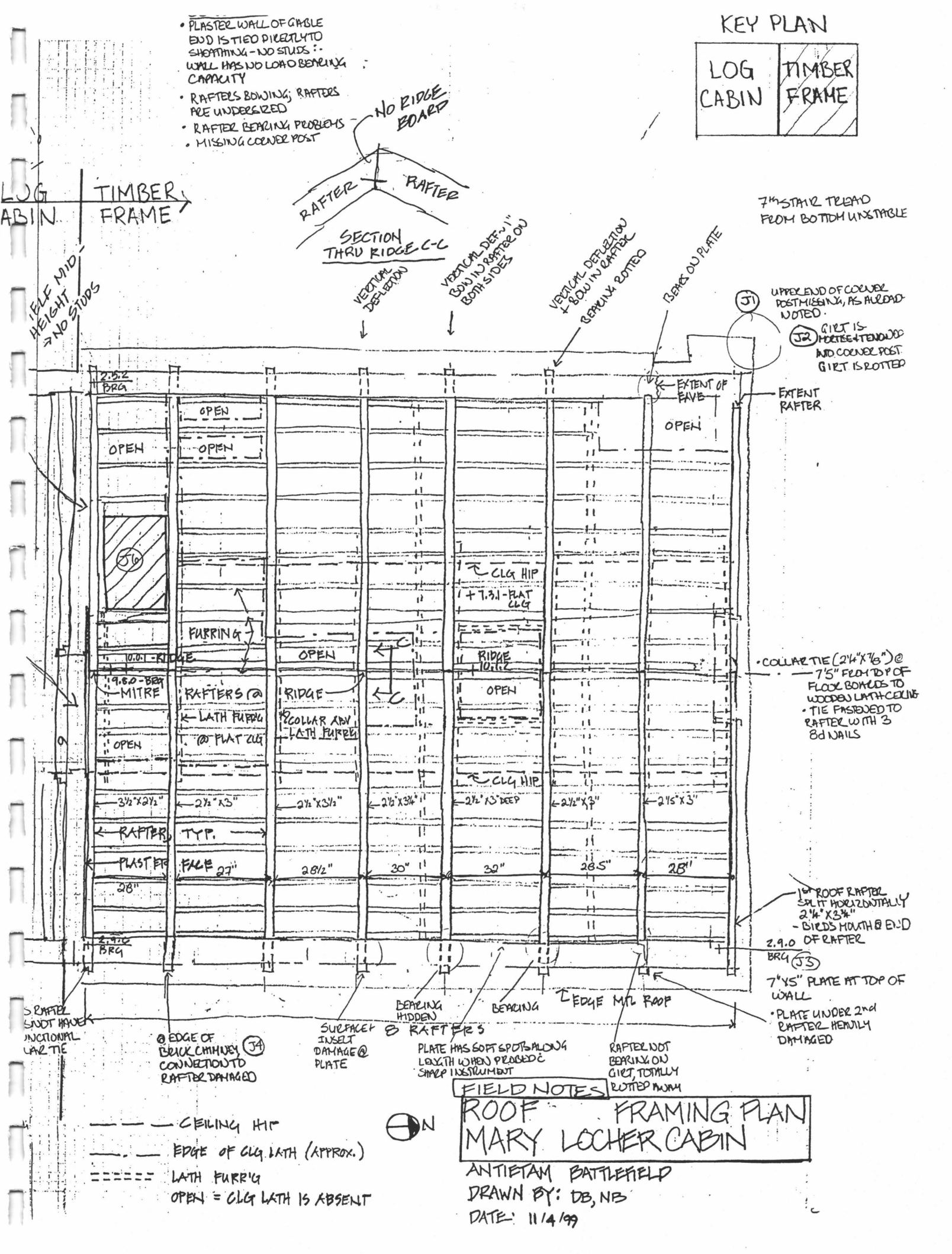
| LOG CABIN | TIMBER FRAME |
|---|---|




# 2ND FLOOR FRAMING PLAN
# MARY LOCHER CABIN

ANTIETAM BATTLEFIELD
DRAWN BY: S. BUCHAN
DATE: 10/21/99


KEY PLAN
LOG CABIN
TIMBER FRAME
SOME WOOD BOARDS SPAN BETWEEN SLATS
RIDGE
WOOD SLATS
METAL ROOF
LOG RAFTER
LOG RAFTER
SECTION THRU RIDGE A-A
ALL FRAMING OBSERVED FROM FRAME
ENTRY CONSIDERED UNSAFE!
LOG CABIN
TIMBER FRAME
SHELF MID HEIGHT → NO STUDS
B
K5 RAFTER BRGS
FLOOR LITTERED & DEBRIS FROM PLASTER CEILING ADDING WT. TO FLOOR
LOG RAFTERS ESTIMATE ±4" ϕ TOTAL OF 9
K2 DEFLECTION IN FLOOR
K3 RAFTER CONDITIONS
K4 RIDGE
A
A
CORNER SEPERATION K6
1
2
3
4
5
6
7
8
9
B
THIS RAFTER DOESN'T HAVE A FUNCTIONAL COLLAR TIE
ROOF FRAMING PLAN
MARY LOCHER CABIN
N
J5 ROOF FRAMING NEAR CHIMNEY
J6 CHIMNEY
ORIGINAL SHAPE DASHED LINE
RAFTER DEFLECTION ± 2"
COLLAR TIE HAS DROPPED
± 4"
Log Joists
Sawn Joists
Log Exterior walls
Siding
Corner Post
RAFTERS DROPPED
TEMP. SHORING (WOOD PROPS)
J1
WINDOW + TILTED WALL ABOVE 2ND FLOOR LINE
2ND FLOOR
LOGS MISSING UNDER RAFTER BEARING
WOOD LATH PREVENTING COLLAPSE?
SECTION THRU ROOF B-B (LOG CABIN)



KEY PLAN
LOG CABIN
TIMBER FRAME
• PLASTER WALL OF GABLE END IS TIED DIRECTLY TO SHEATHING - NO STUDS :- WALL HAS NO LOAD BEARING CAPACITY
• RAFTERS BOWING; RAFTERS ARE UNDERSIZED
• RAFTER BEARING PROBLEMS
• MISSING CORNER POST
NO RIDGE BOARD
RAFTER
RAFTER
SECTION THRU RIDGE C-C
LOG CABIN
TIMBER FRAME
7th STAIR TREAD FROM BOTTOM UNSTABLE
TELF MID HEIGHT → NO STUDS
VERTICAL DEFLECTION
VERTICAL DEF ~1" BOW IN RAFTER ON BOTH SIDES
VERTICAL DEFLECTION + BOW IN RAFTER
BEARING ROTTED
BEARS ON PLATE
J1 UPPER END OF CORNER POST MISSING, AS ALREADY NOTED.
J2 GIRT IS MORTISE + TENONED INTO CORNER POST. GIRT IS ROTTED
2.5.2 BRG
EXTENT OF EAVE
EXTENT RAFTER
OPEN
OPEN
OPEN
OPEN
J6
CLG HIP
+ 7.3.1 - FLAT CLG
FURRING
10.0.1 - RIDGE
OPEN
RIDGE 10.1.2
9.8.0 - BRG
MITRE
RAFTERS @ RIDGE
LATH FURR'G @ FLAT CLG
COLLAR ABV LATH FURR'G
OPEN
OPEN
CLG HIP
• COLLAR TIE (2¼"X⅞") @ 7'5" FROM TOP OF FLOOR BOARDS TO WOODEN LATH CEILING
• TIE FASTENED TO RAFTER WITH 3 8d NAILS
3½"X2½"
2½"X3"
2½"X3½"
2½"X3¼"
2½"X3" DEEP
2½"X3"
2½"X3"
RAFTER TYP.
PLASTER FACE
27"
28½"
30"
32"
28.5"
28"
28"
1st ROOF RAFTER SPLIT HORIZONTALLY 2¼"X3¾" - BIRDS MOUTH @ END OF RAFTER
2.9.0 BRG
2.9.0 BRG J3
7"X5" PLATE AT TOP OF WALL
• PLATE UNDER 2nd RAFTER HEAVILY DAMAGED
S RAFTER SNOT HAVE UNCTIONAL LAR TIE
@ EDGE OF BRICK CHIMNEY J4 CONNECTION TO RAFTER DAMAGED
SURFACE INSET DAMAGE @ PLATE
BEARING HIDDEN
8 RAFTERS
BEARING
EDGE MTL ROOF
PLATE HAS SOFT SPOTS ALONG LENGTH WHEN PROBED C SHARP INSTRUMENT
RAFTER NOT BEARING ON GIRT, TOTALLY ROTTED AWAY
FIELD NOTES
ROOF FRAMING PLAN
MARY LOCHER CABIN
ANTIETAM BATTLEFIELD
DRAWN BY: DB, NB
DATE: 11/4/99
N
CEILING HIP
EDGE OF CLG LATH (APPROX.)
LATH FURR'G
OPEN = CLG LATH IS ABSENT

RECEIVED
DEC 0 8 1999
ARCHITRAVE

# HAZARDOUS MATERIALS SURVEY REPORT
# MARY LOCHER CABIN
# ANTIETAM NATIONAL BATTLEFIELD PARK

Prepared for:

architrave p.c. architects
420 10th Street, SE
Washington, D.C. 20003

Prepared by:

**MANTECH ENVIRONMENTAL CORPORATION**
*A ManTech International Subsidiary*
1901 Research Boulevard, Suite 240
Rockville, Maryland 20850

**December 6, 1999**

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Appendix A - Results of Limited XRF Survey For Lead Paint
Appendix B - Lead-Based Paint Survey Diagram

# 1.0 INTRODUCTION

At the request of architrave p.c. architects, a hazardous material survey was performed by ManTech Environmental Corporation (ManTech) within the Mary Locher Cabin located in the Antietam National Battlefield Park. The project area included the interior and exterior of the cabin. The purpose of the survey was to provide adequate information for the design of any necessary environmental remediation actions prior to the possible restoration of the cabin. The scope of work included two separate parts: an asbestos location survey including visual inspections for both friable[1] and non-friable materials suspected of containing asbestos with collection of samples of suspect materials, and a lead-based paint screening of all suspect surfaces using the NITON 703A lead detector. The property surrounding the cabin was not surveyed by ManTech.

The cabin is a two story dwelling constructed in the late 1700s with an addition attached to the original construction in the early 1800s. For the purposes of this report, the original construction will be referred to as the log room and the addition will be referred to as the timber room. The cabin is constructed mostly of wood, with some stone, plaster, and metal. The foundation walls were constructed of wooden logs resting on top of a stone base. The exterior roof is sheet metal. A portion of the interior walls and ceilings are covered with a plaster material. The plaster is made of limestone, sand, and horse hair. A masonry fireplace is located in the timber room. The interior walls and ceilings were coated with a tinted whitewash. The tinted whitewash, evident throughout the cabin, was identified as non-lead based. Lead-based paint was identified on some of the first floor components of the cabin but not on the second floor of the cabin. The lead-based painted components identified in the cabin included:

- All five first floor window components (log and timber rooms)
- The entrance door of the timber room
- The stair components of the timber room
- The door to the stairway of the timber room

A survey for lead-based painted components had not previously been performed within this cabin. ManTech's survey determined that some of the cabin components do contain lead-based paint. Any removal or disturbance of the lead-based painted components should be performed by a State of Maryland-licensed lead-based paint abatement contractor prior to any renovation work on the components. The results of our findings are contained within this report.

No suspect asbestos-containing materials were identified during the survey, thus no samples were collected for analysis.

[1] Friability is defined as the ease with which a material can be reduced to a dust or powder using hand pressure.

# 2.0 PART A - ASBESTOS LOCATION SURVEY

## 2.1 Background

The first part of the hazardous materials survey was an inspection for asbestos-containing materials in the Mary Locher Cabin. The scope of work included the visual inspection of the cabin and the sampling and analysis of any suspect asbestos-containing materials (ACM) encountered.

## 2.2 Methodology

The survey was conducted by a person who had successfully completed Inspector and Management Planner training as specified in the Environmental Protection Agency's (EPA) AHERA Model Accreditation Plan. The survey began with a walk-through of the cabin to identify various visually distinct homogeneous areas. No homogeneous areas were found. No samples were collected.

## 2.3 Findings/Discussion

No asbestos-containing materials were identified in the Mary Locher Cabin.

## 2.4 Conclusions/Recommendations

No asbestos, no recommendations.

# 3.0 PART B - LEAD-BASED PAINT

## 3.1 Background

The second aspect of the hazardous materials survey was a lead-based paint survey to identify any lead-based paint in the Mary Locher Cabin. The survey evaluated lead concentrations of painted surfaces in the cabin.

## 3.2 Methodology

ManTech's certified lead inspector performed the lead paint survey in accordance with all local and federal regulations. The non-destructive survey (paint chips were not collected) was conducted using a NITON 703A Spectrum Analyzer Lead Detector (Serial No. U8382433LY; calibrated on-site), commonly referred to as an x-ray fluorescence (XRF) device. Painted building components on the interior of the Mary Locher Cabin were tested to determine their lead content.

The United States Environmental Protection Agency (EPA) has defined a "lead-based paint" as any paint, plaster, or other surface coating material containing greater than or equal to 1.0 milligram of lead per square centimeter ($mg/cm^2$) of coating. The State of Maryland uses the value of greater than 0.7 $mg/cm^2$ of lead to define a lead-based paint. Levels exceeding this value require licensing and certification of contractors performing "abatement" of these painted surfaces. If "abatement" is not the intent of the construction activity, then licensing and certification is not required. If the lead paint will only be disturbed during renovation or construction activities, the contractor must train his workers on the hazards of lead and how to minimize worker exposure. The Occupational Safety and Health Administration's (OSHA) standard for Lead in Construction (29 CFR 1926.62) requires that precautions be taken when disturbing paint that contains any amount of lead. One of the major hazards for workers is the amount of lead released into the air, which is as dependent on the method of disturbance as it is on the concentration of lead in paint.

## 3.3 Findings/Discussion

A visual inspection of the cabin revealed that the painted surfaces were homogeneous by building component. Most painted surfaces were generally observed to be in poor or peeling conditions with areas of major substrate damage. All sample results are summarized in Appendix A; containing the location, description, condition, and amount of lead present in the paint. Appendix B contains a diagram, room designations, and approximate location of the positive readings. Listed below are the components in the cabin identified as containing lead-based paint:

- All five first floor brown painted window components (log and timber rooms)
- The black-painted entrance door of the timber room
- The black-painted stair components of the timber room
- The black-painted door to the stairway of the timber room

All lead-based painted components are in poor or peeling condition. None of the remaining components in the survey area contain lead-based paint. No lead-based painted components were identified on the second floor or on the exterior of the cabin.

### 3.4 Conclusions/Recommendations

Contractors are required to possess a lead-based paint abatement license prior to the start of a lead-based paint abatement project. Since this is not an abatement project, but rather a restoration project, the contractor is not required to possess a lead-based paint abatement license. However, if any of the lead painted components listed above are to be disturbed in the cabin restoration project, the project must be performed by a contractor who has an established respiratory protection program and a minimum two-hour awareness training for employees working with lead-based paint. Where lead-based paint is present in the solid waste stream to be landfilled, undertake TCLP testing of the waste in accordance with EPA SWP 846 and local requirements, to determine whether the waste is characterized as a hazardous material requiring disposal at a hazardous waste landfill or proper incineration.

# APPENDIX A
# RESULTS OF XRF SURVEY
# FOR LEAD PAINT

ManTech Inspector: Mark D'Ascenzo, Certificate # 3672 (MD)
NITON 703A Lead Detector, Serial No. U8382433LY (Readings include L- and K-Shells)

*ManTech Project No. 9017-025*

## RESULTS OF XRF SURVEY FOR LEAD-BASED PAINT

Survey Period: November 15, 199
Mary Locher Cabin
Antietam National Battlefield Park
Sharpsburg, MD

| XRF | Room | Side | Structure | Feature | Condition | Substrate | Color | Result | Combined | Error (+) | Depth Index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| 1 | Shutter Cal - 1 | | | | | | | . . . | 0.0 | 0.0 | 0.0 |
| 2 | Calibrate | | | | | | | POS | 1.0 | 0.2 | 1.1 |
| 3 | Calibrate | | | | | | | POS | 1.2 | 0.3 | 2.9 |
| 4 | Calibrate | | | | | | | POS | 1.0 | 0.2 | 2.5 |
| 5 | Log | A | Wall | Wall | Peeling | Plaster | Blue | NEG | 0.0 | 0.0 | 1.0 |
| 6 | Log | B | Wall | Wall | Peeling | Plaster | Blue | NEG | 0.0 | 0.0 | 1.6 |
| 7 | Log | C | Wall | Wall | Peeling | Plaster | Blue | NEG | 0.0 | 0.1 | 2.2 |
| 8 | Log | A | Ceiling | Ceiling | Peeling | Wood | Blue | NEG | 0.1 | 0.3 | 2.6 |
| 9 | Log | A | Ceiling | Ceiling | Peeling | Wood | Blue | NEG | 0.2 | 0.2 | 1.9 |
| **10** | **Log** | **A** | **Window** | **Casing** | **Poor** | **Wood** | **Brown** | **POS** | **5.1** | **0.3** | **1.7** |
| **11** | **Log** | **C** | **Window** | **Casing** | **Poor** | **Wood** | **Brown** | **POS** | **14.2** | **1.6** | **1.8** |
| **12** | **Log** | **C** | **Window** | **Stool** | **Poor** | **Wood** | **Brown** | **POS** | **1.3** | **6.4** | **1.5** |
| **13** | **Log** | **C** | **Window** | **Sash** | **Poor** | **Wood** | **Brown** | **POS** | **3.7** | **0.8** | **1.8** |
| **14** | **Log** | **C** | **Window** | **Casing** | **Poor** | **Wood** | **Brown** | **POS** | **2.0** | **0.5** | **1.8** |
| **15** | **Log** | **C** | **Window** | **Stool** | **Poor** | **Wood** | **Brown** | **POS** | **1.8** | **0.4** | **1.6** |
| 16 | Log | D | Wall | Wall | Poor | Wood | Brown | NEG | 0.2 | 0.1 | 1.0 |
| 17 | Log | D | Door | Casing | Peeling | Wood | Blue | NEG | 0.0 | 0.2 | 1.0 |
| 18 | Heavy Timber | A | Wall | Wall | Peeling | Plaster | White | NEG | 0.1 | 0.1 | 1.8 |
| 19 | Heavy Timber | B | Wall | Wall | Peeling | Plaster | White | NEG | 0.2 | 0.1 | 2.8 |
| 20 | Heavy Timber | B | Ceiling | Ceiling | Peeling | Wood | White | NEG | 0.2 | 0.1 | 2.8 |
| 21 | Heavy Timber | B | Ceiling | Ceiling | Peeling | Wood | White | NEG | 0.3 | 0.1 | 1.9 |
| 22 | Heavy Timber | A | Wall | Wall | Poor | Wood | Black | NEG | 0.1 | 0.1 | 1.1 |
| 23 | Heavy Timber | A | Stairs | Riser | Peeling | Wood | White | NEG | 0.0 | 0.0 | 1.0 |
| **24** | **Heavy Timber** | **A** | **Door** | **Door** | **Peeling** | **Wood** | **Black** | **POS** | **1.9** | **0.5** | **1.2** |
| **25** | **Heavy Timber** | **A** | **Door** | **Door** | **Peeling** | **Wood** | **Black** | **POS** | **4.4** | **1.7** | **1.8** |

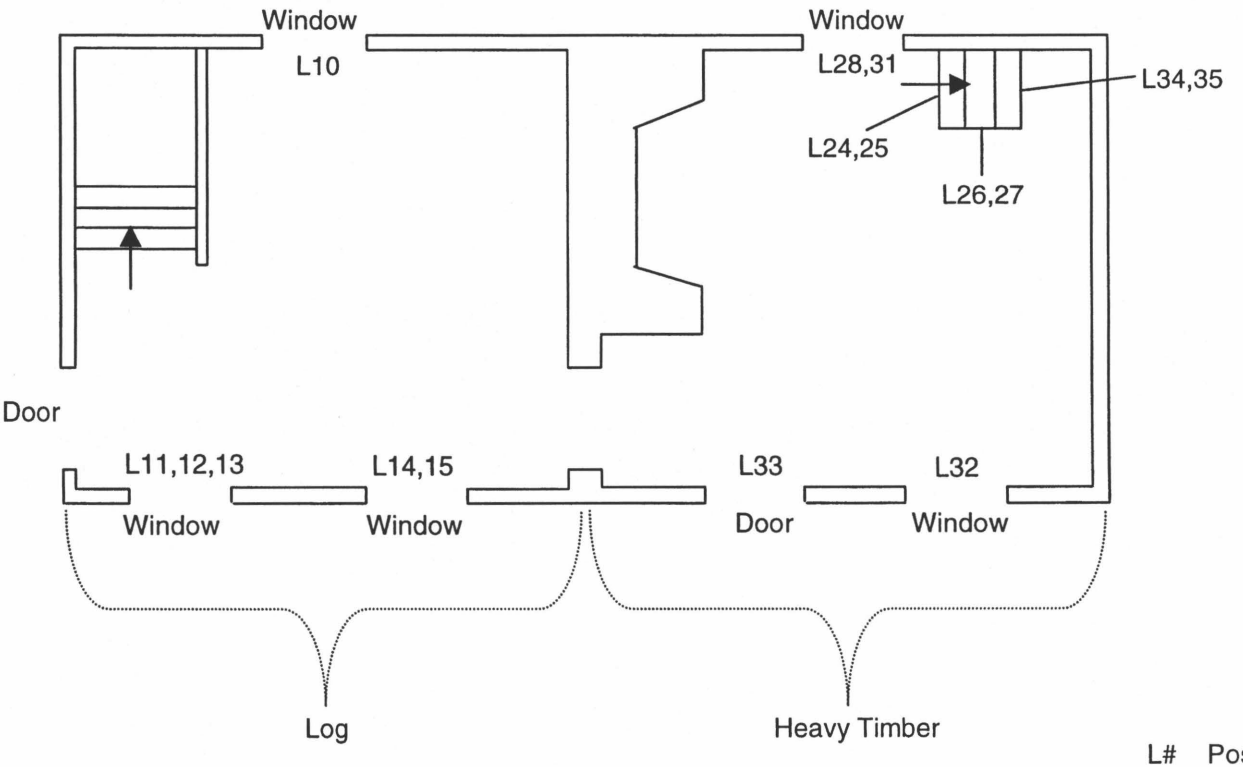
POS = > 0.7 mg/cm2 of lead
NEG = ≤ 0.7 mg/cm2

| XRF | Room | Side | Structure | Feature | Condition | Substrate | Color | Result | Combined | Error (+) | Depth Index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| 26 | Heavy Timber | A | Door | Door | Peeling | Wood | Black | POS | 2.1 | 0.6 | 1.3 |
| 27 | Heavy Timber | A | Door | Door | Peeling | Wood | Black | POS | 2.1 | 0.6 | 1.9 |
| 28 | Heavy Timber | A | Window | Casing | Poor | Wood | Brown | POS | 1.4 | 0.3 | 1.3 |
| 29 | Heavy Timber | A | Window | Stool | Poor | Wood | Brown | NEG | 0.1 | 0.2 | 1.5 |
| 30 | Heavy Timber | A | Window | Stool | Poor | Wood | Brown | NEG | 0.1 | 0.2 | 1.8 |
| 31 | Heavy Timber | A | Window | Casing | Poor | Wood | Brown | POS | 2.6 | 0.6 | 1.2 |
| 32 | Heavy Timber | C | Window | Casing | Poor | Wood | Brown | POS | 5.1 | 2.0 | 2.3 |
| 33 | Heavy Timber | C | Door | Door | Poor | Wood | Black | POS | 2.0 | 0.5 | 1.3 |
| 34 | Heavy Timber | C | Stairs | Riser | Poor | Wood | Black | POS | 1.2 | 0.2 | 1.3 |
| 35 | Heavy Timber | C | Stairs | Stringer | Poor | Wood | Black | POS | 1.0 | 0.2 | 1.2 |
| 36 | Heavy Timber | C | Stairs | Tread | Poor | Wood | Black | NEG | 0.0 | 0.2 | 1.4 |
| 37 | Heavy Timber | C | Door | Door | Poor | Wood | Brown | NEG | 0.2 | 0.2 | 1.4 |
| 38 | Heavy Timber | C | Wall | Wall | Poor | Plaster | White | NEG | -0.4 | 0.8 | 3.7 |
| 39 | Heavy Timber | C | Stairs | Rail-cap | Poor | Wood | White | NEG | 0.1 | 0.1 | 1.3 |
| 40 | Log | B | Stairs | Baseboard | Poor | Wood | Blue | NEG | 0.1 | 0.1 | 1.0 |
| 41 | Calibrate | | | | | | | POS | 1.0 | 0.2 | 1.1 |
| 42 | Calibrate | | | | | | | POS | 0.9 | 0.2 | 2.3 |

POS = > 0.7 mg/cm2 of lead
NEG = ≤ 0.7 mg/cm2

**APPENDIX B**
**LEAD-BASED PAINT**
**SURVEY DIAGRAM**

**Mary Locher Cabin**
**Antietam National Battlefield Park**
**Sharpsburg, Maryland 21782**




L# Positive sample locations for lead-based paint

**Lead-Based Paint Survey Diagram**

# Antietam National Battlefield
# Mary Locher Cabin
# Analysis of Finishes

Submitted to:

Architrave Architects
420 10th Street, SE
Washington, DC 20003

By:

Myers Conservation Ltd.
2700 Q Street, NW
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Washington, DC 20007

February 4, 2000

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Room C, Timber Frame, Second Floor
Room D, Log Cabin, Second Floor

RECOMMENDATIONS FOR ADDITIONAL RESEARCH

APPENDICES
Appendix A: Historic Finishes
Appendix B: Historic Finishes Colors
Appendix C: Munsell/Duron Color Equivalencies

## INTRODUCTION

This report describes and documents the historic finishes study of the Mary Locher Cabin. The small log and frame structure, located on a low rise in a field approximately 200 yards from the Sharpsburg Pike in the Antietam National Battlefield in Sharpsburg, Maryland, is a contributing building to the Antietam National Battlefield historic district.

This report describes a study conducted in December 1999 by Myers Conservation, Ltd. for Architrave Architects as part of the historic structures report. It focuses on the exterior and interior finishes of four specific historic periods chosen as periods of conjectural or documented changes to the building. The first period marks the original construction. Based on style and archaeological evidence it may be as early as 1780. The first specific reference to the building occurred in an 1811 deed and described a two-story log structure at the south end of the site. The second period belongs to approximately 1820 when a one room, two-story timber frame was added to the north end of the original log cabin. At that time, a door at the center of the common wall connected the two units. As in the original structure, first and second floors were joined by a stair. The third period is associated with the Civil War and may be dated to approximately 1860-1865. It is noted because Confederate troops occupied the building during that time, probably resulting in notable alterations to the finishes. By the fourth period, the 1940s, photographs documented a period when the building was not occupied and the now missing third addition was in ruinous condition.

The report is organized into two major parts: a main body and appendices. The body describes the research methodology, the history of the Cabin and conclusions. Findings are presented according to room. They are considered within the chronology of documented changes and uses of the house and the architectural contexts of late eighteenth and nineteenth century regional architecture.

Supporting materials, located in the Appendices, provide substantiating data. Appendix A contains tables of the historic finishes for each study area. Because a limited amount of original material is believed to exist, the tables also present information on the type of finish typical of the period, region, and building type. Appendix B provides Munsell[1] color matches, an equivalent Duron color match, and the Duron color chip. Munsell/ Duron color equivalencies charts are found in Appendix C.

[1] The Munsell system is a standardized color notation system.

## RESEARCH METHODS

Research utilized laboratory and documentary methods. Finishes samples were microscopically examined and recorded. They were augmented by documented accounts of construction, occupation, and historical events.

The analyst examined the site to determine the most appropriate sample locations based on recorded changes to the building and the likelihood of yielding accurate information. Surfaces from the exterior and interior of the structure were sampled. Small samples approximately 1/3" in diameter were taken of all layers including the substrate. In most cases, more than one sample was taken from each location.

Samples were examined with a stereomicroscope at low magnification (10X-30X). They were studied for the number and character of finishes. The analyst recorded preliminary results based on the sequence, or chromachronologies, of paint layers of these samples. Finishes included varnishes, paints, and limewashes. All painted finishes were matched to Munsell color standards and Duron paint chips. Varnishes were not matched.

A range of shades of white paint appeared among the samples. These minor color variations resulted from differences in paint formulations, rates of deterioration, or use and exposure. As an example, there were six shades of yellowish white, four shades of cream tan, and three shades of gray white. In order to indicate the repeated use of one of these groups of white, instead of presenting some twelve different shades, one example of each group (yellowish white, cream tan, etc.) was chosen and is presented here.

## HISTORICAL OVERVIEW

The current Mary Locher Cabin is a log and timber frame dwelling located on the Alfred Poffenberger farmstead in Sharpsburg, Maryland, northwest of the Antietam National Battlefield. In 1996, the cabin was designated eligible for the National Register of Historic Places as a contributing building to the battlefield historic district.

Antietam National Battlefield is one of the country's most significant Civil War battlefields. It was the site of the largest number of fatalities in one day (September 17, 1862) during the Civil War. The Mary Locher Cabin is located near the battlefield at the edge of the West Woods where a major and bloody portion of the battle occurred. More than 2200 Union soldiers fell, killed or wounded in what came to be known as the "West Woods Massacre."

At one time three separate building campaigns constituted the Mary Locher Cabin. Today just two of the three periods of construction remain: the one room, two-story log cabin part of the building, the southernmost structure on the site, represents the earliest 1780-1790 construction period (Period I, Rooms A and D). By 1811 and 1814 deeds state that the property "may have tenants" and indicate that buildings existed on the tract

of land. Archaeological evidence supports records with the relatively high frequency of 1790s and 1820s ceramics recovered in shovel tests.

The second main construction period dates to the 1820s (Period II) when the one room, two-story timber frame addition (Rooms B and C) was built at the north end of the original log cabin, a date supported by archaeological investigation. Ceramic analysis suggests that the trash discard pattern of the occupants changed sometime in the 1820s when the east door of the northern addition became the primary entrance to the cabin.

The Civil War (Period III) serves as a third period in the Mary Locher Cabin history. The cabin was used as a Confederate infirmary prior to the Battle of Antietam, a temporary medical aid at the time of the battle, and a Federal encampment for a month after the cessation of fighting.

There is little documentation about the cabin or its occupation in the time following the Civil War. Archaeological evidence suggests that the site was occupied up into the early twentieth century. Although a specific date is not known, a memorandum from March of 1940 (Period IV) indicates that the cabin was unoccupied at that time. A photograph from the 1940s-1950s shows the now missing third unit in shambles.

## CONCLUSIONS

Because of its current ruinous condition, history of neglect, alterations, and harsh use, very little evidence of original finishes is believed to remain. Moreover, although historic records and archaeological evidence offer general periods of occupation, they do not include references to the finishes. With the a combination of nominal documentary and physical evidence, conclusions are necessarily conjectural.

However, one may draw preliminary conclusions based on a combination of physical evidence and context. Commonly, utilitarian buildings such as the Mary Locher Cabin developed organically. Additions and changes to such structures occurred in conjunction with the building's function. For example, repair and maintenance focused on immediate needs. At the Mary Locher Cabin each of the building campaigns was probably prompted by need. As a result, the three units may not have shared a unified finishes scheme at any one time. Considering the simple, utilitarian character of the building and the availability and inexpensive cost of limewashes and distempers, it is probable that light colored limewashes were applied to the exterior and the limewashes or distempers were used on the interior. Colors are not known. Of the first period, the colors were probably white. An annual or semi annual finish of limewash would have been applied as a routine housekeeping measure. For the second 1820's period white would have endured on the exterior. It is possible that pigmented distempers were introduced in the interior.

Conclusions are discussed on a room-by-room basis below. Although each of the four historic periods (Period I 1780-1790; Period II 1820s, Period III Civil War, Period IV 1940s) are considered, only Periods I and II are discussed in detail.

The study may be considered preliminary. It is based on scope of work limited to the analysis of fifty samples. Additional research is warranted and is recommended in the conclusions.

## EXTERIOR

Samples of mortar and wood substrates were taken from each of the four facades. It is not believed that any of the samples yield information of the historic finishes from any of the four periods, with one possible exception: a sample from a less exposed location of the timber frame addition of the east elevation (sample MLE4) revealed early white paint layers. It is not known if this is original material but this finish may be as early as the original construction of the northern addition, the 1820s.

Photo 1: Exterior. Southeast corner. Log cabin ca. 1780-1811 at left; timber frame ca. 1820s at right.
Note the juncture of the two structures. Early finishes were found below the roof eave of the 1820s timber structure.

During the late eighteenth and early nineteenth centuries whitewash or limewash was commonly applied to the exterior and interior of such utilitarian buildings as an inexpensive and sanitary way of maintaining the walls. For a log construction type, these finishes were applied only to the mortar, which was most suseptible to deterioration.For a timber construction, all surfaces would have been painted. These finishes, which were regularly renewed, usually annually, served as a sacrifical coating to protect the substrate against the weather and deterioration.

Photo 2: Log cabin ca. 1780-1811. Exterior, south elevation.

## INTERIOR

In general, the interior plaster walls of the 1780-1790s (Period I) were probably finished with light limewashes or distempers. The woodwork was probably varnished or oiled. Baseboards were probably black. The plaster wall finishes in the 1820s addition (Rooms B and C) and in the original structure (Rooms A and D) during Period II appear to have also been white limewashes or distempers. Woodwork appears to have been varnished while baseboards were dark green. Between the end of the Civil War and the middle of the twentieth century, these types of finishes and colors were reapplied, sometimes to replaced substrates.

It appears that after the 1940s period of abandonment, the house was used again, possibly for habitation. At least two painting campaigns occurred. One is marked by a bright yellow green on the plaster walls of rooms A, B and C; the other is a bright green blue. Both colors are associated with the middle of the twentieth century.

- Room A, Log Cabin, First Floor

Few historic finishes remain on the first floor of the original log cabin structure. Evidence of a white limewash taken from the ceiling joists in this room possibly dates to Period I, 1780-1790. It is distinguished from later finishes on a less deteriorated wood substrate from the surrounding joists and floorboards.

Photo 3: Log cabin ca. 1780-1811. First floor, Room A. Northwest corner; north door to Room B.

The remainder of first layer finishes found in Room A appear to date to the 1820s (Period II) or later. The dark green baseboards are typical of the nineteenth century, attributing that finish to Period II at the earliest.

The doorframes, which were painted dark brown or varnished, and the cream window frames, window sashes, and stair paneling, were probably replaced. Bright colors associated with the the middle of the twentieth century — bright light yellow green and bright light green blue — found on the north and south walls are probably modern finishes and possibly appear on replaced substrates.

Photo 4: Log cabin ca. 1780-1811. First floor, Room A. Southwest corner; south window of west wall; stair paneling. Note blue green finishes believed to date to middle twentieth century.

- Room B, Timber Frame, First Floor

The walls of the 1820s timber addition were limewashed and are currently buried beneath later plaster and finishes. One original wall plaster sample from the plaster south of the east door (sample MLB2) reveals a chalky limewash paint on an original plaster buried beneath a later plaster layer. The later plaster was painted and probably dates to the twentieth century.

It is expected that the ceiling joists and ceiling boards were also whitewashed. Although it is not known if these elements are original, the presence of white paint on a very deteriorated and distressed wood substrate suggests that it dates to the time of construction, the 1820s. However, further analysis of these elements would be needed to make that determination.

Photo 5: Timber frame ca. 1820s. First floor, Room B. Fireplace at south wall; south door to Room A.
Note the deteriorated finishes on all surfaces.

The west wall plaster (sample MLB3) has a different composition than the plaster elsewhere suggesting it was replaced. The same light green blue paint that is associated with the twentieth century and was found in Room A (samples MLA5, MLA6, and MLA6.1) was found as the earliest finish on this sample, indicating that this wall is a modern replacement.

There is evidence of a dark reddish-brown varnish on the window frames, sashes, doors and doorframes. It is not known if this woodwork is original but the fact that varnish layers remain exposed in such a ruinous building suggests that the woodwork was replaced.

- Room C, Timber Frame, Second Floor

The original walls were probably limewashed or painted with distempers. Multiple layers of plasters on the north wall and the fact that similar layers do not remain in other rooms suggest that the plaster elsewhere in the structure was replaced completely. The south doorframe and stair rail were a dark reddish-brown varnish at some time. It is not known if this woodwork is original, but the finish is consistent with wood elements in Room B.

Photo 6: Timber frame ca. 1820s. Second floor, Room C. Northeast corner.

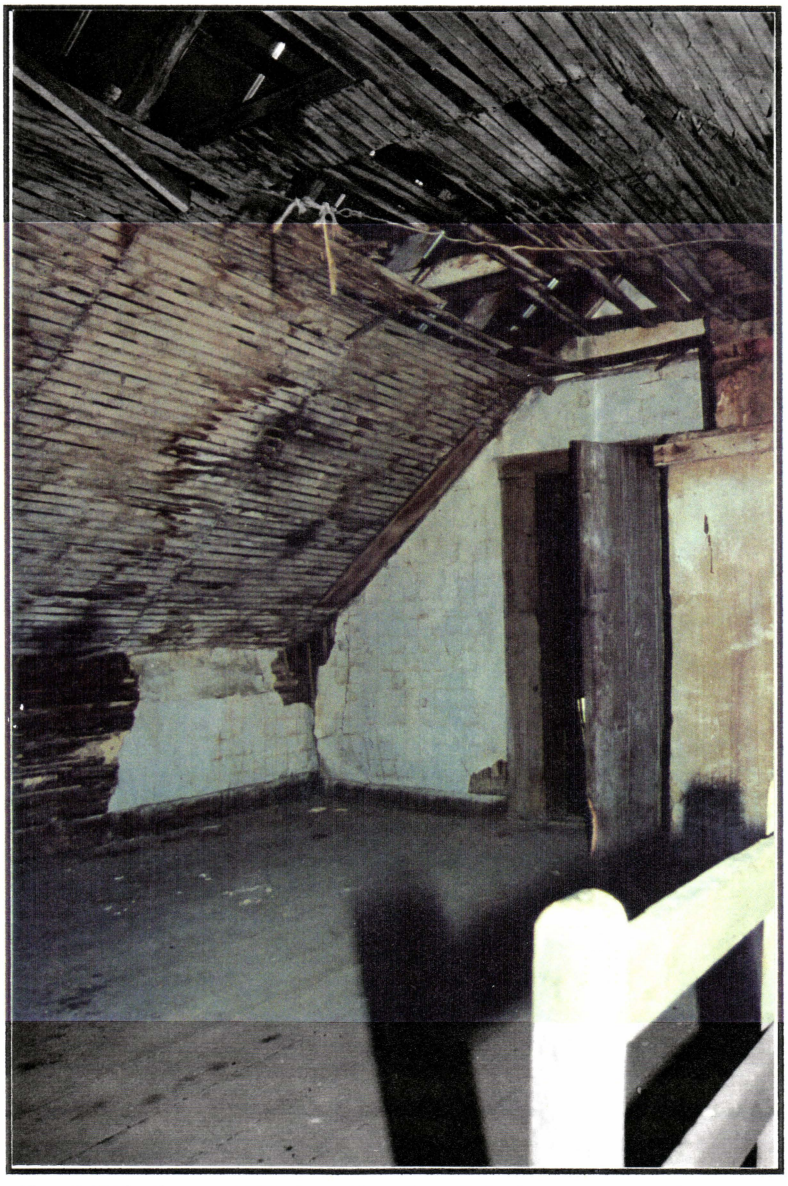


Photo 7: Timber frame ca. 1820s. Second floor, Room C. Southeast corner; south door to Room D. Few traces of original finishes remain.

- Room D, Log Cabin, Second Floor

Due to inaccessibility caused by an unstable floor, this room could not be thoroughly studied. Plaster samples taken from the north wall revealed a white, chalky finish layer, but it is difficult to assign a period. Considering the 1820s addition to the north of this room and the likelihood of damage to the plaster during construction, the plaster is probably no earlier than 1820.

## RECOMMENDATIONS FOR ADDITIONAL RESEARCH

In general, additional study informed by both architectural analysis and documentary research is recommended. Though few historic finishes are believed to exist, further information regarding periods of change and occupation would substantiate results and assist with approximating finish periods.

Areas of particular interest are the ceiling joists and floorboards in Rooms A and B. The presence of two wood substrates, one much older than the other, is noted on the joists in Room A. It is believed that the joists and floorboards were replaced, but the date and the extent of replacement is not known. The finishes and substrates of the joists and floorboards in Room B are distressed and deteriorated suggesting that they are original, but again, further investigation is needed.

Original plaster and finishes buried beneath later plaster layers on the north wall of Room C suggests that the plaster throughout the house was replaced. A relative date of change informed by further architectural investigation would allow analysts to associate finish periods with previous and subsequent layers.

Further documentary research is recommended, especially for periods following the Civil War. The cabin's use during and after the Battle of Antietam would probably have precipitated structural and finishes maintenance and change. However at this point there is no substantiating evidence of such maintenance. Conversely, the belief that the cabin was occupied up into the twentieth century, but not after the 1940s is unlikely considering the existence of mid-twentieth century paint colors. Additional documentary research may reveal more definitive dates of occupation and change, helping to attribute later finish periods and to provide a more accurate record of the structure's history.

# MARY LOCHER CABIN
## HISTORIC FINISHES
## PERIOD I (1780-1790)—ROOM A; LOG CABIN, FIRST FLOOR

| ELEMENT | SAMPLE | EARLIEST FINISH | ESTIMATED DATE | ORIGINAL | REMARKS |
|---|---|---|---|---|---|
| East wall plaster | MLA1<br>MLA2 | White, chalky (possibly limewash/ whitewash) | 1820s at the earliest | Not likely | At this time, walls were commonly whitewashed. Used for hygienic purposes, whitewash was an inexpensive and easily maintained finish (Note 1)<br><br>However, due to the utilitarian nature of the building and its extremely deteriorated condition, it is not likely that any original finish remains. (Note 2) |
| West wall plaster | MLA3 | White, chalky (possibly limewash/ whitewash) | 1820s at the earliest; probably twentieth century | Not likely | Note 1, Note 2<br><br>Only two white finish layers exist before the appearance of twentieth century paint colors, namely a light green blue. In a building of this age, more successive finish layers are expected. This suggests the west wall plaster was replaced. |
| North wall plaster | MLA4 | Light yellow green | 20th century | No | Note 1, Note 2<br><br>Light yellow green paint is associated with the middle of the twentieth century.<br><br>The plaster of this wall is a different color (white) and consistency (fine) than the chunky, brown stucco throughout the rest of the structure. This indicates the north wall plaster was replaced. |
| South wall plaster | MLA5<br>MLA6<br>MLA6.1 | Light green blue | 20th century | No | Note 1, Note 2 |
| East window frame | MLA7<br>MLA8 | Cream tan | 1820s at the earliest | Unknown | Note 1<br><br>It is not known if the woodwork is original. (Note 3) |
| West window frame | MLA9 | Cream tan | 1820s at the earliest | Unknown | Note 1, Note 3 |
| East window sashes | MLA10<br>MLA11 | Cream tan | 1820s at the earliest | Unknown | Note 1, Note 3 |
| East doorframe | MLA12 | Dark brown paint or varnish | 1820s at the earliest | Unknown | Note 1, Note 3<br><br>There are fragmented and deteriorated traces of a dark brown finish. It is not known whether it is paint or varnish. (Note4) |
| Stair doorframe | MLA13 | Dark brown paint or varnish | 1820s at the earliest | Unknown | Note 1, Note 3, Note 4 |
| Stair paneling | MLA14 | Cream | 1820s at the earliest; probably late 19th or early 20th century | Unknown | Note 1, Note 3<br><br>It is expected that the stair paneling finish would have matched the color of the door and window surrounds. However, in a structure of this age, evidence of more than two finish layers is expected. In this case, only two finish layers were found, suggesting that the paneling was replaced at a later date. |
| Baseboards | MLA15 | Dark green | Mid to late 19th century | Unknown | Note 1, Note 3<br><br>Dark green baseboards are typical of the mid-late 19th century<br><br>At this time black paint was commonly used on baseboards to hide dirt and scuffs. |

Note 1: Not likely the original finish due to the extremely deteriorated condition of the cabin.
Note 2: At this time, walls were commonly whitewashed. Used for hygienic purposes, whitewash was an inexpensive and easily maintained finish.
Note 3: It is not known if the woodwork is original.
Note 4: There are fragmented and deteriorated traces of a dark brown finish. It is not known whether it is paint or varnish.
Note 5: Exterior mortar would likely have been replaced over the years.

# MARY LOCHER CABIN
## HISTORIC FINISHES
## PERIOD I (1780-1790)—ROOM A; LOG CABIN, FIRST FLOOR

| ELEMENT | SAMPLE | EARLIEST FINISH | ESTIMATED DATE | ORIGINAL | REMARKS |
|---|---|---|---|---|---|
| Ceiling boards | MLA16<br>MLA17 | Dark brown paint or varnish | Post 1820s | Unknown | Note 1, Note 2, Note 3<br><br>Ceiling boards and joists were also commonly whitewashed in the 18th Century.<br><br>What looks like traces of varnish may be the resinous property of wood coming through.<br><br>In a building of this age and deteriorated state, we expect to find the structural members also in a deteriorated state. The wood of the ceiling boards appears too new to be original, suggesting they were replaced at a later date. |
| Ceiling joists | MLA18<br>MLA19 | Cream or white<br>Pale bluish-white | 1780-90<br>Post 1820s | One fragment may be original | Note 2, Note 3<br><br>Ceiling boards and joists were also commonly whitewashed in the 18th Century.<br><br>Two different wood substrates were found in sample MLA18. One was light in color, typical of a newer wood member. The other was dark and deteriorated. The latter appears much older and may be original material.<br><br>The absence of this older wood elsewhere suggests that the ceiling joists were replaced and/or patched at a later date. More conclusive results may be found through further investigation. |
| Ceiling mortar b/t joists & floorboards | MLA20 | Pale bluish-white | 20th century | No | Note 1, Note 3<br><br>The mortar is a different color (white) and consistency (fine) than the chunky, brown stucco we see used throughout the rest of this early structure. This indicates the mortar was replaced at a later date.<br><br>Over time, cracking and deteriorating mortar would have been replaced. It is not known if this mortar dates to the replacement of the ceiling boards and joists or if it is even more modern. |

Note 1: Not likely the original finish due to the extremely deteriorated condition of the cabin.
Note 2: At this time, walls were commonly whitewashed. Used for hygienic purposes, whitewash was an inexpensive and easily maintained finish.
Note 3: It is not known if the woodwork is original.
Note 4: There are fragmented and deteriorated traces of a dark brown finish. It is not known whether it is paint or varnish.
Note 5: Exterior mortar would likely have been replaced over the years.

# MARY LOCHER CABIN
## HISTORIC FINISHES—PRELIMINARY FINDINGS
## PERIOD I (1780-1790)—ROOM D; LOG CABIN, SECOND FLOOR

| ELEMENT | SAMPLE | EARLIEST FINISH | ESTIMATED DATE | ORIGINAL | REMARKS |
|---|---|---|---|---|---|
| North wall plaster | MLD1 | White, chalky (possibly limewash/ whitewash) | Post 1820s | Unknown | Note 1, Note 2<br><br>The 1820s addition north of this wall may have required removal and replacement of this plaster. |

Note 1: Not likely the original finish due to the extremely deteriorated condition of the cabin.
Note 2: At this time, walls were commonly whitewashed. Used for hygienic purposes, whitewash was an inexpensive and easily maintained finish.
Note 3: It is not known if the woodwork is original.
Note 4: There are fragmented and deteriorated traces of a dark brown finish. It is not known whether it is paint or varnish.
Note 5: Exterior mortar would likely have been replaced over the years.

# MARY LOCHER CABIN
## HISTORIC FINISHES
## PERIOD I (1780-1790)—LOG CABIN, EXTERIOR

| ELEMENT | SAMPLE | EARLIEST FINISH | ESTIMATED DATE | ORIGINAL | REMARKS |
|---|---|---|---|---|---|
| South wall mortar | MLE1 | White, chalky (possibly limewash/ whitewash) | 20th century | Not likely | Note 1, Note 2<br><br>At this time, the exteriors of utilitarian buildings were also commonly whitewashed.<br><br>Due to weathering and deterioration, the exterior mortar would likely have been replaced over the years (Note 5)<br><br>Orange inclusions, possibly sand particles, were found in the mortar. |
| West wall mortar | MLE2 | White, chalky (possibly limewash/ whitewash) | 20th century | Not likely | Note 1, Note 2, Note 5 |
| West window frame | MLE3 | White/cream | 20th century | Not likely | Note 1, Note 2, Note 5 |

Note 1: Not likely the original finish due to the extremely deteriorated condition of the cabin.
Note 2: At this time, walls were commonly whitewashed. Used for hygienic purposes, whitewash was an inexpensive and easily maintained finish.
Note 3: It is not known if the woodwork is original.
Note 4: There are fragmented and deteriorated traces of a dark brown finish. It is not known whether it is paint or varnish.
Note 5: Exterior mortar would likely have been replaced over the years.

# MARY LOCHER CABIN
## HISTORIC FINISHES
## PERIOD II (1820)—ROOM B; TIMBER FRAME, FIRST FLOOR

| ELEMENT | SAMPLE | EARLIEST FINISH | ESTIMATED DATE | ORIGINAL | REMARKS |
|---|---|---|---|---|---|
| East wall plaster | MLB1<br>MLB2 | White, chalky (possibly limewash/ whitewash) | 1820s and 20th century, both | Plaster south of the east door is probably original (MLB2) | Note 2<br><br>Sample MLB2 taken south of the east door reveals a chalky limewash paint on an original plaster buried beneath a later plaster layer. It is not known if this plaster is original but it could date to the 1820s.<br><br>The plaster found in sample MLB1 probably dates to the 20th century.<br><br>Considering the age and deteriorated state of this structure we would expect to find evidence of several finish layers. No successive finish layers were found in sample MLB1, suggesting that at least a portion of this wall plaster was replaced at a later date. |
| West wall plaster | MLB3 | Light green blue | 20th century | No | Note 1, Note 2<br><br>This light green blue paint is associated with the middle of the twentieth century.<br><br>The plaster of this wall is a different color (white) and consistency (fine) than the chunky, brown stucco used elsewhere. This indicates the west wall plaster was replaced. |
| North wall plaster | MLB4 | White, chalky (possibly limewash/ whitewash) | 1820s | Unknown | Note 2<br><br>Many whitewash layers plus successive finish layers were found on this sample (Note 6)<br><br>It is not known whether this plaster is original, but the chromachronology indicates it predates other plasters in the room. |
| Plaster, face of fireplace | MLB5<br>MLB6 | White, chalky (possibly limewash/ whitewash) | Post 1820s | Unknown | Note 2, Note 6<br><br>This stucco is a different color and consistency than elsewhere. |
| East window frame | MLB7 | Dark reddish-brown varnish | Post 1820s | Unknown | Note 3<br>The fact that varnish layers remain exposed in such a ruinous building suggests that the woodwork was replaced. |
| East window sash | MLB8 | Dark reddish-brown varnish | Post 1820s | Unknown | Note 3; Same as above |
| East doorframe | MLB9 | Possible varnish | Post 1820s | Unknown | Note 3, Note 4; Same as above |
| East door | MLB10 | Possible varnish | Post 1820s | Unknown | Note 3, Note 4; Same as above |
| Stair door to second floor | MLB11 | Possible varnish | Post 1820s | Unknown | Note 3, Note 4; Same as above |
| Stair wall paneling | MLB12 | Possible varnish | Post 1820s | Unknown | Note 3, Note 4; Same as above |
| Cubbyhole mantel | MLB13 | White | 1820s | Unknown | This sample is very deteriorated (Note 7)<br><br>It is hard to determine paint sequence due to the extremely deteriorated condition of this sample. |

Note 1: Not likely the original finish due to the extremely deteriorated condition of the cabin.
Note 2: At this time, walls were commonly whitewashed. Used for hygienic purposes, whitewash was an inexpensive and easily maintained finish.
Note 3: It is not known if the woodwork is original.
Note 4: There are fragmented and deteriorated traces of a dark brown finish. It is not known whether it is paint or varnish.
Note 5: Exterior mortar would likely have been replaced over the years.
Note 6: Many whitewash layers plus successive finish layers were found on this sample.
Note 7: This sample is very deteriorated.

# MARY LOCHER CABIN
## HISTORIC FINISHES
## PERIOD II (1820)—ROOM B; TIMBER FRAME, FIRST FLOOR, CONT'D.

| ELEMENT | SAMPLE | EARLIEST FINISH | ESTIMATED DATE | ORIGINAL | REMARKS |
|---|---|---|---|---|---|
| Wainscot | MLB14 | Varnish | Post 1820s | Unknown | Note 3 |
| Ceiling boards<br>Ceiling joists | MLB15<br>MLB16 | Cream | 1820s at the earliest | Unknown | Note 3, Note 7<br><br>This deteriorated condition could be indicative of the exposed and crumbling structure or it may indicate that it is original material. |
| Baseboards | MLB17 | Light tan | 20th century | No | Note 3<br>The baseboards appear to be new wood, suggesting that they were replaced. |

Note 1: Not likely the original finish due to the extremely deteriorated condition of the cabin.
Note 2: At this time, walls were commonly whitewashed. Used for hygienic purposes, whitewash was an inexpensive and easily maintained finish.
Note 3: It is not known if the woodwork is original.
Note 4: There are fragmented and deteriorated traces of a dark brown finish. It is not known whether it is paint or varnish.
Note 5: Exterior mortar would likely have been replaced over the years.
Note 6: Many whitewash layers plus successive finish layers were found on this sample.
Note 7: This sample is very deteriorated.

# MARY LOCHER CABIN
## HISTORIC FINISHES
## PERIOD II (1820)—ROOM C; TIMBER FRAME, SECOND FLOOR

| ELEMENT | SAMPLE | EARLIEST FINISH | ESTIMATED DATE | ORIGINAL | REMARKS |
|---|---|---|---|---|---|
| North wall plaster | MLC1 | White, chalky (possibly limewash/ whitewash) | Post 1820 | Unknown | Note 2<br><br>This sample reveals an additional stucco layer applied over earlier finishes. |
| South wall plaster | MLC8 | White, chalky (possibly limewash/ whitewash) | Post 1820 | Unknown | Note 2<br><br>This sample reveals an additional stucco layer applied over earlier finishes. |
| East wall plaster | MLC2 | White, finish plaster | 20th century | Not likely | Note 2<br><br>This sample reveals very few finish layers. The absence of an additional stucco layer such as that found on the north and south wall samples suggests that this plaster was replaced. |
| South doorframe | MLC3 | Dark reddish-brown varnish | Post 1820 | Unknown | Note 3 |
| South door | MLC4 | Grayish-White, chalky | 20th century | Not likely | Note 3, Note 7<br><br>There is no evidence of earlier finish layers suggesting this door was replaced at a later date. |
| Plaster, chimney face | MLC5 | White, chalky (possibly limewash/ whitewash) | 20th century | Not likely | Note 2<br><br>Few white finish layers were found on this sample suggesting that the plaster was replaced at a later date. |
| Stair rail | MLC6 | Dark reddish-brown varnish | 20th century | Unknown | Note 3 |
| Baseboard | MLC7 | Dark brown or black; possible varnish | Post 1820 | Unknown | Note 3, Note 4<br><br>The finish on this sample is deteriorated and fragmented; it is not continuous across sample. |

Note 1: Not likely the original finish due to the extremely deteriorated condition of the cabin.
Note 2: At this time, walls were commonly whitewashed. Used for hygienic purposes, whitewash was an inexpensive and easily maintained finish.
Note 3: It is not known if the woodwork is original.
Note 4: There are fragmented and deteriorated traces of a dark brown finish. It is not known whether it is paint or varnish.
Note 5: Exterior mortar would likely have been replaced over the years.
Note 6: Many whitewash layers plus successive finish layers were found on this sample.
Note 7: This sample is very deteriorated.

# MARY LOCHER CABIN
## HISTORIC FINISHES
## PERIOD II (1820)—TIMBER FRAME, EXTERIOR

| ELEMENT | SAMPLE | EARLIEST FINISH | ESTIMATED DATE | ORIGINAL | REMARKS |
|---|---|---|---|---|---|
| East timber frame member | MLE4 | White | As early as 1820; probably later | Unknown | Note 1, Note 2<br><br>This sample was taken from a less exposed location on the east elevation.<br><br>The finish could be as early as 1820, but the deteriorated state of the structure as well as a lack of successive finish layers suggests that this is not the original finish.<br><br>Additional investigation is recommended. |
| East doorframe | MLE5 | Dark brown stain or varnish | Post 1820; late 19th century | Not likely | Note 1, Note 3, Note 4<br><br>The fact that varnish layers remain exposed on the exterior of such a ruinous building suggests that the doorframe was replaced.<br><br>Later layers of a light bluish gray are also found later on other frame addition elements (samples MLE4, MLE6). But overall, there are few successive finish layers, suggesting that the doorframe was replaced. |
| East door | MLE6 | White | Post 1820; probably 20th century | Not likely | Note 1, Note 2<br><br>Later layers of a light bluish gray are also found later on other frame addition elements (samples MLE4, MLE5). But overall, there are few successive finish layers, suggesting that the door was replaced. |

Note 1: Not likely the original finish due to the extremely deteriorated condition of the cabin.
Note 2: At this time, walls were commonly whitewashed. Used for hygienic purposes, whitewash was an inexpensive and easily maintained finish.
Note 3: It is not known if the woodwork is original.
Note 4: There are fragmented and deteriorated traces of a dark brown finish. It is not known whether it is paint or varnish.
Note 5: Exterior mortar would likely have been replaced over the years.
Note 6: Many whitewash layers plus successive finish layers were found on this sample.
Note 7: This sample is very deteriorated.

# MARY LOCHER CABIN
## HISTORIC FINISHES COLORS
## PERIODS I & II (1780-1820)—ROOM A; LOG CABIN, FIRST FLOOR

| ELEMENT | SAMPLES | COLOR | DURON | DURON PAINT CHIP | MUNSELL |
|---|---|---|---|---|---|
| East wall plaster | MLA1 | White | Solo White CW051W | | N 9.25/ |
| East wall plaster<br>West wall plaster | MLA2<br>MLA3<br>MLA5 | Light green blue | Wayward Wind 8063M | | 7.5BG 7/2 |
| North wall plaster | MLA4 | Light yellow green | Pekoe Tea 7673M | | 2.5GY 7/4 |
| East window frame<br><br>East window sashes | MLA7<br><br>MLA8 | Varnish | | | |
| Stair paneling | MLA14 | Grayish white | Fog Mist CW059W | | N 9.5/ 50%<br>5 Y 9/2 50% |
| Baseboards | MLA15 | Dark green | Alligator AC093N | | 2.5G 3/2 |
| Ceiling joist mortar | MLA20 | Light bluish-white | Pearl Violet 7990W | | 10B 9/1 |

# MARY LOCHER CABIN
## HISTORIC FINISHES COLORS
## PERIOD II (1820)—ROOM B; TIMBER FRAME, FIRST FLOOR

| ELEMENT | SAMPLES | COLOR | DURON | DURON PAINT CHIP | MUNSELL |
|---|---|---|---|---|---|
| East wall plaster<br><br>North wall plaster<br><br>South fireplace plaster<br><br>Joists | MLB1*<br>MLB2*<br>MLB4*<br><br>MLB5<br>MLB6<br><br>MLB16 | White | Solo White<br>CW051W | | N 9.25/ |
| West wall plaster | MLB3 | Light bluish-white | Pearl Violet<br>7990W | | 10B 9/1 |
| Ceiling boards<br>Baseboards | MLB15<br>MLB17 | Cream | Restorative<br>CW025W | | 2.5Y 9/2 |

* Later colors found: Light yellow green (Pekoe Tea 7673M), Light green blue (Wayward Wind 8063M)

# MARY LOCHER CABIN
## HISTORIC FINISHES COLORS
## PERIOD II (1820)—ROOM C; TIMBER FRAME, SECOND FLOOR

| ELEMENT | SAMPLES | COLOR | DURON | DURON PAINT CHIP | MUNSELL |
|---|---|---|---|---|---|
| North wall plaster<br>East wall plaster | MLC1<br>MLC2 | Cream | Restorative<br>CW025W | | 2.5Y 9/2 |
| South door<br>North face of chimney | MLC4<br>MLC5 | Grayish-white | Solo White<br>CW051W | | N 9.25/ |
| Baseboards | MLC7 | Dark brown or black | Black Deco<br>AC144N | | 10YR 3/1 50%<br>N 2.25/ 50% |

# MARY LOCHER CABIN
## HISTORIC FINISHES COLORS
## PERIOD II (1820) —ROOM D; LOG CABIN, SECOND FLOOR

| ELEMENT | SAMPLES | COLOR | DURON | DURON PAINT CHIP | MUNSELL |
|---|---|---|---|---|---|
| North wall plaster | MLD1 | Grayish white | Solo White CW051W | | N 9.25/ |

# MARY LOCHER CABIN
## HISTORIC FINISHES COLORS
## PERIOD II (1820)—EXTERIOR

| ELEMENT | SAMPLES | COLOR | DURON | DURON PAINT CHIP | MUNSELL |
|---|---|---|---|---|---|
| East elevation Vertical frame member | MLE4 | Grayish white | Solo White CW051W | | N 9.25/ |

# MARY LOCHER CABIN
## DURON/ MUNSELL COLOR EQUIVALENCIES

Solo White (CW051W) = N 9.25/

Restorative (CW025W) = 2.5Y 9/2

Fog Mist (CW059W) = N 9.5/ 50%, 5 Y 9/2 50%

Pearl Violet (7990W) = 10B 9/1

Alligator (AC093N) = 2.5G 3/2

Black Deco (AC144N) = 10YR 3/1 50%, N 2.25/ 50%

Wayward Wind (8063M) = 7.5BG 7/2

Pekoe Tea (7673M) = 2.5GY 7/4

## I. BACKGROUND

The Mary Locher Cabin consists of a log cabin and a frame addition. The National Park Service believes that the log cabin may date to the first quarter of the 19th century. They also believe that the frame addition was probably built during the second or third quarter of the 19th century. This dating of construction is conjecture based on examination of extant physical fabric of the structure. The National Park Service is currently exploring stabilization options for the log and timber-framed house. The anticipated stabilization of the exterior will ultimately include preservation and repair efforts to the log structure. This work may include wood consolidation, patching and the possible replacement of some logs. This effort will also include repair and replacement of the existing chinking.

In an effort to develop a repair recipe that is appropriate to the building and the site, samples of the existing chinking were taken from different locations on the log cabin and used to evaluate the probable content of the material.

## II. METHODOLOGY

**Note:** For the purposes of this report, it is assumed that the front door to the log cabin section of the house faces due south.

**A. Location of Samples:** Three chinking samples were gathered from the building. Sample #1 was taken from the west side of the cabin, sample #2 was taken from the south side, and sample #3 was taken from the east side. The samples were bagged and labeled on site, and the sample locations documented.

**B. Evaluation:** Each of the three samples was divided into three smaller, evaluation units. These evaluation units were labeled with the appropriate sample number and an A through C designation. A single evaluation unit from each location was then chosen for processing. The following is a general outline of the process that was used to evaluate the color, texture and general content of the samples.

1. The dry sample was weighed. It was then carefully crushed in an effort to separate the aggregate and the binder. The crushed sample was then weighed to determine a benchmark.

2. A mild acid, in this case white vinegar, was used in an effort to burn off lime in the mixture. Successive baths of acid were introduced until there were no more visible reactions, such as bubbling or fizzing, observed. The digested material was then allowed to stand in a fresh acid bath in an effort to dissolve remaining lime.

3. The evaluation unit was dried and weighed. The reduction in weight was recorded and the percentage of loss by weight was calculated.

4. A stronger acid, in this case diluted muratic acid, was used in an effort to burn off remaining lime in the mixture. Successive baths of acid were introduced until there were no more visible reactions, such as bubbling or fizzing, observed.

**Note:** It is our experience that the first mild acid bath (white vinegar) acts primarily on lime. By using a second, stronger acid to act on cements such a Portland, reasonable conclusions can be drawn as to the amount of cement in the evaluation units. However, the relative softness of the evaluation units suggested that there was no Portland cement in the original chinking mixture. The belief that the evaluation samples date from the 18th or 19th century, further reinforces this assumption.

5. The unit was dried and weighed. The reduction in weight was recorded and the percentage of loss by weight was calculated. This figure was used to help determine the amount of lime that was probably in the original mix.

6. The loose material that remained after the acid baths was visually inspected for color and texture. A series of sieves were used to determine the general proportion of aggregate sizes and fines in the material. (In this case, clay.) This information was then used to determine sources for clay.

7. Several different sample of clay that was gathered from near the building site, were then screened to determine if they were close in content to the clay in the evaluation units.

8. Local clay and lime were then mixed in appropriate proportions and allowed to dry.

Note: A sample of this material will be submitted to the architect.

## C. Results:

1. Sample #1. was gathered from the west side of the cabin near the center of the wall. The sample had a light coating of what appeared to be whitewash on the surface. The evaluation sample consisted of approximately 3 parts native clay and 1 part lime.

2. Sample #2. was gathered from the south side of the cabin, to the immediate right of the front door. The sample had a coating of what appeared to be whitewash on the surface. Clumps of short, stiff hair were found in the evaluation sample. The evaluation sample consisted of approximately 3 parts native clay and 1 part lime. The percentage of hair in the sample was estimated by visual inspection only.

3. Sample #3. was gathered from the east side of the cabin near the center of the wall. The sample had a coating of what appeared to be whitewash on the surface. No hair was visible in the evaluation sample, however hair was found in evaluation samples 3. b. and 3. c.

**D. Discussion:**

"Chinking" is the mortar and in-fill that is place between logs to help form a weatherproof building envelope. It typically consists of a mixture of clay and lime that is placed over a bulk filler material. The bulk filler material is usually made of small stones or pieces of wood that have been placed tightly between the logs. The mixture of clay and lime is forced into the voids between the filler material and is typically tooled flush with the interior and exterior faces of the log. Once dry, the chinking was sometimes coated with whitewash. Sometimes the logs were coated with whitewash as well.

The method of construction on the log portion of the house suggest that the materials used in its were probably native to the site. The clay used in the chinking was most likely excavated near the cabin. On the south side of the cabin, there is a small rise that has been partially excavated. A vaulted ceiling and walls were built and then covered with soil. This structure probably served as a dairy or root cellar. It is possible that this excavation was done at the same time as the cabin, and that the excavated soil was used for the chinking. Samples of this clay were gathered, dried and put through a sieve. The results were compared to the dried, sieved clay of the evaluation samples. The clay gathered from the root cellar was similar in color and texture to the clay in the evaluation samples.

## III. PROPOSED REPAIR RECIPE

**A. Repair Recipe:** All proportions are by volume.

1. Clay: 3 parts native clay. It may be possible to excavate the clay near the cabin.

2. Lime: 1 part lime putty. The lime putty can be made by placing hydrated mason's lime in clean water and allowing the lime to slake for 1 to 2 weeks. The water that rises to the top should be poured off prior to use.

3. Animal Hair: The exact amount of animal hair was not determined. However, visual evidence suggests that the proportion would be less than 1% of volume.

> **Note:** Historic lime plasters usually have animal hair in the scratch (first) coat. The animal hair acts as a binder and helps to reduce cracking. Contemporary sources that relate to the plaster trades, usually call for approximately nine (9) pounds of animal hair to be mixed in enough plaster to coat 1,000 square feet. If it is assumed that the proportion of animal hair in the chinking is roughly the same, then a proportion of less than 1% seems reasonable.

4. Whitewash: Whitewash is a "paintable" mixture of water and lime. See 2.

5. General Notes.

a. Lime putty can be made from hydrated lime by placing approximately 3 gallons of water into a clean 5-gallon bucket and carefully pouring the dry lime into the bucket. Keep pouring lime into the water until the lime is 3-4 inches from the top of the bucket. Put a lid on the bucket and let this stand for one to two weeks. Approximately 10 gallons of lime putty can be made from a 50-lb. bag of hydrated lime.

b. Very little water should be added to the mix. The lime putty should provide sufficient plasticity to make a workable mix. During the placement of the chinking, it may be necessary to sprinkle the mix to keep it in a workable state.

c. The clay should be placed in the mixing pan first and the lime putty should then be added. The chinking can be mixed using a mortar hoe by hand and wooden tamper to ensure that the clay and lime are cohesive. Once the lime and clay have been thoroughly mixed, the animal hair may be added.

d. It may be necessary to place the chinking in a series of "lifts" or layers to reduce cracking. (see also f.)

e. Once the chinking has dried, it may be coated with whitewash. The whitewash can be made of lime putty, thinned with water to a paintable consistency. Whitewash is translucent when it is first applied and dries more opaque. Several coats of whitewash may be needed to achieve an appropriate aesthetic level.

f. There appeared to be a slightly higher percentage of fine aggregates (sand) in the evaluation samples than were seen in the clay gathered from the excavation near the cabin. For the purposes of the repair recipe, no additional sand was added. However, the addition of sand may help to reduce some of the cracking that is typically associated with clay/lime mixtures. The amount of sand should probably not exceed ½ part of the mix ratio.

## B. Material List

1. Clay: It may be possible to get native clay from a site near the cabin. If not, efforts should be made to find clay that is similar in content to the evaluation sample. The color and texture of the clay will impact the color and texture of the repair chinking..

2. Lime:

a. Hydrated Mason's Lime, manufactured by Bellefonte Lime Co., is available from T.W. Perry at their Chevy Chase, MD and their Gaithersburg, MD locations.

Bellefonte Lime Co.
North Thomas St.
P.O. Box 448
Bellefonte, PA 16823
Phone: 814-355-4761

T.W. Perry
8101 Snouffer School Rd.
Gaithersburg, MD 20879
Phone: 301-840-9600

Steffey and Findlay Incorporated
177 S. Burhans Blvd.
Hagerstown, MD 21740
Phone: 301-733-1600

b. Lime Putty is available from the following source.

U.S. Heritage Group, Inc.
3516 North Kostner Avenue
Chicago, IL 60641
Phone: 773-286-2100

c. Animal Hair is available from Preservation Resource Group.

Preservation Resource Group
P.O. Box 1768
Rockville, MD 20849
Phone: 301-309-2222

# MORTAR TESTING

Date: 11/28/99 Project Name: MARY LOCHER CABIN

Job Number: _____ Job Location: ANTIETAM BATTLEFIELD

Sample Number: 1

Sample Location: _____

DELL CORPORATION
P. O. Box 1462 Rockville, MD 20849-1462
301-279-2612 F. 301-279-7885

TESTED BY: ACB

1. GrossWeight of Sample: 98 g
2. Gross Weight of Crushed Sample: 97.50g
3. 1st Acid Bath: Beginning Weight 97.50g
   a. Typeof acid: DISTILLED WHITE VINEGAR
   b. Weight of sample after acid bath: 80.25 g
   c. Amount of reduction: Grams 17.25g Percentage 18%
4. 2nd Acid Bath: Beginning Weight 80.25 g
   a. Type of acid: DISTILLED WHITE VINEGAR
   b. Weight of sample after acid bath: 78 g
   c. Amount of reduction: Grams 2.25g Percentage 3%
5. 3rd Acid Bath: Beginning Weight 78g
   a. Type of acid: MURATIC ACID
   b. Weight of sample after acid bath: 76.25 g
   c. Amount of reduction: Grams 2.75g Percentage 3%
6. Weight of Sample After Acid Baths: 75.25 g
7. Sieving of Aggregate: Number of Units: 85
   a. Sieve size: 8 Units of Aggregate Not Passing Though: 20 UNITS
   b. Sieve size: 18 Units of Aggregate Not Passing Through: 25 UNITS
   c. Sieve size: 24 Units of Aggregate Not Passing Through: 5 UNITS
   d. Sieve size: 40 Units of Aggregate Not Passing Through: 10 UNITS
   e. Bottom Chamber of Sieve / Units of Fines Remaining: 25 UNITS
8. Notes: _____
9. Replacement Recipe:
   a. Sand Color, type and/or supplier: _____
   b. Seive size for sand: _____
   c. Probable Mix Ratio: _____parts sand, _____parts _____, _____parts _____
   d. Other Ingredients: _____

# MORTAR TESTING

Date: 11/18/99 Project Name: MAST LOCHER CABIN

Job Number: _____ Job Location: ANTIETAM BATTLEFIELD

Sample Number: 2

Sample Location: _____

DELL CORPORATION

P. O. Box 1462 Rockville, MD
20849-1462
301-279-2612 F. 301-279-7885

TESTED BY: ACB

1. GrossWeight of Sample: 52.75 g
2. Gross Weight of Crushed Sample: 52.50 g
3. 1st Acid Bath: Beginning Weight 52.50 g
   a. Typeof acid: DISTILLED WHITE VINEGAR
   b. Weight of sample after acid bath: 50.50g
   c. Amount of reduction: Grams 2g Percentage 4%
4. 2nd Acid Bath: Beginning Weight 50.50 g
   a. Type of acid: MURATIC ACID
   b. Weight of sample after acid bath: 42.50 g
   c. Amount of reduction: Grams 8g Percentage 16%
5. 3rd Acid Bath: Beginning Weight _____
   a. Type of acid: _____
   b. Weight of sample after acid bath: _____
   c. Amount of reduction: Grams _____ Percentage _____
6. Weight of Sample After Acid Baths: _____
7. Sieving of Aggregate: Number of Units: 45
   a. Sieve size: 8 Units of Aggregate Not Passing Though: 5 UNITS
   b. Sieve size: 18 Units of Aggregate Not Passing Through: 10 UNITS
   c. Sieve size: 24 Units of Aggregate Not Passing Through: 5 UNITS
   d. Sieve size: 40 Units of Aggregate Not Passing Through: 10 UNITS
   e. Bottom Chamber of Sieve / Units of Fines Remaining: 15 UNITS
8. Notes: CLUMPS OF HAIR FOUND IN SAMPLE.
9. Replacement Recipe:
   a. Sand Color, type and/or supplier: _____
   b. Seive size for sand: _____
   c. Probable Mix Ratio: _____parts sand, _____parts _____, _____parts _____
   d. Other Ingredients: _____

# MORTAR TESTING

Date: 11/24/99 Project Name: MARY LOCHER CABIN

Job Number: _____ Job Location: ANTIETAM BATTLEFIELD

Sample Number: 3

Sample Location: _____

DELL CORPORATION
P. O. Box 1462 Rockville, MD
20849-1462
301-279-2612 F. 301-279-7885

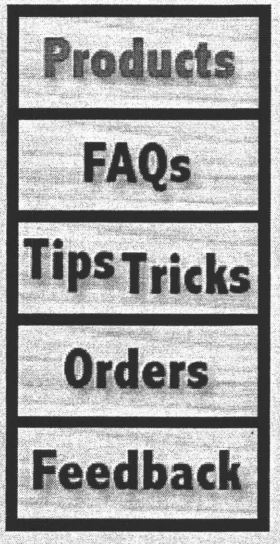
TESTED BY: ACB

1. GrossWeight of Sample: 105 g
2. Gross Weight of Crushed Sample: 103 g
3. 1st Acid Bath: Beginning Weight 103 g
   a. Typeof acid: DISTILLED WHITE VINEGAR
   b. Weight of sample after acid bath: 85.75 g
   c. Amount of reduction: Grams 17.25 g Percentage 17%
4. 2nd Acid Bath: Beginning Weight 85.75 g
   a. Type of acid: DISTILLED WHITE VINEGAR
   b. Weight of sample after acid bath: 82.25 g
   c. Amount of reduction: Grams 3.50 g Percentage 4%
5. 3rd Acid Bath: Beginning Weight 82.25 g
   a. Type of acid: MURATIC ACID
   b. Weight of sample after acid bath: 77.50 g
   c. Amount of reduction: Grams 4.75 g Percentage 6%
6. Weight of Sample After Acid Baths: 77.50 g
7. Sieving of Aggregate: Number of Units: 70
   a. Sieve size: 8 Units of Aggregate Not Passing Though: 15 UNITS
   b. Sieve size: 18 Units of Aggregate Not Passing Through: 20 UNITS
   c. Sieve size: 24 Units of Aggregate Not Passing Through: 5 UNITS
   d. Sieve size: 40 Units of Aggregate Not Passing Through: 10 UNITS
   e. Bottom Chamber of Sieve / Units of Fines Remaining: 20 UNITS
8. Notes: _____
9. Replacement Recipe:
   a. Sand Color, type and/or supplier: _____
   b. Seive size for sand: _____
   c. Probable Mix Ratio: ____parts sand, _____parts_____, _____parts_____
   d. Other Ingredients: _____

# ConServ Epoxy®

## PRODUCTS

[ Home | Products | FAQs | Tips & Tricks | Orders | Feedback ]




**Product specific data:**

- ConServ Flexible Epoxy Consolidant 100
- ConServ Flexible Epoxy Patch 200
- ConServ Structural Epoxy Adhesive 500
- ConServ Structural Epoxy Repair 600
- ConServ Fiberglass Rebar 800

**Data for all products:**

- Instructions
- Technical Data
- Specifications
- Material Safety Data Sheets (M.S.D.S.)

**Information is cross-referenced by Product and Data categories. Select either a product or a data type to quickly find the information you need.**

**We have prepared a *Quick Reference Guide* and some *Introductory Material* to familiarize you with both our company and our product line.**

Website by Webster-Design

# ConServEpoxy

A division of
HOUSECRAFT ASSOCIATES
7 Goodale Road, Newton, New Jersey 07860

# QUICK REFERENCE GUIDE

[ Home | Products | Instructions | Technical Data | Specifications | M.S.D.S. ]


- *Flexible Epoxy Consolidant 100*
- *Flexible Epoxy Patch 200*
- *Structural Epoxy Adhesive 500*
- *Structural Epoxy Repair 600*


## *Flexible Epoxy Consolidant 100*

### Description

A non-structural epoxy system designed for stabilizing decayed wood and making it firm. The very low viscosity of this epoxy and its long curing time (3 to 5 days) provides deep penetration and ease of use. It impregnates and consolidates soft wood fibers with flexible epoxy. This allows for expansion and contraction as a result of temperature and moisture.

### Applications

- window and door sills
- railings and balustrades
- porches and floors
- framing
- sash
- trim and siding
- columns and posts
- log and timber elements
- stairs and stringers
- decorative ornamental elements

### Advantages

- impregnates and stabilizes decayed wood
- retards future decay development
- flexible - gives with the wood
- preserves original fabric
- easy to use

*return to top*

## *Flexible Epoxy Patch 200*

### Description

### Applications

### Advantages

A flexible epoxy filler for filling voids and making non-structural and cosmetic repairs in wood. When cured, the epoxy is quite pliable and can be easily shaped or formed with typical hand or power tools. The Epoxy Patch 200 reacts just like wood; it can hold nails and screws and accepts stain or point. Flexible Epoxy Consolidant 100 should be used as a base. Use for a wide variety of wood.

- window and door sills
- railings and balustrades
- porches and floors
- framing
- sash
- trim and siding
- columns and posts
- log and timber elements
- stairs and stringers
- decorative ornamental elements

- rebuilds elements back to original shape
- flexible - gives with the wood
- will not shrink
- easy to form and tool

*return to top*

## *Structural Epoxy Adhesive 500*

### Description

A thick, paste-like epoxy designed for surface-to-surface adhesion of wood, metal, and masonry and for imbedding fiberglass rebar for making structural connections, splices, and reinforcements. Now it is possible to make simple structural repairs by removing or cutting off sections of wood deterioration and splicing in new sections. Easy to use and fast curing.

### Applications

- log rafters and purlins
- log and timber facing
- timber frame construction
- sills and plates
- beams and lintels
- joists and framing
- concrete pinning

### Advantages

- eliminates expensive or difficult scarf joints
- preserves original fabric
- simple and cost effective
- makes amazingly strong connections

*return to top*

## *Structural Epoxy Repair 600*

### Description

Used for rebuilding or repairing deteriorated structural elements. This low viscosity structural epoxy has many uses. It can be mixed with sand and aggregate to make an epoxy concrete for casting and reinforcing or used as is as an incredibly strong structural consolidant.

### Applications

- timber frame and log repair
- vigas
- rafters and purlins
- columns and posts
- sills and plates
- beams and lintels

### Advantages

- reinforces deteriorated structural elements
- reduces massive disruption to the building
- allows for casting of large voids
- can be used as a structural element

[ Home | Products | Instructions | Technical Data | Specifications | M.S.D.S. ]

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7 Goodale Road, Newton, New Jersey 07860

TECHNICAL DATA

# FLEXIBLE EPOXY CONSOLIDANT 100

**ConServ 100 FLEXIBLE EPOXY CONSOLIDANT** is a two part ***low*** viscosity epoxy system designed for saturating and consolidating wood. The properties are ideally suited for consolidating and stabilizing pockets of wood decay, checks, fissures and other surface imperfections likely to sustain damage due to exposure, infestation or minor charring from fire damage. Applications include logs, timbers, framing, windows and doors, trim, etc...

## MIXING

Combine entire contents of plastic bottle B (curing agent) into container A (epoxy resin) and mix ***thoroughly*** with a power mixer for 3 minutes or vigorously by hand. Mixing ratio is 3.6 parts by volume of epoxy resin A to 1 part by volume of curing agent B.

## CURE SCHEDULE

| | |
|---|---|
| Pot life | 8 oz. mass - approx. 3-6 hrs. @ 77° F. |
| Gel time | 8 oz. mass - approx. 1½ to 3 days @ 77° F. |
| Final cure | 3-7 days @ 77° F. (approx. 75% cured) |

***DO NOT*** use below 50° F.
***AVOID*** exposure to intense sunlight until final cure is complete.

## PROPERTIES

| | |
|---|---|
| Color | Clear |
| Viscosity | Consistency @ 77° F of vegetable oil |
| Operating range | -30° F. to 160° F. |
| Mixing temp. range | 50° F. to 90° F. |
| Shelf life | 1 year in unopened original containers |

## STORAGE CONDITIONS

Store at room temperature. ***DO NOT*** allow to freeze.  Keep containers closed. Epoxies often crystallize when exposed to temperatures below 50° F. If you notice a white substance in the bottom of the container, heat and stir resin until crystals are reconstituted. Allow epoxy to regain normal room temperature before using.

## PACKAGING & YIELD

**ConServ 100** is supplied in 7/8 qt. and ½ gal. quantities. ***Yield is variable*** depending on the extent of the decay and subsequent degree of saturation. Sufficient saturation to stabilize the damaged material is imperative for proper protection and preparation for the **ConServ 200** patch.

**ConServEpoxy**
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7 Goodale Road, Newton, New Jersey 07860

**INSTRUCTIONS**

# FLEXIBLE EPOXY CONSOLIDANT 100

**ConServ 100 FLEXIBLE EPOXY CONSOLIDANT** is a non-structural, flexible,slow curing, very low viscosity epoxy system designed for saturating and encapsulating soft, decayed and charred wood. **ConServ 100** is used for stabilizing decayed wood elements such as window and door sills, sash, jambs, trim, siding, porch elements, stairs, framing, and log and timber elements. Use as a stabilizing primer for **ConServ 200** Flexible Epoxy Patch.

**NOTICE:** Labels & literature are ***color coded*** to ensure proper identification of the component and corresponding instructions. ***Please*** take time to aquaint yourself with ***all*** labels, instructions and precautions ***before*** mixing. NOTE: the can will appear partially full until all components are combined for mixing.

**WOOD PREPARATION** involves removing ***all*** loose and soft decay down to good wood prior to application of the epoxy consolidant. If possible drill small holes close together in the decay zone to provide for better penetration. Wood to be consolidated should be ***clean*** and ***dry*** with a 20% moisture content or less.

**MIXING EPOXY** is ***easily*** done by pouring the contents of bottle B (curing agent) into container A (epoxy resin). If you intend to use less than a full container, combine a ratio of 3.6 parts of Resin A to 1 part Curing agent B. Blend ***thoroughly*** for three minutes using a power mixer or by hand. Mixed consolidant may be placed back in the small bottle and capped with the spout for application by squirting or pouring.

*CAUTION:* Resins may ***crystallize*** in cool temperatures causing a white ***waxy*** substance to form on the bottom of the can. This condition ***does not*** in any way alter or inhibit the effectiveness of your epoxy. ***Dissolve*** by warming with a heat gun or in a double boiler and mix gently until the material is reconstituted. Allow epoxy to regain normal room temperature before using.

**APPLYING CONSOLIDANT** should be done while temperatures range between 50°-90° F.

Avoid applying epoxy in direct sunlight or rain. Protect affected areas for one full day using black plastic wrapped or tented over work to keep materials warm and dry until epoxy has set. Apply epoxy by pouring, brushing or spraying into affected areas. Squeeze bottles or hand pump sprayers work well to ***saturate*** hard to reach surfaces. Apply consolidant repeatedly until the wood glosses over and accepts no more epoxy. Remember, the object is to get ***deep, deep penetration*** to encapsulate and stabilize and remaining decay. Protect surrounding unaffected areas from overspray or spills for aesthetic reasons.

**CURING ConServ 100 EPOXY CONSOLIDANT** takes 3 to 5 days to cure completely at room temperature. The epoxy has been designed to cure slowly for maximum penetration. Heat will cause epoxy to cure faster. Consolidant needn't be ***completely*** cured before application of **ConServ 200** patch because the ingredients are compatible.

**CLEAN-UP AND STORAGE ConServ 100** epoxy consolidant has a one year shelf life when stored at room temperature in closed containers. DO NOT allow epoxy to freeze. Tools may be cleaned before full curing using hot soapy water or acetone. Methylene chloride will work but should be avoided if at all possible due to its toxicity. Deposit paper towels and containers in plastic bag and discard with trash for incineration.

**EPOXY SAFETY** is a function of common sense and good housekeeping. ***Wear*** rubber gloves, eye gear and old clothing. Don't get epoxy on your skin or clothes. Work with good ventilation.

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***ConServ Flexible Epoxy Consolidant 100***

**[ Instructions | Technical Data | Specifications | M.S.D.S. ]**

***All ConServ Products***

**[ Consolidant 100 | Patch 200 | Adhesive 500 | Repair 600 | Rebar 800 ]**

**[ Products | Instructions | Technical Data | Specifications | M.S.D.S. ]**

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7 Goodale Road, Newton, New Jersey 07860

TECHNICAL DATA

# FLEXIBLE EPOXY PATCH 200

**ConServ 200 FLEXIBLE EPOXY PATCH** is a non-structural two part epoxy system which produces a putty-like substance designed for wood filling. The patch is compatible with **ConServ 100** consolidant which should be used to prime the affected area prior to filling. Applications include logs, timbers, framing, windows and doors, trim, etc..

## MIXING

Combine entire contents of plastic bottle B (curing agent) into container A (epoxy resin) and mix ***thoroughly*** with a power mixer for 3 minutes or vigorously by hand. By hand blend in the entire contents of bag C (brown filler) and only enough of bag D (white thickener) to achieve the desired working consistency. If you are not going to mix the entire contents at once, the mixing ratio is 2.75 parts by volume of epoxy resin A to 1 part by volume of curing agent B. Adjust the filler materials proportionally.

## CURE SCHEDULE

| | |
|---|---|
| Pot life | 8 oz. mass - approx. 1-3 hrs. @ 77° F. |
| Gel time | 8 oz. mass - approx. 8 to 24 hours @ 77° F. |
| Final cure | 2-5 days @ 77° F. (approx. 75% cured) |

***DO NOT*** use below 50° F.
***AVOID*** exposure to intense sunlight until final cure is complete.

## PROPERTIES

| | |
|---|---|
| Color | Reddish brown (may be tinted with dry mortar colorant) |
| Viscosity | Consistency @ 77° F of mayonaise -to- stiff mashed potatoes (depending on amount of thickener used) |
| Operating range | -30° F. to 100° F. with no intense sun exposure until cured |
| Shelf life | 1 year in unopened original containers |

## STORAGE CONDITIONS

Store at room temperature. ***DO NOT*** allow to freeze. Keep containers closed. Epoxies often crystallize when exposed to temperatures below 50° F. If you notice a white substance in the bottom of the container, heat gently (can in warm water over stove) and stir resin until crystals are reconstituted. Allow epoxy to regain normal room temperature before using.

## PACKAGING & YIELD

**ConServ 200** is supplied in 7/8 qt. and 7/8 gal. quantities. Yield depends on extent of damage and consistency of mix. Maximum use of fillers and thickeners supplied will produce a full can.

ConServ Epoxy
A division of
HOUSECRAFT ASSOCIATES
7 Goodale Road, Newton, New Jersey 07860

INSTRUCTIONS

# FLEXIBLE EPOXY PATCH 200

**ConServ 200 FLEXIBLE EPOXY PATCH** is a non-structural, flexible, epoxy system for filling cavities, voids and surface imperfections in wood. The patching filler has the consistency of a hard rubber ball.**ConServ 200** is flexible enough to withstand the ongoing expansion and contraction of the wood. It is easily tooled, carved, planed, drilled and sanded. It will even accept nails and screw fasteners and can be painted or stained. This material is often used on window and door elements, railings and balustrades, trim and siding, logs and timbers and ornamental components.

**NOTICE:** Instructions, labels, technical data and MSDS sheets are ***color coded*** to ensure proper identification of the component and corresponding literature. ***Please*** take time to aquaint yourself with ***all*** available labels, instructions and precautions ***before*** mixing.

**WOOD PREPARATION** involves removing ***all*** loose and soft decay down to good wood prior to application of the epoxy consolidant. Wood to be consolidated should be ***clean*** and ***dry*** with a 20% moisture content or less. Affected area to be filled should be ***primed*** using **ConServ 100** consolidant so that the patch adheres to stabilized wood.

**MIXING EPOXY** is ***easily*** done by pouring the contents of bottle B (curing agent) into container A (epoxy resin). Blend ***thoroughly*** for three minutes using a power mixer or by hand. Quickly blend in the entire contents of bag C (brown filler) by hand. Add componet D (white thickener) as needed to achieve the desired working consistency for your application. If you intend to use less than a full container, combine an exact ratio of 2.75 parts of Resin A to 1 part Curing agent B. Adjust the filling/thickening materials proportionally to suit.

*CAUTION:* Mixed epoxy will generate considerable heat within 5 to 10 minutes. To prevent premature curing divide material into smaller quantities and use immediately. Resins may ***crystallize*** in cool temperatures causing a white ***waxy*** substance to form on the bottom of the can. This condition ***does not*** in any way alter or inhibit the effectiveness of your epoxy. ***Dissolve*** by warming with a heat gun or in a double boiler and mix gently until the material is reconstituted. Allow epoxy to regain normal room temperature before using.

**APPLYING THE PATCH** must be done while temperatures range between 50°-90° F.

Avoid applying epoxy in direct sunlight or rain. Protect affected areas for one full day using black plastic wrapped or tented over work to keep materials warm and dry until epoxy has set.

**CURING ConServ 200 Patch** takes about a day to cure completely at room temperature. Temperature is the determining factor. Heat will cause epoxy to cure faster. Consolidant needn't be ***completely*** cured before application of **ConServ 200** patch because the ingredients are compatible. Apply material using a trowel, putty knife, caulk tube or by casting in place. Fill large voids (over 1"thick) in layers allowing a day to cure between applications.

**CLEAN-UP AND STORAGE ConServ 200** Patch has a one year shelf life when stored at room

temperature in closed containers. DO NOT allow epoxy to freeze. Tools may be cleaned before full curing using hot soapy water or acetone. Methylene chloride will work but should be avoided if at all possible due to its toxicity. Deposit paper towels and containers in plastic bag and discard with trash for incineration.

**EPOXY SAFETY** is a function of common sense and good housekeeping. ***Wear*** rubber gloves, eye gear and old clothing. Don't get epoxy on your skin or clothes. Work with good ventilation.

---

***ConServ Flexible Epoxy Patch 200***

**[ Instructions | Technical Data | Specifications | M.S.D.S. ]**

***All ConServ Products***

**[ Consolidant 100 | Patch 200 | Adhesive 500 | Repair 600 | Rebar 800 ]**

**[ Products | Instructions | Technical Data | Specifications | M.S.D.S. ]**

ConServ Epoxy
A division of
HOUSECRAFT ASSOCIATES
7 Goodale Road, Newton, New Jersey 07860

TECHNICAL DATA

# EPOXY ADHESIVE 500

**ConServ 500 EPOXY ADHESIVE** is a two part epoxy system with a soft paste-like consistency. It is a ***structural adhesive*** designed to attach wood to fiberglass rods and wood to wood. This system is most often applied in applications using rebar to create new ***structural joints*** between broken or decayed components and new wood components. Typical uses include attaching log crowns, rafter ends, log facings, timber frame joints, viga and purlin splices, etc..

## MIXING

Combine ***equal*** volumes of part A and part B and mix ***thoroughly*** for 3 minutes. Avoid entrapping air in mixture by using fluid motions during mixing. Good results are achieved using a flat stick on a pallet board to blend the components smoothly. Roughly separate the mixed adhesive into smaller quantities to inhibit excess heat build-up and reduced pot life.

| | weight ratio | volume ratio |
|---|---|---|
| Part A | 100 | 1 |
| Part B | 88 | 1 |

## CURE SCHEDULE

| | |
|---|---|
| Pot life | 100 cc mass - approx. 20-30 minutes @ 77° F. |
| Gel time | 100 cc mass - approx. 30-45 minutes @ 77° F. |
| Final cure | 24 hrs. @ 77° F. (approx. 75% ultimate strength) |

***DO NOT*** use below 40° F.

## PROPERTIES

| | |
|---|---|
| Color | Light amber |
| Viscosity | Consistency @ 77° F of vaseline or mayonaise |
| Operating range | -30° F. to 160° F. |
| Mixing temp. range | 45° F. to 85° F. |
| Flash point | 435° F. (approx.) |
| Hardness, shore D. | 90 +/- 5 |
| Lap shear | 3000 psi after 24 hrs. @ 25 degrees C. 25° C. |
| Shelf life | 1 year in unopened original containers |

## STORAGE CONDITIONS

Store at room temperature in a cool, dry area. ***DO NOT*** allow to freeze. Keep containers closed. May crystallize when exposed to temperatures below 50° F.

## PACKAGING & YIELD

2 quart set and 2 gallon set. The 2 gal. sets are most typical and will yield approx. 462 cu.in. of epoxy

or approx. 50 connections*.

*½" dia. rods, placed 12" deep in each end, no waste.

---

***ConServ Epoxy Adhesive 500***
**[ Instructions | Technical Data | Specifications | M.S.D.S. ]**

***All ConServ Products***
**[ Consolidant 100 | Patch 200 | Adhesive 500 | Repair 600 | Rebar 800 ]**
**[ Products | Instructions | Technical Data | Specifications | M.S.D.S. ]**

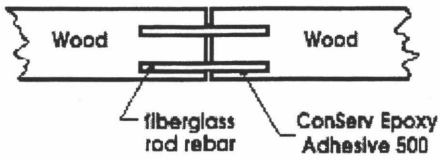
**ConServEpoxy**
A division of
HOUSECRAFT ASSOCIATES
7 Goodale Road, Newton, New Jersey 07860

**INSTRUCTIONS**

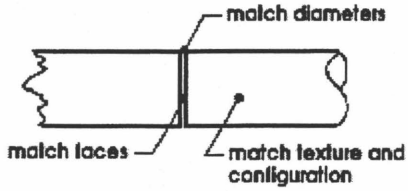
# EPOXY ADHESIVE 500

**ConServ 500 EPOXY ADHESIVE** is a two part epoxy system with a paste-like consistency. It is a structural adhesive designed to attach wood to fiberglass rods and wood to wood. This system is most often applied in applications using rebar to create new structural joints between broken or decayed components and new wood components. Typical uses are attaching log crowns, rafter ends, log facings, timber frame joints, viga and purlin splices, etc..

Structural connections with **ConServ 800** fiberglass Rebar may require design analysis. Contact ***Housecraft Associates*** if you did not receive a worksheet and ask for a ***Design Calculation Worksheet*** or engage the services of a structural engineer. For further information on specific applications of **ConServ 500** contact our offices and we may be able to send you a job specific report on just such an undertaking.




Read through all instructions first to become fully acquainted with the process. Take the time to become familiar with each step and ascertain that all materials will be available before beginning the work. It is highly recommended that you make a trial run to get comfortable with the techniques.




A typical connection is the splicing of wood to wood elements using **ConServ 800** rebar embedded in epoxy 500. Many such applications require two 1/2" dia. rods 8"-12" long. Refer to our ***Design Calculation Worksheet*** for sizes, depths, locations and number of rods.

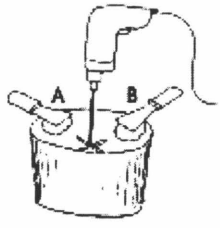
Make an effort to match the wood elements to be spliced with like species, size, and texture. Use only seasoned wood free of decay to within 3" of the joint. Wood should be less than 20% moisture content at the time of splicing. Drill matching holes in the two elements. Make holes 1/4" to 3/8" larger in dia. than the rebar. Blow out all dust in the holes and cut the rebar to be 1/2" less than the combined depths of the matching holes.

***Go to next page***

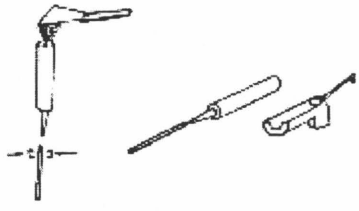
# EPOXY ADHESIVE 500

## Instructions

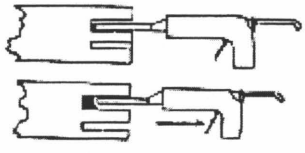
*(continued)*



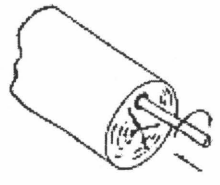

Mixing: Combine equal volumes of Part A and Part B and mix thoroughly until blend is a uniform color. This may take 3 minutes with a power blender or longer when mixing by hand. Mix only the quantity you will use within 15 to 20 minutes. Avoid entrapping air into the epoxy.



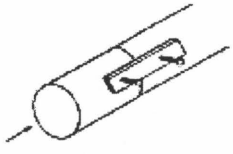
Epoxies may be applied many ways. An easy method for injecting epoxy in small deep holes is with a caulk cartridge with an extension tube stapled to the nozzle. Fill the empty caulk cartridge with epoxy using a putty knife or a flat stick. Tap occasionally to release all trapped air.



Insert the extension tube of the caulk cartridge to the bottom of the hole. Slowly squeeze out the epoxy while you back out. Only fill holes about 3/4 full. The rebar will displace much of the epoxy.



Insert the dry, clean fiberglass rebar into the epoxy with a slow twisting motion. Do not touch the rebar with your fingers. Hold with paper towels or clean gloves.



Bring the logs/timber together slowly and support by any method for 24 hours.

Clean up tools, gloves, mess, etc. before the epoxy cures. Use a solvent (methylene chloride, acetone or a paint remover). Acetone and some solvents may be flammable or highly explosive. **Be careful!** Use only in well-ventilated areas. Do not use these solvents on your skin. DO NOT breathe vapors of the solvents. Wash up everything, including your hands, with soap and water at the end of the job.

After 24 hours at an average temperatue of 60° F or higher, remove supports and blend spliced surfaces together.

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**TECHNICAL DATA**

# STRUCTURAL EPOXY REPAIR 600

**ConServ 600 STRUCTURAL EPOXY REPAIR** is a ***high strength***, multipurpose adhesive designed for structural repair applications in wood. As it comes from the container it is suited to be used as a ***heavy duty*** structural consolidant. When mixed with washed sand and or fine aggregate it can be used to make structural repairs to load bearing members or connections. **ConServ 800** rebar can further add to the versatility and effectiveness of structural repairs using this material. Depending on the mixture, this epoxy can be poured, brushed, sprayed, puttied, cast or molded to the affected area. Typical applications include reinforcing and casting purlins, rafters, joists, beams, columns and sills.

## MIXING

Combine ***equal*** volumes of part A (epoxy resin) and part B (curing agent) and blend ***thoroughly*** for 3 minutes using a power mixer. When used as a mortar or epoxy concrete, combine washed sand/or fine aggregate at a ratio of 3 parts epoxy to 9 parts filler by volume. A thixotropic material such as fumed silica available from **ConServ** may be used as a ***thickener*** to prevent stratification/separation of fillers.

## CURE SCHEDULE

| | |
|---|---|
| Pot life | 100 cc mass - 24-36 hours @ 77° F. |
| Gel time | 100 cc mass - 4-6 hours @ 77° F. |
| Final cure | 2-5 days @ 77° F. (approx. 75% ultimate strength) |

***DO NOT*** use below 50° F.
***AVOID*** exposure to intense sunlight until final cure is complete.

## PROPERTIES

| | |
|---|---|
| Color | Amber |
| Viscosity | 500 cps @ 75° F. |
| Operating range | -20° F. to 85° F. |
| Mixing temp. range | 50° F. to 85° F. |
| Shelf life | 1 year in unopened original containers |

## STORAGE CONDITIONS

Store at room temperature. ***DO NOT*** allow to freeze. Keep containers closed.

## PACKAGING & YIELD

**ConServ 600** comes in 2 qt., 2 gal., and 10 gal. sets (A & B):

2 Quart set yields - approx. 0.07 cu ft without fillers
approx. 0.0135 - 0.40 cu ft with aggregate added
2 Gallon set yields - approx. 0.27 cu ft without fillers
approx. 0.54 to 1.6 cu ft with aggregate added
10 Gallon set yields - approx. 0.27 cu ft without fillers
approx. 2.7 - 8.0 cu ft with aggregate added

---

***ConServ Epoxy Repair 600***
**[ Instructions | Technical Data | Specifications | M.S.D.S. ]**

***All ConServ Products***
**[ Consolidant 100 | Patch 200 | Adhesive 500 | Repair 600 | Rebar 800 ]**
**[ Products | Instructions | Technical Data | Specifications | M.S.D.S. ]**

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INSTRUCTIONS

# STRUCTURAL EPOXY REPAIR 600

**ConServ 600 STRUCTURAL EPOXY REPAIR** is a ***high strength***, low viscosity, multipurpose epoxy system for casting, making ***structural*** repairs and for structural consolidation and stabilization. The systems versatility is enhanced during casting applications by using sand and or fine aggregate as an additive to ***stretch*** the epoxy while improving the performance.

**NOTICE:** Instructions, labels, technical data and MSDS sheets are ***color coded*** to ensure proper identification of the component and corresponding literature. ***Please*** take time to aquaint yourself with ***all*** available labels, instructions and precautions ***before*** mixing. Due to the variety of uses, methods of application and types of conditions, the results of this product cannot be anticipated. NO warranty is written or implied.

**WOOD PREPARATION** involves cleaning and keeping dry the surfaces being adhered to (less than 20% moisture content.) Epoxy must not be subjected to freezing temperatures within 48 hours of application.

**MIXING EPOXY** is ***easily*** done by combining ***equal*** volumes of component A with component B. Mix thoroughly for three minutes using a power mixer or by hand. When used for casting or as an epoxy/concrete, combine dry washed sand and or sand and fine aggregate at a ratio of 3 to 9 parts by volume. To facilitate handling, a thixotropic material such as fumed silica or calcium carbonate may be used as a thickener. These thickening agents will help to prevent stratification of the aggregate fillers during curing. Fumed silica is available on request from **ConServEpoxy** at a reasonable cost.

**APPLYING STRUCTURAL REPAIRS** should ***only*** be undertaken when the temperature ranges between 55° and 90° degrees F. Keep treated areas dry and out of direct sunlight before and during the procedure until the epoxy has set. When using **ConServ 600** in heavy duty consolidation applications it may be applied using a squirt/spray bottle and brush. Temporary molds or forms may be used to restrain epoxy from leaking out of affected areas and onto adjacent wood. As with the **ConServ 100**, drilling holes in and around the area to be stabilized can help to promote deep penetration. Reapply as required until maximum saturation has been attained. For surface repair of damaged areas after consolidation **ConServ 600**can be thickened and applied as a putty-like filler or left thin and poured and cast using a mold. Surface patches are best repaired with a putty like mixture applied using a putty knife or caulk tube (PN#911-1) and gun. These areas should be overfilled to a small extent to facilitate finishing later with conventional carpentry tools. However, in larger areas of missing or heavily damaged wood the original shape is better maintained by casting the part using a mold. This will require some planning but in the end will produce a repair or joint more closely resembling the original and requiring less trimming to finish. Plywood forms wrapped with poly film or faced with paste wax will work well. Potters clay or silicone caulk work well to seal small openings. The addition of sand and or aggregate becomes more cost effective as the molded area becomes larger, thus requiring, but also saving considerable amounts of epoxy.

**CURING ConServ 600** will vary depending on temperature. It is normal for considerable heat to be given off as the exothermic reaction of the two components occurs. Normal curing begins to set up in approximately one day at 70°-75° F. Allow 2-5 days for full curing to occur under these conditions.

**EPOXY STORAGE** should be done at room temperature. ***DO NOT*** let epoxy freeze. Use epoxy within 1 year.

**EPOXY SAFETY** is a function of common sense and good housekeeping. ***Wear*** rubber gloves, eye gear and old clothing. ***DO NOT*** get epoxy on your skin or clothes. Work with good ventilation.

---

***ConServ Epoxy Repair 600***
**[ Instructions | Technical Data | Specifications | M.S.D.S. ]**

***All ConServ Products***
**[ Consolidant 100 | Patch 200 | Adhesive 500 | Repair 600 | Rebar 800 ]**
**[ Products | Instructions | Technical Data | Specifications | M.S.D.S. ]**

**ConServEpoxy**
A division of
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7 Goodale Road, Newton, New Jersey 07860

**TECHNICAL DATA**

# FIBERGLAS REBAR 800

**ConServ 800 FIBERGLAS REBAR** is a structural spiral wrapped fiberglass reinforcing rod which is corrosion resistant, non-conductive and lightweight while it is one-fourth the weight of steel rebar. It more closely matches the characteristics of wood for modulus of elasticity, expansion and contraction, and condensation than does typical steel reinforcing rod.

## USES

For making ***load bearing*** connections, pinning and reinforcing wood and concrete elements. Typical applications include attachment and reinforcement of rafters, trusses, purlins, framing members, beams, sills, columns, logs, timbers, etc. It can be used for casting wood and concrete elements and to replace steel rebar in concrete slabs, forms and beams. Fiberglass rebar is most often used in conjunction with **ConServ 500 *Epoxy Adhesive*** for attaching the rebar to the elements and the elements to one another.

## PROPERTIES

Continuous drawn glass roving saturated with vinyl ester resin. A single strand, spiral wrapped around the exterior diameter to provide a spiral indentation in the bar providing maximum bonding and lock to epoxy, concrete or grout bedding.

| | |
|---|---|
| Bond shear (between rebar and epoxy) | 580 psi |
| Bond shear (between rebar and concrete) | 400 psi |
| Modulus of elasticity | $4x(10^6)$ |
| Single transverse shear | 5,000 psi |
| Tensile strength | 80,000 psi |
| Bonding stress | 72,000 psi |
| Thermal coeficient of expansion | $5.5x(10^6)$ in/in/°F. |
| Recommended allowable working stress | 20,000 psi |

## SIZE AVAILABILITY

All diameters are shipped in convenient 5 ft. lengths to facilitate UPS handling. Longer lengths are available by special order up to 20 ft.

| Diameter (in.) | Item # | Weight/100 LF (lbs.) |
|---|---|---|
| 1/4 | 800-14 | 5 |
| 3/8 | 800-38 | 10 |
| 1/2 | 800-12 | 17 |
| 3/4 | 800-34 | 38 |
| 1 | 800-01 | 66 |

**NOTE:** For specific assistance in determining which diameter is most appropriate for an application refer to the **Design Calculation Worksheet.**

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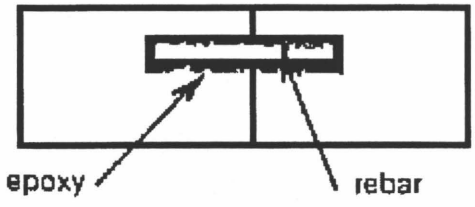
**WORKSHEET**
(page 1 of 4)

# DESIGN CALCULATION WORKSHEET
## ConServ 500 Epoxy & 800 Rebar

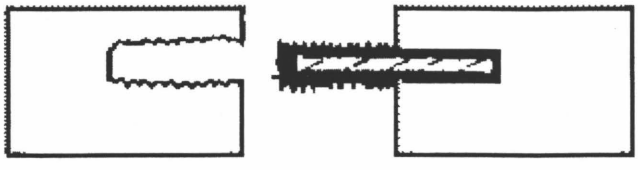
Most connections with fiberglass rebar and **ConServ Epoxy Adhesive 500** need to be designed for structural integrity to delermine the location, quantity, diameter, and length of rebar necessary to withstand the forces acting on them.

This calculation sheet shows a simplified method for the design of connections. Since numerous structural variations occur. It is strongly recommended that a structural engineer calculate or review the application and design before field work begins.

The weakest link in a simple splice connection is the linear shear of the wood. At some point the wood adjacent to the epoxy in one end of the connection will "pull out" at a force proportional to the shear values of the wood fibers. Refer to the figure below. Linear shear values for the epoxy and fiberglass rebar and their bond shear far exceed the shear value of the wood.

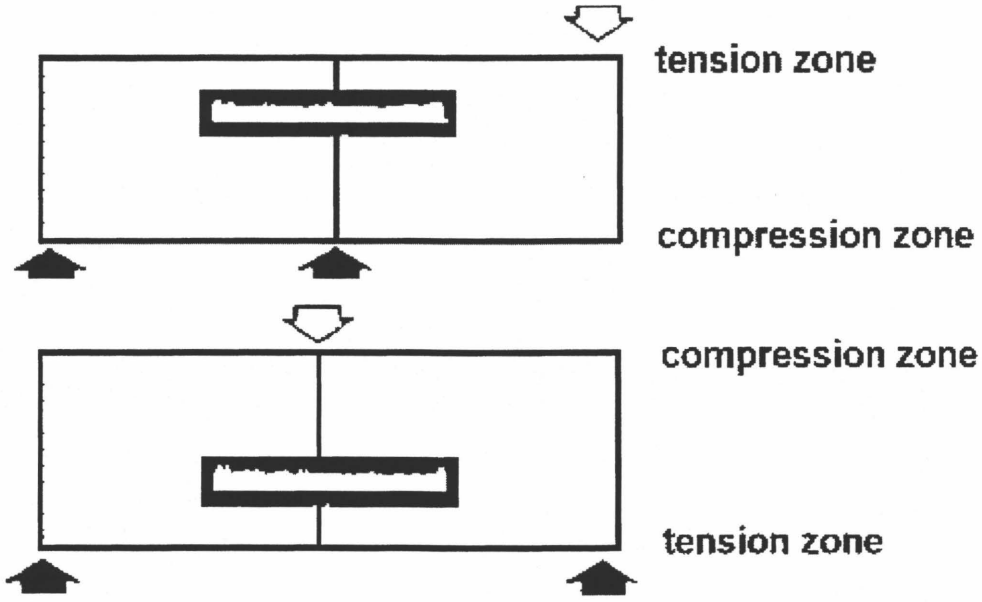



shear of wood 90.+/- psi (pine)
shear of epoxy 3000 psi
shear/bond strength of epoxy to rebar 580 psi
shear of fiberglass rebar 30,000 psi



Force = surface area of hole in inches x shear value of wood (90+/- psi)

The calculation process determines how many square inches of hole surface (epoxy surface area with the wood) is necessary to counteract the force on tile rebar. Variables to this design are the number of rebar, diameter of the holes and depth of the holes to provide the necessary surface area. Locations and positioning of the holes is an additional important factor and is based on the direction or application of the force. In all cases, the primary rebar must be located in the tension zone of the member since the connection is primarily in tension.

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***ConServ Fiberglass Rebar 800***

[ Technical Data | Specifications ]

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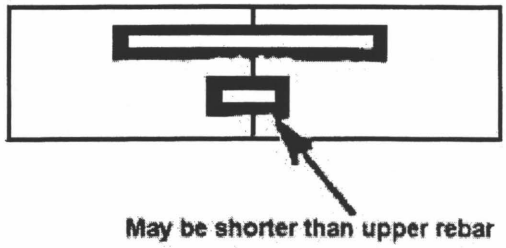
# WORKSHEET

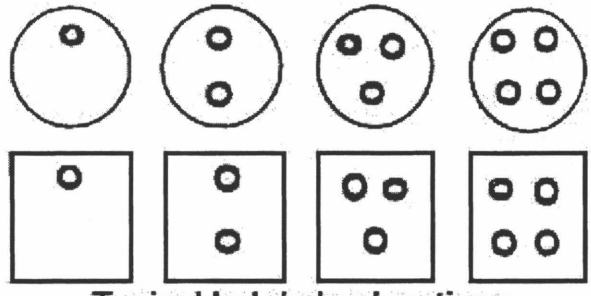


## DESIGN CALCULATION WORKSHEET

*(continued)*

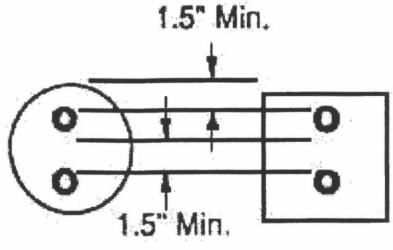
There are occasions when it is desirable to embed more than one rebar. Reasons may be to have members stand away from each other or to prevent vibration or movement between the spliced members.



**Typical hole/rebar locations**

The location of holes cannot be too close to the outer surface of the member, too close to each other, in major checks, or in pockets of decay. Typically, 1.5 inches of good wood around a hole will provide sufficient strength.




Individual judgement must be taken into consideration if any of the wood is partially decayed, extremely dry or weathered, or is not firm, good wood. This is true for all calculations. Should decay conditions exist, use a sufficient safety factor for that condition.

Begin the calculation by determining the known or assumed values which act on the connection.

[ *Previous Page* | *Next Page* ]

***ConServ Fiberglass Rebar 800***

[ Technical Data | Specifications ]

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# WORKSHEET



## DESIGN CALCULATION WORKSHEET
***(continued)***

**TABLE A** Rod sizes

| Cross Section Area of Rebar | | Diameter of Rebar |
|---|---|---|
| 0.44 sq in | = | 3/4" |
| 0.20 sq in | = | 1/2" |
| 0.11 sq in | = | 3/8" |

**TABLE B** Bond Strength - Epoxy to Rebar
Resin to rebar bond strength = 580 lbs/sq in constant

| Diameter of Rebar | | Bond Strength/ lineal inch |
|---|---|---|
| 3/4" | = | 1366 lbs |
| 1/2" | = | 911 lbs |
| 3/8" | = | 683 lbs |

*Bond strength must exceed that of Epoxy to Timber (see table below)*

**TABLE C** Bond Strength - Epoxy to Timber (for pine)
Epoxy to timber bond strength/inch = hole diameter x shear stress (pine)

| Rebar Size | Hole Size | x | pi | x | Shear for pine | = | Bond Strength/inch |
|---|---|---|---|---|---|---|---|
| 3/4" dia. | 1.125" dia. | x | 3.1416 | x | 90 psi | = | 318 lb/inch |
| 1/2" dia. | 0.875" dia. | x | 3.1416 | x | 90 psi | = | 247 lb/inch |
| 3/8" dia. | 0.750" dia. | x | 3.1415 | x | 90 psi | = | 212 lb/inch |

[ *Previous Page* | *Next Page* ]

***ConServ Fiberglass Rebar 800***
[ Technical Data | Specifications ]

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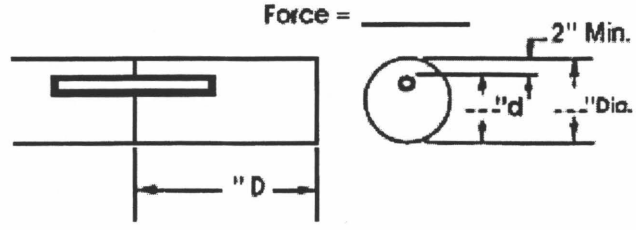
# WORKSHEET



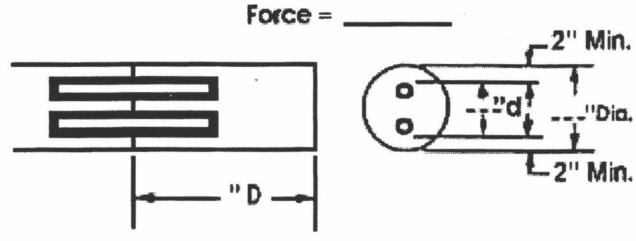
## DESIGN CALCULATION WORKSHEET

*(continued)*




**Bending Moment**

BM = Force x Distance (F x D)
BM = _____lb x_____inches
BM = _____inch lbs




**Force in Rebar**

F = BM/d
F = _____inch lbs /_____inches
F = _____lbs

**Required Diameter of Rebar**

Cross Section = force / shear stress of rods (30,000 lb/sq in)
Area of rebar = _____ /30,000
= _____ (See Table A)

_____ minimum diameter of rebar
_____ minimum number of rebar
*(Note: multiple rebar may be required if cross section area exceeds 0.44 sq in)*

**Bond Length**

BL is calculated = force in rebar / bond strength per inch in pine (Table C)

*SELECT ONE*

| | | | | | |
|---|---|---|---|---|---|
| BL | (3/4" rebar) | _____/318 | = | _____ | inch depth in wood (each end) |
| BL | (1/2" rebar) | _____/247 | = | _____ | inch depth in wood (each end) |
| BL | (3/8" rebar) | _____/212 | = | _____ | inch depth in wood (each end) |

**Summary**

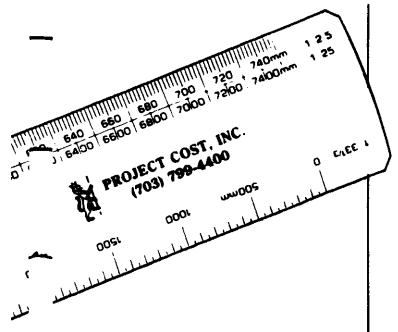
| Calculations | Item | Use on job |
|---|---|---|
| _____ | number of rebar | _____ |
| _____ | diameter of rebar | _____ |
| _____ | diameter of hole(s) | _____ |
| _____ | depth of hole(s) | _____ |
| _____ | length of rebar | _____ |

[ ***Previous Page*** ]

***ConServ Fiberglass Rebar 800***

# Appendix C

Estimate of Probable Construction Costs




**PROJECT COST, INC.**
8109 Hinson Farm Rd.
Suite 514
Alexandria
Virginia 22306

(703) 799-4400
FAX 799-4403

# ESTIMATE OF PROBABLE CONSTRUCTION COST

## MARY LOCHER CABIN
## ANTIETAM NATIONAL BATTLEFIELD
## SHARPSBURG, MARYLAND
## FINAL SUBMISSION

**prepared for**

**architrave p.c., architects**
**420 Tenth Street, S.E.**
**Washington, DC 20003**

**Project Cost, Inc.**
**Construction Consultants**
**8109 Hinson Farm Road, Suite 514**
**Alexandria, Virginia 22306**

**Dan Freeman**
**Tel. 703/799-4400**

**January 15, 2001**

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Cost Project Summary ..... 4

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## PROJECT PLANS AND SPECIFICATIONS

Schematic drawings received 7/18/00 and 1/10/01
Narrative received 1/10/01
Telecons with Architect through 1/10/01

## ESTIMATE PRICING

The pricing used in the estimate is based on the following general assumptions:

The project will be competitively bid by a minimum of three general contractors.

There will be no small business or disadvantaged business set-aside requirements.

The contractors will be required to pay prevailing wages.

The primary work area will be accessible by vehicle during construction.

## METHODOLOGY

This estimate is based upon measured quantities wherever information is provided in the plans or specifications or where reasonable scope assumptions can be made when the work is not covered in the plans and specifications.

The unit rates for material and labor are based upon historical records and/or discussion with contractors and suppliers. Where subcontractors execute the work, the rates include allowance for the subcontractors' field and home office overheads and profit.

The level of pricing reflects the probable construction costs obtainable in the Western Maryland area at the time the estimate was prepared. The estimate is a determination of fair market value for the construction work. It is not a prediction of the low bid. It assumes competitive bidding as stated above. Experience indicates that a smaller number of bidders or lack of competitive subcontractor bidding may result in less competitive bids.

As Project Cost, Inc. (PCI) has no control over the cost of labor, material and equipment, or the competitive conditions at the time of bid, this estimate is based on industry practice and professional experience and represents PCI's best judgement as a professional construction consultant familiar with the industry. However, PCI cannot and does not guarantee that the proposals, bids or construction cost will not vary from opinions of probable costs prepared by us.

Due to the highly specialized nature of the work, the relatively small number of contractors who are qualified to perform the work and the prominent location of the project, PCI would anticipate a much wider variance in contractor proposals than normal.

## SCOPE OF THE WORK

The project consists of architectural and structural modifications to an existing historic cabin comprising approximately 1,216 square feet.

## EXCLUSIONS

Utility work or charges except as noted

Design, inspection or construction management fees

Change order contingency allowance

Bidding contingency allowance

## ESCALATION ALLOWANCE

This allowance is intended to reflect two variable predictions of future conditions. First, inflation, which takes into account the market forces of supply and demand on the price level of construction materials and labor. Second, construction market conditions, which affect the level of profit and productivity that contractors use in the submission of their bids.

Escalation is highly speculative and equally unpredictable and therefore should be re-evaluated on a quarterly basis, or more frequently in an unstable market.

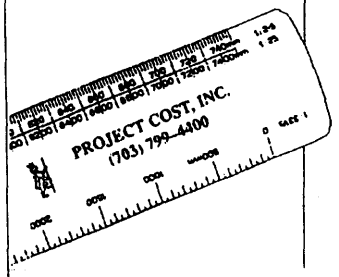
Escalation is included for this project at a rate of 4% per annum for twelve months, for a total of 4%.

## DESIGN CONTINGENCY

The purpose for the inclusion of a design contingency amount is to allow for the following:

> The cost of items which are not yet shown or detailed on the drawings and cannot be measured but are required to complete the design; the cost of details and variations from the norm, which the unit prices used in a preliminary estimate do not reflect; minor design changes or scope increase required as the design evolves.

The design contingency is not intended to cover the cost of extensive design changes or significant scope increases. A 20% design contingency is included for this project.




# Project Cost, Inc.

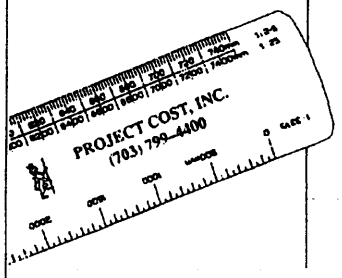
**Construction Consultants**

## Project Summary

Client: **ARCHITRAVE, P.C.**
Project: **MARY LOCHER CABIN**
Location: **SHARPSBURG, MARYLAND**

Date: **January 15, 2001**
Status: **FINAL SUBMISSION**
PCI No: **20151**

| | LABOR TOTAL | MATL / EQPT TOTAL | SUBCONTRACT TOTAL | DIRECT TOTAL | W / INDIRECT TOTAL |
|---|---|---|---|---|---|
| **SECTIONS** | | | | | |
| MANAGEMENT AS A RUIN | 5,061 | 8,490 | | 13,551 | 21,394 |
| STABILIZED BUILDING | 111,944 | 39,622 | 15,000 | 166,567 | 262,962 |
| RESTORED BUILDING | 192,517 | 83,856 | 12,000 | 288,372 | 455,257 |
| RESTORE & RECONSTRUCT | 300,702 | 167,515 | 16,000 | 484,216 | 764,440 |




# Project Cost, Inc.

**Construction Consultants**

## Individual Step Summary

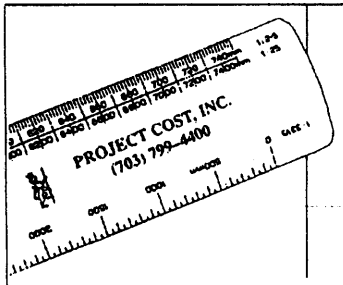
Section: **MANAGEMENT AS A RUIN**
Subdivison: **ALTERNATIVE 1**
Gross Area:

Client: **ARCHITRAVE, P.C.**
Project: **MARY LOCHER CABIN**
Location: **SHARPSBURG, MARYLAND**

Date: **January 15, 2001**
Status: **FINAL SUBMISSION**
PCI No: **20151**

| | | LABOR TOTAL | MATL / EQPT TOTAL | SUBCONTRACT TOTAL | DIRECT TOTAL | W / INDIRECT TOTAL |
|---|---|---|---|---|---|---|
| **MANAGEMENT AS A RUIN ALTERNATIVE 1** | | | | | | |
| M101A SITE REQUIREMENTS | | 1,468 | 2,782 | | 4,250 | 6,710 |
| M102A BUILDING REQUIREMENTS | | 3,593 | 5,708 | | 9,301 | 14,684 |
| SUBTOTAL | | 5,061 | 8,490 | | 13,551 | 21,394 |
| GENERAL CONDITIONS | 15.00% | | | | 2,033 | |
| PRIME CONTRACTOR OVERHEAD & FEE | 10.00% | | | | 3,117 | |
| DESIGN ALLOWANCE | 20.00% | | | | 1,870 | |
| AREA LOCATION FACTOR | 0.00% | | | | | |
| ESTIMATED PRESENT DAY COST | | | | | 20,570 | |
| ESCALATION ALLOWANCE | 4.00% | | | | 823 | |
| **TOTAL ESTIMATED COST** | | | | | **$21,393** | **21,394** |

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **M MANAGEMENT** | | | | | | | | | | | | | |
| **M10 BUILDING AS A RUIN** | | | | | | | | | | | | | |
| **M101A SITE REQUIREMENTS** | | | | | | | | | | | | | |
| 01800 | MISCELLANEOUS | | | | | | | | | | | | |
| 0100 | Signage | 4 | ea | 1 | 38.50 | 154 | 105 | 420 | | | 144 | 574 | 906 |
| | SUBTOTAL MISCELLANEOUS | | | | | 154 | | 420 | | | | 574 | 906 |
| 02100 | SITE PREPARATION | | | | | | | | | | | | |
| 0100 | Clean site | 1 | ls | 8 | 308 | 308 | 263 | 262 | | | 570 | 570 | 900 |
| | SUBTOTAL SITE PREPARATION | | | | | 308 | | 262 | | | | 570 | 900 |
| 02850 | FENCING | | | | | | | | | | | | |
| 0100 | Chain link fence, 8' high | 154 | lf | 0.15 | 5.78 | 890 | 12.61 | 1,942 | | | 18.39 | 2,832 | 4,471 |
| 0200 | Security gate, 3'x7' | 1 | ea | 3 | 116 | 116 | 158 | 158 | | | 274 | 274 | 433 |
| | SUBTOTAL FENCING | | | | | 1,006 | | 2,100 | | | | 3,106 | 4,904 |
| | **TOTAL M101A SITE REQUIREMENTS** | | | | | **1,468** | | **2,782** | | | | **4,250** | **6,710** |
| **M102A BUILDING REQUIREMENTS** | | | | | | | | | | | | | |
| 01800 | MISCELLANEOUS | | | | | | | | | | | | |
| 0100 | Pest control allowance | 1 | ls | 0 | | | 3,150 | 3,150 | | | 3,150 | 3,150 | 4,973 |
| | SUBTOTAL MISCELLANEOUS | | | | | | | 3,150 | | | | 3,150 | 4,973 |
| 02050 | DEMOLITION | | | | | | | | | | | | |
| 0200 | Clean and remove interior debris | 1 | ls | 4 | 154 | 154 | 158 | 158 | | | 312 | 312 | 493 |
| | SUBTOTAL DEMOLITION | | | | | 154 | | 158 | | | | 312 | 493 |




# Project Cost, Inc.

**Construction Consultants**

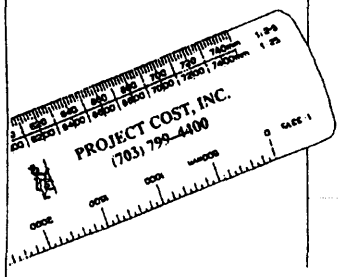
Section MANAGEMENT AS A RUIN
Subdivison: ALTERNATIVE 1

Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

## Cost Detail Report

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | | QUANTITY | | LABOR | | | MATL / EQPT | | SUBCONTRACT | | UNIT | TOTAL | WITH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UNITS | U/M | UNIT M/H | $/UNIT | TOTAL | UNIT | TOTAL | UNIT | TOTAL | COST | DIRECT | INDIRECT |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0300 | Plywood on floor/wall openings | 10 | ea | 2 | 77.00 | 770 | 47.26 | 473 | | | 124 | 1,243 | 1,962 |
| 0400 | Plywood on door/window openings | 9 | ea | 4 | 154 | 1,386 | 105 | 945 | | | 259 | 2,331 | 3,680 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 2,156 | | 1,418 | | | | 3,574 | 5,642 |
| 07600 | FLASHING AND SHEET METAL | | | | | | | | | | | | |
| 0600 | Repair metal roof | 1 | ls | 16 | 616 | 616 | 788 | 788 | | | 1,404 | 1,404 | 2,217 |
| 0700 | Bird screen on chimney | 1 | ea | 2 | 77.00 | 77 | 78.76 | 79 | | | 156 | 156 | 246 |
| | SUBTOTAL FLASHING AND SHEET METAL | | | | | 693 | | 867 | | | | 1,560 | 2,463 |
| 09900 | PAINTING | | | | | | | | | | | | |
| 0500 | Paint plywood panels | 608 | sf | 0.025 | .97 | 590 | .19 | 116 | | | 1.16 | 705 | 1,113 |
| | SUBTOTAL PAINTING | | | | | 590 | | 116 | | | | 705 | 1,113 |
| | **TOTAL M102A BUILDING REQUIREMENTS** | | | | | **3,593** | | **5,708** | | | | **9,301** | **14,684** |
| | **TOTAL M10 BUILDING AS A RUIN** | | | | | **5,061** | | **8,490** | | | | **13,551** | **21,394** |
| **TOTAL M MANAGEMENT** | | | | | | **5,061** | | **8,490** | | | | **13,551** | **21,394** |




# Project Cost, Inc.

**Construction Consultants**

# Individual Step Summary

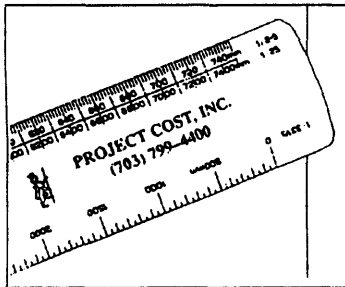
Section: **STABILIZED BUILDING**
Subdivison: **ALTERNATIVE 2**
Gross Area:

Client: **ARCHITRAVE, P.C.**
Project: **MARY LOCHER CABIN**
Location: **SHARPSBURG, MARYLAND**

Date: **January 15, 2001**
Status: **FINAL SUBMISSION**
PCI No: **20151**

| | | LABOR TOTAL | MATL / EQPT TOTAL | SUBCONTRACT TOTAL | DIRECT TOTAL | W / INDIRECT TOTAL |
|---|---|---|---|---|---|---|
| **STABILIZED BUILDING** | | | | | | |
| **ALTERNATIVE 2** | | | | | | |
| S101A SITE REQUIREMENTS | | 4,643 | 3,365 | 15,000 | 23,008 | 36,324 |
| S102A STRUCTURAL STABILIZATION, FIRST FLOOR | | 14,592 | 3,074 | | 17,665 | 27,887 |
| S102B STRUCTURAL STABILIZATION, SECOND FLOOR | | 20,168 | 4,573 | | 24,741 | 39,058 |
| S102C EXTERIOR WALL REPAIR, LOG HOUSE | | 65,935 | 25,002 | | 90,938 | 143,566 |
| S102D EXTERIOR WALL REPAIR, TIMBER HOUSE | | 6,607 | 3,608 | | 10,215 | 16,127 |
| SUBTOTAL | | 111,944 | 39,622 | 15,000 | 166,567 | 262,962 |
| GENERAL CONDITIONS | 15.00% | | | | 24,985 | |
| PRIME CONTRACTOR OVERHEAD & FEE | 10.00% | | | | 38,310 | |
| DESIGN ALLOWANCE | 20.00% | | | | 22,986 | |
| AREA LOCATION FACTOR | 0.00% | | | | | |
| ESTIMATED PRESENT DAY COST | | | | | 252,849 | |
| ESCALATION ALLOWANCE | 4.00% | | | | 10,114 | |
| **TOTAL ESTIMATED COST** | | | | | **$262,963** | **262,962** |

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S** | **STABILIZATION** | | | | | | | | | | | | |
| **S10** | **STABILIZED BUILDING** | | | | | | | | | | | | |
| **S101A** | **SITE REQUIREMENTS** | | | | | | | | | | | | |
| 01800 | MISCELLANEOUS | | | | | | | | | | | | |
| 0100 | Signage | 4 | ea | *1* | 38.50 | 154 | 105 | 420 | | | 144 | 574 | 906 |
| 0150 | Interpretative panel, allowance | 3 | ea | *0* | | | | | 4,000 | 12,000 | 4,000 | 12,000 | 18,945 |
| 0200 | Pest control allowance | 1 | ls | *0* | | | | | 3,000 | 3,000 | 3,000 | 3,000 | 4,736 |
| | SUBTOTAL MISCELLANEOUS | | | | | 154 | | 420 | | 15,000 | | 15,574 | 24,587 |
| 02100 | SITE PREPARATION | | | | | | | | | | | | |
| 0100 | Clean site | 1 | ls | *8* | 308 | 308 | 263 | 262 | | | 570 | 570 | 900 |
| | SUBTOTAL SITE PREPARATION | | | | | 308 | | 262 | | | | 570 | 900 |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | Plywood on floor/wall openings | 10 | ea | *2* | 77.00 | 770 | 47.26 | 473 | | | 124 | 1,243 | 1,962 |
| 0200 | Plywood on door/window openings | 10 | ea | *4* | 154 | 1,540 | 105 | 1,050 | | | 259 | 2,590 | 4,089 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 2,310 | | 1,523 | | | | 3,833 | 6,051 |
| 07600 | FLASHING AND SHEET METAL | | | | | | | | | | | | |
| 0100 | Repair metal roof | 1 | ls | *16* | 616 | 616 | 788 | 788 | | | 1,404 | 1,404 | 2,217 |
| | SUBTOTAL FLASHING AND SHEET METAL | | | | | 616 | | 788 | | | | 1,404 | 2,217 |
| 09900 | PAINTING | | | | | | | | | | | | |
| 0010 | Paint plywood panels | 608 | sf | *0.025* | .97 | 590 | .19 | 116 | | | 1.16 | 705 | 1,113 |
| 0020 | Paint metal roof | 950 | sf | *0.018* | .70 | 665 | .27 | 257 | | | .97 | 922 | 1,456 |
| | SUBTOTAL PAINTING | | | | | 1,255 | | 372 | | | | 1,627 | 2,569 |
| | **TOTAL S101A SITE REQUIREMENTS** | | | | | **4,643** | | **3,365** | | **15,000** | | **23,008** | **36,324** |




# Project Cost, Inc.

**Construction Consultants**

Section **STABILIZED BUILDING**

Subdivison: **ALTERNATIVE 2**

Client: **ARCHITRAVE, P.C.**

Project: **MARY LOCHER CABIN**

Location: **SHARPSBURG, MARYLAND**

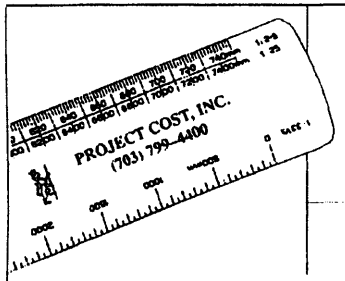
## Cost Detail Report

Date: **January 15, 2001**

Status: **FINAL SUBMISSION**

PCI No: **20151**

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S102A** | **STRUCTURAL STABILIZATION, FIRST FLOOR** | | | | | | | | | | | | |
| 01500 | TEMPORARY FACILITIES | | | | | | | | | | | | |
| 0100 | Inventory doors/windows | 1 | ls | 4 | 154 | 154 | 52.50 | 53 | | | 207 | 206 | 325 |
| | SUBTOTAL TEMPORARY FACILITIES | | | | | 154 | | 53 | | | | 206 | 325 |
| 02050 | DEMOLITION | | | | | | | | | | | | |
| 0100 | Remove flooring for concrete piers | 12 | ea | 4 | 154 | 1,848 | | | | | 154 | 1,848 | 2,917 |
| | SUBTOTAL DEMOLITION | | | | | 1,848 | | | | | | 1,848 | 2,917 |
| 03300 | CAST IN PLACE CONCRETE | | | | | | | | | | | | |
| 0100 | Hand excavate pier footing | 12 | ea | 8 | 308 | 3,696 | 26.26 | 315 | | | 334 | 4,011 | 6,332 |
| 0200 | Place concrete in footing | 12 | ea | 4 | 154 | 1,848 | 26.26 | 315 | | | 180 | 2,163 | 3,415 |
| 0300 | Set post anchors | 12 | ea | 0.5 | 19.26 | 231 | 15.76 | 189 | | | 35.02 | 420 | 663 |
| | SUBTOTAL CAST IN PLACE CONCRETE | | | | | 5,775 | | 819 | | | | 6,594 | 10,410 |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | 6"x6"x8' SSP post | 12 | ea | 2 | 77.00 | 924 | 42.00 | 504 | | | 119 | 1,428 | 2,254 |
| 0200 | 6"x6"x14' cross beam | 6 | ea | 4 | 154 | 924 | 73.50 | 441 | | | 228 | 1,365 | 2,155 |
| 0300 | Plywood gusset on beam | 24 | ea | 1 | 38.50 | 924 | 10.50 | 252 | | | 49.00 | 1,176 | 1,857 |
| 0400 | 2"x6"x8' cross brace | 24 | ea | 1 | 38.50 | 924 | 8.40 | 202 | | | 46.90 | 1,126 | 1,778 |
| 0500 | 6"x6"x18' joist support beam | 6 | ea | 6 | 231 | 1,386 | 94.50 | 567 | | | 326 | 1,953 | 3,083 |
| 0600 | Shim floor joist at beam | 45 | ea | 1 | 38.50 | 1,733 | 5.26 | 237 | | | 43.76 | 1,969 | 3,108 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 6,815 | | 2,202 | | | | 9,017 | 14,235 |
| | **TOTAL S102A STRUCTURAL STABILIZATION, FIRST FLOOR** | | | | | **14,592** | | **3,074** | | | | **17,665** | **27,887** |




# Project Cost, Inc.

**Construction Consultants**

Section **STABILIZED BUILDING**

Subdivison: **ALTERNATIVE 2**

Client: **ARCHITRAVE, P.C.**

Project: **MARY LOCHER CABIN**

Location: **SHARPSBURG, MARYLAND**

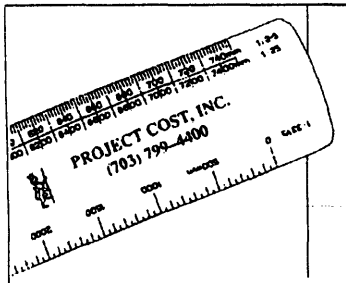
## Cost Detail Report

Date: **January 15, 2001**

Status: **FINAL SUBMISSION**

PCI No: **20151**

| | | QUANTITY | | LABOR | | | MATL / EQPT | | SUBCONTRACT | | UNIT | TOTAL | WITH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UNITS | U/M | UNIT M/H | $/UNIT | TOTAL | UNIT | TOTAL | UNIT | TOTAL | COST | DIRECT | INDIRECT |
| **S102B** | **STRUCTURAL STABILIZATION, SECOND FLOOR** | | | | | | | | | | | | |
| 01500 | TEMPORARY FACILITIES | | | | | | | | | | | | |
| 0100 | Lay 2"x6" sleepers on floor | 286 | lf | *0.015* | .58 | 166 | .48 | 137 | | | 1.06 | 303 | 478 |
| 0200 | Lay 1/2" OSB on sleepers | 525 | sf | *0.015* | .58 | 305 | .32 | 168 | | | .90 | 472 | 745 |
| | SUBTOTAL TEMPORARY FACILITIES | | | | | 470 | | 305 | | | | 775 | 1,223 |
| 02050 | DEMOLITION | | | | | | | | | | | | |
| 0100 | Remove debris from second floor | 525 | sf | *0.06* | 2.32 | 1,218 | .53 | 278 | | | 2.85 | 1,496 | 2,362 |
| 0200 | Cut holes in floor for post | 12 | ea | *1* | 38.50 | 462 | | | | | 38.50 | 462 | 729 |
| | SUBTOTAL DEMOLITION | | | | | 1,680 | | 278 | | | | 1,958 | 3,091 |




# Project Cost, Inc.

**Construction Consultants**

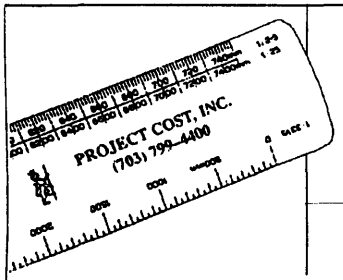
Section STABILIZED BUILDING
Subdivison: ALTERNATIVE 2

Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

## Cost Detail Report

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | | QUANTITY | | LABOR | | | MATL / EQPT | | SUBCONTRACT | | UNIT | TOTAL | WITH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UNITS | U/M | UNIT M/H | $/UNIT | TOTAL | UNIT | TOTAL | UNIT | TOTAL | COST | DIRECT | INDIRECT |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | 6"x6"x8' SSP post | 12 | ea | 2 | 77.00 | 924 | 42.00 | 504 | | | 119 | 1,428 | 2,254 |
| 0200 | 6"x6"x10' SSP cross beam | 6 | ea | 4 | 154 | 924 | 52.50 | 315 | | | 207 | 1,239 | 1,956 |
| 0300 | 6"x6"x14' SSP cross beam | 3 | ea | 4 | 154 | 462 | 73.50 | 221 | | | 228 | 682 | 1,077 |
| 0400 | Plywood gusset on cross beam | 36 | ea | 1 | 38.50 | 1,386 | 10.50 | 378 | | | 49.00 | 1,764 | 2,785 |
| 0500 | 2"x6'x8' diagonal bracing | 24 | ea | 1 | 38.50 | 924 | 8.40 | 202 | | | 46.90 | 1,126 | 1,778 |
| 0600 | 6"x6"x14' SSP rafter support | 1 | ea | 4 | 154 | 154 | 73.50 | 74 | | | 228 | 228 | 360 |
| 0700 | 6"x6"x14' rafter support | 3 | ea | 4 | 154 | 462 | 94.50 | 284 | | | 249 | 746 | 1,178 |
| 0800 | Shim rafters/attach gusset | 36 | ea | 2 | 77.00 | 2,772 | 7.36 | 265 | | | 84.36 | 3,037 | 4,795 |
| 0900 | Sister 2"x6"x10' to rafter | 36 | ea | 2 | 77.00 | 2,772 | 10.50 | 378 | | | 87.50 | 3,150 | 4,973 |
| 1000 | Sister 2"x4"x8' collar tie | 36 | ea | 1 | 38.50 | 1,386 | 5.26 | 189 | | | 43.76 | 1,575 | 2,486 |
| 1100 | Gusset at ridge connection | 36 | ea | 2 | 77.00 | 2,772 | 10.50 | 378 | | | 87.50 | 3,150 | 4,973 |
| 1200 | 4"x4" temp brace @ N.E. corner | 2 | ea | 4 | 154 | 308 | 8.40 | 17 | | | 162 | 325 | 513 |
| 1300 | Remove rotten corner post | 1 | ea | 8 | 308 | 308 | | | | | 308 | 308 | 486 |
| 1400 | Splice corner post | 1 | ea | 16 | 616 | 616 | 263 | 262 | | | 878 | 878 | 1,386 |
| 1500 | Remove end of girt plate | 2 | ea | 8 | 308 | 616 | | | | | 308 | 616 | 972 |
| 1600 | Splice end of girt plate | 2 | ea | 16 | 616 | 1,232 | 263 | 524 | | | 878 | 1,756 | 2,772 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 18,018 | | 3,989 | | | | 22,008 | 34,744 |
| | **TOTAL S102B STRUCTURAL STABILIZATION, SECOND FLOOR** | | | | | **20,168** | | **4,573** | | | | **24,741** | **39,058** |




# Project Cost, Inc.

**Construction Consultants**

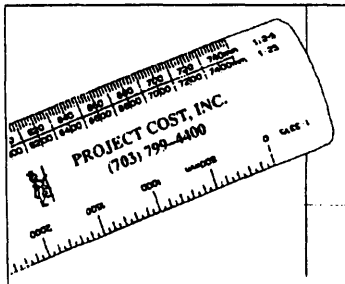
Section STABILIZED BUILDING
Subdivison: ALTERNATIVE 2

Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

## Cost Detail Report

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | | QUANTITY | | LABOR | | | MATL / EQPT | | SUBCONTRACT | | UNIT | TOTAL | WITH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UNITS | U/M | UNIT M/H | $/UNIT | TOTAL | UNIT | TOTAL | UNIT | TOTAL | COST | DIRECT | INDIRECT |
| **S102C** | **EXTERIOR WALL REPAIR, LOG HOUSE** | | | | | | | | | | | | |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | Remove damaged wall logs | 286 | lf | 1 | 38.50 | 11,011 | | | | | 38.50 | 11,011 | 17,383 |
| 0200 | Replace damaged wall logs | 286 | lf | 2 | 77.00 | 22,022 | 52.50 | 15,015 | | | 130 | 37,037 | 58,471 |
| 0300 | Repair wall logs | 234 | lf | 2 | 77.00 | 18,018 | 26.26 | 6,145 | | | 103 | 24,163 | 38,147 |
| 0700 | 4"x6"x8' wall brace | 10 | ea | 1 | 38.50 | 385 | 12.61 | 126 | | | 51.11 | 511 | 807 |
| 0800 | Cable and turnbuckle | 18 | ea | 4 | 154 | 2,772 | 52.50 | 945 | | | 207 | 3,717 | 5,868 |
| 0900 | Temporary shim logs | 35 | ea | 0.5 | 19.26 | 674 | 2.10 | 74 | | | 21.36 | 748 | 1,181 |
| 1000 | 4"x4"x18' plate at wall brace | 2 | ea | 2 | 77.00 | 154 | 15.76 | 32 | | | 92.76 | 186 | 294 |
| 1100 | Remove sill plate on log house | 28 | lf | 1 | 38.50 | 1,078 | 1.06 | 30 | | | 39.56 | 1,108 | 1,749 |
| 1200 | Replace sill plate at log house | 28 | lf | 2 | 77.00 | 2,156 | 52.50 | 1,470 | | | 130 | 3,626 | 5,724 |
| 1300 | Epoxy repair sill plate, log house | 28 | lf | 1 | 38.50 | 1,078 | 15.76 | 441 | | | 54.26 | 1,519 | 2,398 |
| 1400 | Restore chinking log joints | 684 | lf | 0.25 | 9.63 | 6,587 | 1.06 | 725 | | | 10.69 | 7,312 | 11,544 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 65,935 | | 25,002 | | | | 90,938 | 143,566 |
| | **TOTAL S102C EXTERIOR WALL REPAIR, LOG HOUSE** | | | | | **65,935** | | **25,002** | | | | **90,938** | **143,566** |
| **S102D** | **EXTERIOR WALL REPAIR, TIMBER HOUSE** | | | | | | | | | | | | |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | Remove damaged sill plate | 26 | lf | 2 | 77.00 | 2,002 | 1.06 | 28 | | | 78.06 | 2,030 | 3,205 |
| 0200 | Replace damaged sill plate | 26 | lf | 2 | 77.00 | 2,002 | 36.76 | 956 | | | 114 | 2,958 | 4,670 |
| 0300 | Remove damage B&B siding | 250 | sf | 0.07 | 2.70 | 675 | | | | | 2.70 | 675 | 1,066 |
| 0400 | Replace damaged B&B siding | 250 | sf | 0.2 | 7.71 | 1,928 | 10.50 | 2,625 | | | 18.21 | 4,552 | 7,186 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 6,607 | | 3,608 | | | | 10,215 | 16,127 |
| | **TOTAL S102D EXTERIOR WALL REPAIR, TIMBER HOUSE** | | | | | **6,607** | | **3,608** | | | | **10,215** | **16,127** |




# Project Cost, Inc.

**Construction Consultants**

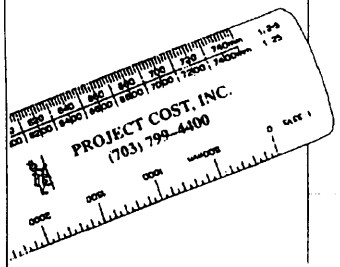
Section STABILIZED BUILDING
Subdivison: ALTERNATIVE 2

Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

## Cost Detail Report

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | QUANTITY UNITS U/M | LABOR UNIT M/H $/UNIT TOTAL | MATL / EQPT UNIT TOTAL | SUBCONTRACT UNIT TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|
| TOTAL S10 STABILIZED BUILDING | | 111,944 | 39,622 | 15,000 | | 166,567 | 262,962 |
| TOTAL S STABILIZATION | | 111,944 | 39,622 | 15,000 | | 166,567 | 262,962 |




# Project Cost, Inc.

**Construction Consultants**

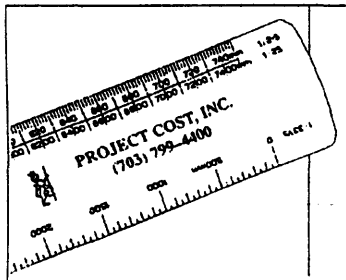
## Individual Step Summary

Section: **RESTORED BUILDING**
Subdivison: **ALTERNATIVE 3**
Gross Area:

Client: **ARCHITRAVE, P.C.**
Project: **MARY LOCHER CABIN**
Location: **SHARPSBURG, MARYLAND**

Date: **January 15, 2001**
Status: **FINAL SUBMISSION**
PCI No: **20151**

| | | LABOR TOTAL | MATL / EQPT TOTAL | SUBCONTRACT TOTAL | DIRECT TOTAL | W / INDIRECT TOTAL |
|---|---|---|---|---|---|---|
| **RESTORED BUILDING** | | | | | | |
| **ALTERNATIVE 3** | | | | | | |
| R200A SITE & GENERAL BUILDING REQUIREMENTS | | 462 | 315 | 12,000 | 12,776 | 20,170 |
| R201A STRUCTURAL STABILIZATION, FIRST FLOOR | | 16,575 | 3,253 | | 19,828 | 31,303 |
| R201B STRUCTURAL STABILIZATION, SECOND FLOOR | | 16,472 | 3,880 | | 20,352 | 32,129 |
| R201C EXTERIOR WALL RESTORATION | | 143,550 | 46,555 | | 190,105 | 300,123 |
| R201D WINDOW AND DOOR RESTORATION | | 6,141 | 12,159 | | 18,300 | 28,889 |
| R201E ROOF RESTORATION | | 9,316 | 9,295 | | 18,611 | 29,382 |
| R201F SUPPORTING UTILITIES | | | 8,400 | | 8,400 | 13,261 |
| SUBTOTAL | | 192,517 | 83,856 | 12,000 | 288,372 | 455,257 |
| GENERAL CONDITIONS | 15.00% | | | | 43,256 | |
| PRIME CONTRACTOR OVERHEAD & FEE | 10.00% | | | | 66,326 | |
| DESIGN ALLOWANCE | 20.00% | | | | 39,795 | |
| AREA LOCATION FACTOR | 0.00% | | | | | |
| ESTIMATED PRESENT DAY COST | | | | | 437,749 | |
| ESCALATION ALLOWANCE | 4.00% | | | | 17,510 | |
| **TOTAL ESTIMATED COST** | | | | | **$455,259** | **455,257** |




# Project Cost, Inc.

**Construction Consultants**

Section RESTORED BUILDING
Subdivison: ALTERNATIVE 3

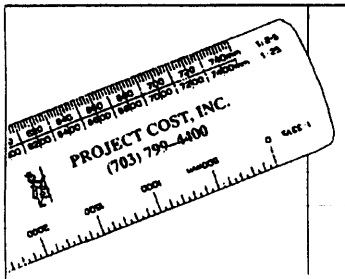
Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

# Cost Detail Report

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **R** | **RESTORATION** | | | | | | | | | | | | |
| **R20** | **RESTORED BUILDING** | | | | | | | | | | | | |
| **R200A** | **SITE & GENERAL BUILDING REQUIREMENTS** | | | | | | | | | | | | |
| 01500 | TEMPORARY FACILITIES | | | | | | | | | | | | |
| 0100 | Inventory doors/windows | 1 | ls | *4* | 154 | 154 | 52.50 | 53 | | | 207 | 206 | 325 |
| | SUBTOTAL TEMPORARY FACILITIES | | | | | 154 | | 53 | | | | 206 | 325 |
| 01800 | MISCELLANEOUS | | | | | | | | | | | | |
| 0100 | Interpretative panel, allowance | 3 | ea | *0* | | | | | 4,000 | 12,000 | 4,000 | 12,000 | 18,945 |
| | SUBTOTAL MISCELLANEOUS | | | | | | | | | 12,000 | | 12,000 | 18,945 |
| 02100 | SITE PREPARATION | | | | | | | | | | | | |
| 0100 | Clean site | 1 | ls | *8* | 308 | 308 | 263 | 262 | | | 570 | 570 | 900 |
| | SUBTOTAL SITE PREPARATION | | | | | 308 | | 262 | | | | 570 | 900 |
| | **TOTAL R200A SITE & GENERAL BUILDING REQUIREMENTS** | | | | | **462** | | **315** | | **12,000** | | **12,776** | **20,170** |
| **R201A** | **STRUCTURAL STABILIZATION, FIRST FLOOR** | | | | | | | | | | | | |
| 02050 | DEMOLITION | | | | | | | | | | | | |
| 0100 | Remove flooring for concrete piers | 12 | ea | *4* | 154 | 1,848 | | | | | 154 | 1,848 | 2,917 |
| | SUBTOTAL DEMOLITION | | | | | 1,848 | | | | | | 1,848 | 2,917 |
| 03300 | CAST IN PLACE CONCRETE | | | | | | | | | | | | |
| 0100 | Hand excavate pier footing | 12 | ea | *8* | 308 | 3,696 | 26.26 | 315 | | | 334 | 4,011 | 6,332 |
| 0200 | Place concrete in footing | 12 | ea | *4* | 154 | 1,848 | 26.26 | 315 | | | 180 | 2,163 | 3,415 |
| 0300 | Set post anchors | 12 | ea | *0.5* | 19.26 | 231 | 15.76 | 189 | | | 35.02 | 420 | 663 |
| | SUBTOTAL CAST IN PLACE CONCRETE | | | | | 5,775 | | 819 | | | | 6,594 | 10,410 |

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0300 | Plywood gusset on beam | 24 | ea | *1* | 38.50 | 924 | 10.50 | 252 | | | 49.00 | 1,176 | 1,857 |
| 0400 | 2"X6"x8' cross brace | 24 | ea | *1* | 38.50 | 924 | 8.40 | 202 | | | 46.90 | 1,126 | 1,778 |
| 0500 | 6"x6"x18' joist support beam | 6 | ea | *6* | 231 | 1,386 | 94.50 | 567 | | | 326 | 1,953 | 3,083 |
| 0600 | Shim floor joist at beam | 45 | ea | *1* | 38.50 | 1,733 | 5.26 | 237 | | | 43.76 | 1,969 | 3,108 |
| 0700 | 4"x6"x8' wall brace | 10 | ea | *1* | 38.50 | 385 | 12.61 | 126 | | | 51.11 | 511 | 807 |
| 0800 | Cable and turnbuckle | 18 | ea | *4* | 154 | 2,772 | 52.50 | 945 | | | 207 | 3,717 | 5,868 |
| 0900 | Temporary shim logs | 35 | ea | *0.5* | 19.26 | 674 | 2.10 | 74 | | | 21.36 | 748 | 1,181 |
| 1000 | 4"x4"x18' plate at wall brace | 2 | ea | *2* | 77.00 | 154 | 15.76 | 32 | | | 92.76 | 186 | 294 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 8,952 | | 2,433 | | | | 11,386 | 17,976 |
| | **TOTAL R201A STRUCTURAL STABILIZATION, FIRST FLOOR** | | | | | **16,575** | | **3,253** | | | | **19,828** | **31,303** |
| **R201B** | **STRUCTURAL STABILIZATION, SECOND FLOOR** | | | | | | | | | | | | |
| 01500 | TEMPORARY FACILITIES | | | | | | | | | | | | |
| 0100 | Lay 2"x6" sleepers on floor | 286 | lf | *0.015* | .58 | 166 | .48 | 137 | | | 1.06 | 303 | 478 |
| 0200 | Lay 1/2" OSB on sleepers | 525 | sf | *0.015* | .58 | 305 | .32 | 168 | | | .90 | 472 | 745 |
| | SUBTOTAL TEMPORARY FACILITIES | | | | | 470 | | 305 | | | | 775 | 1,223 |
| 02050 | DEMOLITION | | | | | | | | | | | | |
| 0100 | Remove debris from second floor | 525 | sf | *0.06* | 2.32 | 1,218 | .53 | 278 | | | 2.85 | 1,496 | 2,362 |
| 0200 | Cut holes in floor for post | 12 | ea | *1* | 38.50 | 462 | | | | | 38.50 | 462 | 729 |
| | SUBTOTAL DEMOLITION | | | | | 1,680 | | 278 | | | | 1,958 | 3,091 |




# Project Cost, Inc.

**Construction Consultants**

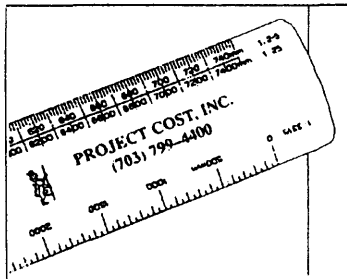
Section RESTORED BUILDING
Subdivison: ALTERNATIVE 3

Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

## Cost Detail Report

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | 6"x6"x8' SSP post | 12 | ea | 2 | 77.00 | 924 | 42.00 | 504 | | | 119 | 1,428 | 2,254 |
| 0300 | 6"x6"x14' SSP cross beam | 3 | ea | 4 | 154 | 462 | 73.50 | 221 | | | 228 | 682 | 1,077 |
| 0400 | Plywood gusset on cross beam | 36 | ea | 1 | 38.50 | 1,386 | 10.50 | 378 | | | 49.00 | 1,764 | 2,785 |
| 0500 | 2"x6"X8' diagonal bracing | 24 | ea | 1 | 38.50 | 924 | 8.40 | 202 | | | 46.90 | 1,126 | 1,778 |
| 0600 | 6"x6"x14' SSP rafter support | 1 | ea | 4 | 154 | 154 | 73.50 | 74 | | | 228 | 228 | 360 |
| 0700 | 6"x6"x14' rafter support | 3 | ea | 4 | 154 | 462 | 94.50 | 284 | | | 249 | 746 | 1,178 |
| 0800 | Shim rafters/attach gusset | 36 | ea | 2 | 77.00 | 2,772 | 7.36 | 265 | | | 84.36 | 3,037 | 4,795 |
| 1000 | Sister 2"x4"x8' collar tie | 36 | ea | 1 | 38.50 | 1,386 | 5.26 | 189 | | | 43.76 | 1,575 | 2,486 |
| 1100 | Gusset at ridge connection | 36 | ea | 2 | 77.00 | 2,772 | 10.50 | 378 | | | 87.50 | 3,150 | 4,973 |
| 1200 | 4"x4" temp brace @ N.E. corner | 2 | ea | 4 | 154 | 308 | 8.40 | 17 | | | 162 | 325 | 513 |
| 1300 | Remove rotten corner post | 1 | ea | 8 | 308 | 308 | | | | | 308 | 308 | 486 |
| 1400 | Splice corner post | 1 | ea | 16 | 616 | 616 | 263 | 262 | | | 878 | 878 | 1,386 |
| 1500 | Remove end of girt plate | 2 | ea | 8 | 308 | 616 | | | | | 308 | 616 | 972 |
| 1600 | Splice end of girt plate | 2 | ea | 16 | 616 | 1,232 | 263 | 524 | | | 878 | 1,756 | 2,772 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 14,322 | | 3,296 | | | | 17,619 | 27,815 |
| | **TOTAL R201B STRUCTURAL STABILIZATION, SECOND FLOOR** | | | | | **16,472** | | **3,880** | | | | **20,352** | **32,129** |
| **R201C** | **EXTERIOR WALL RESTORATION** | | | | | | | | | | | | |
| 04100 | MORTAR AND MASONRY GROUT | | | | | | | | | | | | |
| 0100 | Restore chinking, log joints | 684 | lf | 0.25 | 9.63 | 6,587 | 1.06 | 725 | | | 10.69 | 7,312 | 11,544 |
| 0200 | Restore daubing, log joints | 684 | lf | 1.25 | 48.13 | 32,921 | 3.68 | 2,517 | | | 51.81 | 35,438 | 55,947 |
| | SUBTOTAL MORTAR AND MASONRY GROUT | | | | | 39,508 | | 3,242 | | | | 42,750 | 67,491 |




# Project Cost, Inc.

**Construction Consultants**

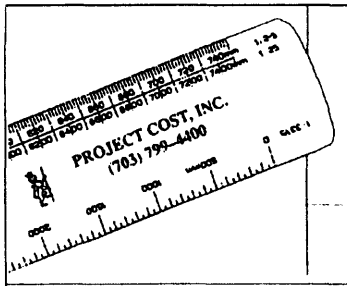
Section RESTORED BUILDING
Subdivison: ALTERNATIVE 3

Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

## Cost Detail Report

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 04500 | MASONRY RESTORATION AND CLEANING | | | | | | | | | | | | |
| 0100 | Restore masonry chimney | 1 | ls | *32* | 1,232 | 1,232 | 525 | 525 | | | 1,757 | 1,757 | 2,774 |
| 0200 | Repair mortar joints, foundation | 1 | ls | *24* | 924 | 924 | 1,050 | 1,050 | | | 1,974 | 1,974 | 3,116 |
| | SUBTOTAL MASONRY RESTORATION AND CLEANING | | | | | 2,156 | | 1,575 | | | | 3,731 | 5,890 |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | 6"x6"x8' SSP post | 12 | ea | *2* | 77.00 | 924 | 42.00 | 504 | | | 119 | 1,428 | 2,254 |
| 0100 | Remove damaged sill plate | 26 | lf | *2* | 77.00 | 2,002 | 1.06 | 28 | | | 78.06 | 2,030 | 3,205 |
| 0100 | Remove damaged wall logs | 286 | lf | *1* | 38.50 | 11,011 | | | | | 38.50 | 11,011 | 17,383 |
| 0200 | Replace damaged wall logs | 286 | lf | *2* | 77.00 | 22,022 | 52.50 | 15,015 | | | 130 | 37,037 | 58,471 |
| 0200 | Replace damaged sill plate | 26 | lf | *2* | 77.00 | 2,002 | 36.76 | 956 | | | 114 | 2,958 | 4,670 |
| 0200 | 6"x6"x10' SSP cross beam | 6 | ea | *4* | 154 | 924 | 52.50 | 315 | | | 207 | 1,239 | 1,956 |
| 0200 | 6"x6"x14' cross beam | 6 | ea | *4* | 154 | 924 | 73.50 | 441 | | | 228 | 1,365 | 2,155 |
| 0300 | Remove damage B&B siding | 250 | sf | *0.07* | 2.70 | 675 | | | | | 2.70 | 675 | 1,066 |
| 0300 | Repair wall logs | 234 | lf | *2* | 77.00 | 18,018 | 26.26 | 6,145 | | | 103 | 24,163 | 38,147 |
| 0300 | Additional detail for log restoration | 286 | lf | *2* | 77.00 | 22,022 | 26.26 | 7,510 | | | 103 | 29,532 | 46,623 |
| 0400 | Rebuild porch over doorway | 1 | ls | *80* | 3,080 | 3,080 | 3,675 | 3,675 | | | 6,755 | 6,755 | 10,664 |
| 0400 | Replace damaged B&B siding | 250 | sf | *0.2* | 7.71 | 1,928 | 10.50 | 2,625 | | | 18.21 | 4,552 | 7,186 |
| 0400 | Additional detail using epoxy for restoration | 234 | lf | *1* | 38.50 | 9,009 | 10.50 | 2,457 | | | 49.00 | 11,466 | 18,102 |
| 1100 | Remove sill plate on log house | 36 | lf | *1* | 38.50 | 1,386 | 1.06 | 38 | | | 39.56 | 1,424 | 2,248 |
| 1200 | Replace sill plate at log house | 28 | lf | *2* | 77.00 | 2,156 | 52.50 | 1,470 | | | 130 | 3,626 | 5,724 |
| 1300 | Epoxy repair sill plate, log house | 28 | lf | *1* | 38.50 | 1,078 | 15.76 | 441 | | | 54.26 | 1,519 | 2,398 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 99,161 | | 41,620 | | | | 140,780 | 222,252 |




# Project Cost, Inc.

**Construction Consultants**

Section RESTORED BUILDING
Subdivison: ALTERNATIVE 3

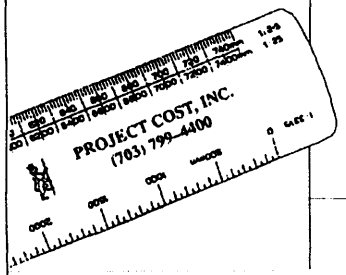
Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

## Cost Detail Report

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 09990 | MISCELLANEOUS FINISHES | | | | | | | | | | | | |
| 0100 | Whitewash logs & chinking, 2 coats | 600 | sf | *0.06* | 2.32 | 1,392 | .10 | 60 | | | 2.42 | 1,452 | 2,292 |
| 0200 | Whitewash B&B siding | 575 | sf | *0.06* | 2.32 | 1,334 | .10 | 58 | | | 2.42 | 1,392 | 2,198 |
| | SUBTOTAL MISCELLANEOUS FINISHES | | | | | 2,726 | | 118 | | | | 2,844 | 4,490 |
| | **TOTAL R201C EXTERIOR WALL RESTORATION** | | | | | **143,550** | | **46,555** | | | | **190,105** | **300,123** |
| **R201D** | **WINDOW AND DOOR RESTORATION** | | | | | | | | | | | | |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | Restored/replaced windows | 59 | sf | *1* | 38.50 | 2,272 | 105 | 6,195 | | | 144 | 8,466 | 13,365 |
| 0200 | Restored/replaced doors | 55 | sf | *1* | 38.50 | 2,118 | 84.00 | 4,620 | | | 123 | 6,738 | 10,637 |
| 0300 | Storm windows | 59 | sf | *0.5* | 19.26 | 1,136 | 21.00 | 1,239 | | | 40.26 | 2,375 | 3,749 |
| 0400 | Paint windows and doors | 1 | ls | *16* | 616 | 616 | 105 | 105 | | | 721 | 721 | 1,138 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 6,141 | | 12,159 | | | | 18,300 | 28,889 |
| | **TOTAL R201D WINDOW AND DOOR RESTORATION** | | | | | **6,141** | | **12,159** | | | | **18,300** | **28,889** |
| **R201E** | **ROOF RESTORATION** | | | | | | | | | | | | |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | Purlins/lath for shingles | 1,825 | lf | *0.06* | 2.32 | 4,234 | 3.16 | 5,767 | | | 5.48 | 10,001 | 15,789 |
| 0900 | Sister 2"x6"x10' to rafter | 36 | ea | *2* | 77.00 | 2,772 | 10.50 | 378 | | | 87.50 | 3,150 | 4,973 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 7,006 | | 6,145 | | | | 13,151 | 20,762 |
| 07300 | SHINGLES AND ROOFING TILES | | | | | | | | | | | | |
| 0100 | Cedar shingle roof | 10 | sq | *6* | 231 | 2,310 | 315 | 3,150 | | | 546 | 5,460 | 8,620 |
| | SUBTOTAL SHINGLES AND ROOFING TILES | | | | | 2,310 | | 3,150 | | | | 5,460 | 8,620 |
| | **TOTAL R201E ROOF RESTORATION** | | | | | **9,316** | | **9,295** | | | | **18,611** | **29,382** |

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **R201F** | **SUPPORTING UTILITIES** | | | | | | | | | | | | |
| 02780 | POWER AND COMMUNICATIONS | | | | | | | | | | | | |
| 0100 | Underground power and telephone | 300 | lf | *0* | | | 10.50 | 3,150 | | | 10.50 | 3,150 | 4,973 |
| | SUBTOTAL POWER AND COMMUNICATIONS | | | | | | | 3,150 | | | | 3,150 | 4,973 |
| 15570 | AIR HANDLING EQUIPMENT | | | | | | | | | | | | |
| 0100 | Exhaust fan in chimney | 1 | ls | *0* | | | 2,100 | 2,100 | | | 2,100 | 2,100 | 3,315 |
| | SUBTOTAL AIR HANDLING EQUIPMENT | | | | | | | 2,100 | | | | 2,100 | 3,315 |
| 16330 | PANELBOARDS | | | | | | | | | | | | |
| 0200 | Panel and receptacle | 1 | ls | *0* | | | 2,100 | 2,100 | | | 2,100 | 2,100 | 3,315 |
| | SUBTOTAL PANELBOARDS | | | | | | | 2,100 | | | | 2,100 | 3,315 |
| 16625 | SECURITY SYSTEM | | | | | | | | | | | | |
| 0100 | Smoke detector/security panel | 1 | ls | *0* | | | 1,050 | 1,050 | | | 1,050 | 1,050 | 1,658 |
| | SUBTOTAL SECURITY SYSTEM | | | | | | | 1,050 | | | | 1,050 | 1,658 |
| | **TOTAL R201F SUPPORTING UTILITIES** | | | | | | | **8,400** | | | | **8,400** | **13,261** |
| | **TOTAL R20 RESTORED BUILDING** | | | | | **192,517** | | **83,856** | | **12,000** | | **288,372** | **455,257** |
| **TOTAL R RESTORATION** | | | | | | **192,517** | | **83,856** | | **12,000** | | **288,372** | **455,257** |




# Project Cost, Inc.

**Construction Consultants**

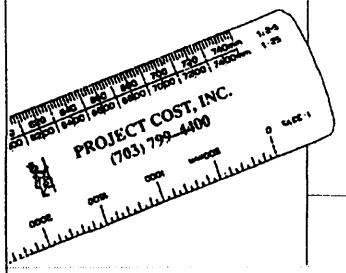
Section: RESTORE & RECONSTRUCT
Subdivison: ALTERNATIVE 4
Gross Area:

Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

## Individual Step Summary

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | LABOR TOTAL | MATL / EQPT TOTAL | SUBCONTRACT TOTAL | DIRECT TOTAL | W / INDIRECT TOTAL |
|---|---|---|---|---|---|
| **RESTORE & RECONSTRUCT ALTERNATIVE 4** | | | | | |
| D200A SITE & GENERAL BUILDING REQUIREMENTS | 308 | 262 | 16,000 | 16,570 | 26,160 |
| D201A STRUCTURAL STABILIZATION, FIRST FLOOR | 18,423 | 4,198 | | 22,621 | 35,712 |
| D201B STRUCTURAL STABILIZATION, SECOND FLOOR | 20,168 | 4,573 | | 24,741 | 39,058 |
| D201C EXTERIOR WALL RESTORATION | 111,422 | 21,450 | | 132,872 | 209,768 |
| D201D EXTERIOR WALL REPAIR, LOG HOUSE | 55,671 | 23,109 | | 78,780 | 124,371 |
| D201E EXTERIOR WALL REPAIR, TIMBER HOUSE | 6,607 | 3,608 | | 10,215 | 16,127 |
| D201F WINDOW AND DOOR RESTORATION | 6,084 | 12,212 | | 18,294 | 28,880 |
| D201G ROOF RESTORATION | 7,779 | 9,063 | | 16,843 | 26,591 |
| D201H SUPPORTING UTILITIES | | 8,400 | | 8,400 | 13,261 |
| D201K RECONSTRUCT MISSING ADDITION | 74,240 | 80,640 | | 154,880 | 244,512 |
| Subtotal forward | 300,702 | 167,515 | 16,000 | 484,216 | 764,440 |




# Project Cost, Inc.

**Construction Consultants**

## Individual Step Summary

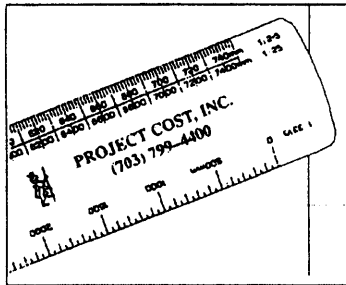
Section: **RESTORE & RECONSTRUCT**
Subdivison: **ALTERNATIVE 4**
Gross Area:

Client: **ARCHITRAVE, P.C.**
Project: **MARY LOCHER CABIN**
Location: **SHARPSBURG, MARYLAND**

Date: **January 15, 2001**
Status: **FINAL SUBMISSION**
PCI No: **20151**

| | | LABOR TOTAL | MATL / EQPT TOTAL | SUBCONTRACT TOTAL | DIRECT TOTAL | W / INDIRECT TOTAL |
|---|---|---|---|---|---|---|
| Subtotal brought forward | | 300,702 | 167,515 | 16,000 | 484,216 | 764,440 |
| SUBTOTAL | | 300,702 | 167,515 | 16,000 | 484,216 | 764,440 |
| GENERAL CONDITIONS | 15.00% | | | | 72,632 | |
| PRIME CONTRACTOR OVERHEAD & FEE | 10.00% | | | | 111,370 | |
| DESIGN ALLOWANCE | 20.00% | | | | 66,822 | |
| AREA LOCATION FACTOR | 0.00% | | | | | |
| ESTIMATED PRESENT DAY COST | | | | | 735,040 | |
| ESCALATION ALLOWANCE | 4.00% | | | | 29,402 | |
| **TOTAL ESTIMATED COST** | | | | | **$764,441** | **764,440** |

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **D** | **RECONSTRUCTION** | | | | | | | | | | | | |
| **D20** | **RECONSTRUCT AND RESTORATION** | | | | | | | | | | | | |
| **D200A** | **SITE & GENERAL BUILDING REQUIREMENTS** | | | | | | | | | | | | |
| 01800 | MISCELLANEOUS | | | | | | | | | | | | |
| 0100 | Interpretative panel, allowance | 4 | ea | *0* | | | | | 4,000 | 16,000 | 4,000 | 16,000 | 25,260 |
| | SUBTOTAL MISCELLANEOUS | | | | | | | | | 16,000 | | 16,000 | 25,260 |
| 02100 | SITE PREPARATION | | | | | | | | | | | | |
| 0100 | Clean site | 1 | ls | *8* | 308 | 308 | 263 | 262 | | | 570 | 570 | 900 |
| | SUBTOTAL SITE PREPARATION | | | | | 308 | | 262 | | | | 570 | 900 |
| | **TOTAL D200A SITE & GENERAL BUILDING REQUIREMENTS** | | | | | **308** | | **262** | | **16,000** | | **16,570** | **26,160** |
| **D201A** | **STRUCTURAL STABILIZATION, FIRST FLOOR** | | | | | | | | | | | | |
| 02050 | DEMOLITION | | | | | | | | | | | | |
| 0100 | Remove flooring for concrete piers | 12 | ea | *4* | 154 | 1,848 | | | | | 154 | 1,848 | 2,917 |
| | SUBTOTAL DEMOLITION | | | | | 1,848 | | | | | | 1,848 | 2,917 |
| 03300 | CAST IN PLACE CONCRETE | | | | | | | | | | | | |
| 0100 | Hand excavate pier footing | 12 | ea | *8* | 308 | 3,696 | 26.26 | 315 | | | 334 | 4,011 | 6,332 |
| 0200 | Place concrete in footing | 12 | ea | *4* | 154 | 1,848 | 26.26 | 315 | | | 180 | 2,163 | 3,415 |
| 0300 | Set post anchors | 12 | ea | *0.5* | 19.26 | 231 | 15.76 | 189 | | | 35.02 | 420 | 663 |
| | SUBTOTAL CAST IN PLACE CONCRETE | | | | | 5,775 | | 819 | | | | 6,594 | 10,410 |




# Project Cost, Inc.

**Construction Consultants**

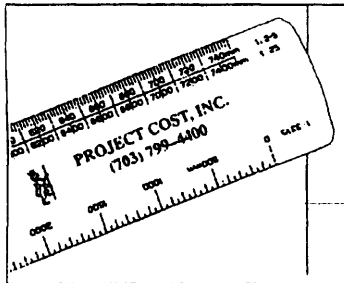
Section RESTORE & RECONSTRUCT
Subdivison: ALTERNATIVE 4

Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

## Cost Detail Report

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | 6"x6"x8' SSP post | 12 | ea | 2 | 77.00 | 924 | 42.00 | 504 | | | 119 | 1,428 | 2,254 |
| 0200 | 6"x6"x14' cross beam | 6 | ea | 4 | 154 | 924 | 73.50 | 441 | | | 228 | 1,365 | 2,155 |
| 0300 | Plywood gusset on beam | 24 | ea | 1 | 38.50 | 924 | 10.50 | 252 | | | 49.00 | 1,176 | 1,857 |
| 0400 | 2"X6"x8' cross brace | 24 | ea | 1 | 38.50 | 924 | 8.40 | 202 | | | 46.90 | 1,126 | 1,778 |
| 0500 | 6"x6"x18' joist support beam | 6 | ea | 6 | 231 | 1,386 | 94.50 | 567 | | | 326 | 1,953 | 3,083 |
| 0600 | Shim floor joist at beam | 45 | ea | 1 | 38.50 | 1,733 | 5.26 | 237 | | | 43.76 | 1,969 | 3,108 |
| 0700 | 4"x6"x8' wall brace | 10 | ea | 1 | 38.50 | 385 | 12.61 | 126 | | | 51.11 | 511 | 807 |
| 0800 | Cable and turnbuckle | 18 | ea | 4 | 154 | 2,772 | 52.50 | 945 | | | 207 | 3,717 | 5,868 |
| 0900 | Temporary shim logs | 35 | ea | 0.5 | 19.26 | 674 | 2.10 | 74 | | | 21.36 | 748 | 1,181 |
| 1000 | 4"x4"x18' plate at wall brace | 2 | ea | 2 | 77.00 | 154 | 15.76 | 32 | | | 92.76 | 186 | 294 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 10,800 | | 3,378 | | | | 14,179 | 22,385 |
| | **TOTAL D201A STRUCTURAL STABILIZATION, FIRST FLOOR** | | | | | **18,423** | | **4,198** | | | | **22,621** | **35,712** |
| **D201B** | **STRUCTURAL STABILIZATION, SECOND FLOOR** | | | | | | | | | | | | |
| 01500 | TEMPORARY FACILITIES | | | | | | | | | | | | |
| 0100 | Lay 2"x6" sleepers on floor | 286 | lf | 0.015 | .58 | 166 | .48 | 137 | | | 1.06 | 303 | 478 |
| 0200 | Lay 1/2" OSB on sleepers | 525 | sf | 0.015 | .58 | 305 | .32 | 168 | | | .90 | 472 | 745 |
| | SUBTOTAL TEMPORARY FACILITIES | | | | | 470 | | 305 | | | | 775 | 1,223 |
| 02050 | DEMOLITION | | | | | | | | | | | | |
| 0100 | Remove debris from second floor | 525 | sf | 0.06 | 2.32 | 1,218 | .53 | 278 | | | 2.85 | 1,496 | 2,362 |
| 0200 | Cut holes in floor for post | 12 | ea | 1 | 38.50 | 462 | | | | | 38.50 | 462 | 729 |
| | SUBTOTAL DEMOLITION | | | | | 1,680 | | 278 | | | | 1,958 | 3,091 |




# Project Cost, Inc.

**Construction Consultants**

Section RESTORE & RECONSTRUCT
Subdivison: ALTERNATIVE 4

Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

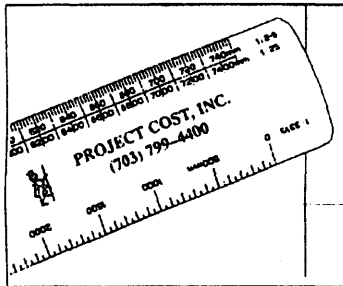
## Cost Detail Report

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | 6"x6"x8' SSP post | 12 | ea | 2 | 77.00 | 924 | 42.00 | 504 | | | 119 | 1,428 | 2,254 |
| 0200 | 6"x6"x10' SSP cross beam | 6 | ea | 4 | 154 | 924 | 52.50 | 315 | | | 207 | 1,239 | 1,956 |
| 0300 | 6"x6"x14' SSP cross beam | 3 | ea | 4 | 154 | 462 | 73.50 | 221 | | | 228 | 682 | 1,077 |
| 0400 | Plywood gusset on cross beam | 36 | ea | 1 | 38.50 | 1,386 | 10.50 | 378 | | | 49.00 | 1,764 | 2,785 |
| 0500 | 2"x6"X8' diagonal bracing | 24 | ea | 1 | 38.50 | 924 | 8.40 | 202 | | | 46.90 | 1,126 | 1,778 |
| 0600 | 6"x6"x14' SSP rafter support | 1 | ea | 4 | 154 | 154 | 73.50 | 74 | | | 228 | 228 | 360 |
| 0700 | 6"x6"x14' rafter support | 3 | ea | 4 | 154 | 462 | 94.50 | 284 | | | 249 | 746 | 1,178 |
| 0800 | Shim rafters/attach gusset | 36 | ea | 2 | 77.00 | 2,772 | 7.36 | 265 | | | 84.36 | 3,037 | 4,795 |
| 0900 | Sister 2"x6"x10' to rafter | 36 | ea | 2 | 77.00 | 2,772 | 10.50 | 378 | | | 87.50 | 3,150 | 4,973 |
| 1000 | Sister 2"x4"x8' collar tie | 36 | ea | 1 | 38.50 | 1,386 | 5.26 | 189 | | | 43.76 | 1,575 | 2,486 |
| 1100 | Gusset at ridge connection | 36 | ea | 2 | 77.00 | 2,772 | 10.50 | 378 | | | 87.50 | 3,150 | 4,973 |
| 1200 | 4"x4" temp brace @ N.E. corner | 2 | ea | 4 | 154 | 308 | 8.40 | 17 | | | 162 | 325 | 513 |
| 1300 | Remove rotten corner post | 1 | ea | 8 | 308 | 308 | | | | | 308 | 308 | 486 |
| 1400 | Splice corner post | 1 | ea | 16 | 616 | 616 | 263 | 262 | | | 878 | 878 | 1,386 |
| 1500 | Remove end of girt plate | 2 | ea | 8 | 308 | 616 | | | | | 308 | 616 | 972 |
| 1600 | Splice end of girt plate | 2 | ea | 16 | 616 | 1,232 | 263 | 524 | | | 878 | 1,756 | 2,772 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 18,018 | | 3,989 | | | | 22,008 | 34,744 |
| | **TOTAL D201B STRUCTURAL STABILIZATION, SECOND FLOOR** | | | | | **20,168** | | **4,573** | | | | **24,741** | **39,058** |

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **D201C** | **EXTERIOR WALL RESTORATION** | | | | | | | | | | | | |
| 04100 | MORTAR AND MASONRY GROUT | | | | | | | | | | | | |
| 0100 | Restore chinking, log joints | 684 | lf | *1.5* | 57.76 | 39,508 | 5.26 | 3,598 | | | 63.02 | 43,106 | 68,052 |
| 0200 | Restore daubing, log joints | 684 | lf | *1.25* | 48.13 | 32,921 | 3.68 | 2,517 | | | 51.81 | 35,438 | 55,947 |
| | SUBTOTAL MORTAR AND MASONRY GROUT | | | | | 72,429 | | 6,115 | | | | 78,544 | 123,999 |
| 04500 | MASONRY RESTORATION AND CLEANING | | | | | | | | | | | | |
| 0100 | Restore masonry chimney | 1 | ls | *32* | 1,232 | 1,232 | 525 | 525 | | | 1,757 | 1,757 | 2,774 |
| 0200 | Repair mortar joints, foundation | 1 | ls | *24* | 924 | 924 | 1,050 | 1,050 | | | 1,974 | 1,974 | 3,116 |
| | SUBTOTAL MASONRY RESTORATION AND CLEANING | | | | | 2,156 | | 1,575 | | | | 3,731 | 5,890 |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0300 | Additional detail for log restoration | 286 | lf | *2* | 77.00 | 22,022 | 26.26 | 7,510 | | | 103 | 29,532 | 46,623 |
| 0400 | Additional detail using epoxy for restoration | 234 | lf | *1* | 38.50 | 9,009 | 10.50 | 2,457 | | | 49.00 | 11,466 | 18,102 |
| 0400 | Rebuild porch over doorway | 1 | ls | *80* | 3,080 | 3,080 | 3,675 | 3,675 | | | 6,755 | 6,755 | 10,664 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 34,111 | | 13,642 | | | | 47,753 | 75,389 |
| 09990 | MISCELLANEOUS FINISHES | | | | | | | | | | | | |
| 0100 | Whitewash log chinking, 2 coats | 600 | sf | *0.06* | 2.32 | 1,392 | .10 | 60 | | | 2.42 | 1,452 | 2,292 |
| 0200 | Whitewash B&B siding, 2 coats | 575 | sf | *0.06* | 2.32 | 1,334 | .10 | 58 | | | 2.42 | 1,392 | 2,198 |
| | SUBTOTAL MISCELLANEOUS FINISHES | | | | | 2,726 | | 118 | | | | 2,844 | 4,490 |
| | **TOTAL D201C EXTERIOR WALL RESTORATION** | | | | | **111,422** | | **21,450** | | | | **132,872** | **209,768** |

| | | QUANTITY | | LABOR | | | MATL / EQPT | | SUBCONTRACT | | UNIT | TOTAL | WITH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UNITS | U/M | UNIT M/H | $/UNIT | TOTAL | UNIT | TOTAL | UNIT | TOTAL | COST | DIRECT | INDIRECT |
| **D201D** | **EXTERIOR WALL REPAIR, LOG HOUSE** | | | | | | | | | | | | |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | Remove damaged wall logs | 286 | lf | 1 | 38.50 | 11,011 | | | | | 38.50 | 11,011 | 17,383 |
| 0200 | Replace damaged wall logs | 286 | lf | 2 | 77.00 | 22,022 | 52.50 | 15,015 | | | 130 | 37,037 | 58,471 |
| 0300 | Repair wall logs | 234 | lf | 2 | 77.00 | 18,018 | 26.26 | 6,145 | | | 103 | 24,163 | 38,147 |
| 1100 | Remove sill plate on log house | 36 | lf | 1 | 38.50 | 1,386 | 1.06 | 38 | | | 39.56 | 1,424 | 2,248 |
| 1200 | Replace sill plate at log house | 28 | lf | 2 | 77.00 | 2,156 | 52.50 | 1,470 | | | 130 | 3,626 | 5,724 |
| 1300 | Epoxy repair sill plate, log house | 28 | lf | 1 | 38.50 | 1,078 | 15.76 | 441 | | | 54.26 | 1,519 | 2,398 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 55,671 | | 23,109 | | | | 78,780 | 124,371 |
| | **TOTAL D201D EXTERIOR WALL REPAIR, LOG HOUSE** | | | | | **55,671** | | **23,109** | | | | **78,780** | **124,371** |
| **D201E** | **EXTERIOR WALL REPAIR, TIMBER HOUSE** | | | | | | | | | | | | |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | Remove damaged sill plate | 26 | lf | 2 | 77.00 | 2,002 | 1.06 | 28 | | | 78.06 | 2,030 | 3,205 |
| 0200 | Replace damaged sill plate | 26 | lf | 2 | 77.00 | 2,002 | 36.76 | 956 | | | 114 | 2,958 | 4,670 |
| 0300 | Remove damage B&B siding | 250 | sf | 0.07 | 2.70 | 675 | | | | | 2.70 | 675 | 1,066 |
| 0400 | Replace damaged B&B siding | 250 | sf | 0.2 | 7.71 | 1,928 | 10.50 | 2,625 | | | 18.21 | 4,552 | 7,186 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 6,607 | | 3,608 | | | | 10,215 | 16,127 |
| | **TOTAL D201E EXTERIOR WALL REPAIR, TIMBER HOUSE** | | | | | **6,607** | | **3,608** | | | | **10,215** | **16,127** |
| **D201F** | **WINDOW AND DOOR RESTORATION** | | | | | | | | | | | | |
| 01500 | TEMPORARY FACILITIES | | | | | | | | | | | | |
| 0100 | Inventory doors/windows | 1 | ls | 4 | 154 | 154 | 52.50 | 53 | | | 207 | 206 | 325 |
| | SUBTOTAL TEMPORARY FACILITIES | | | | | 154 | | 53 | | | | 206 | 325 |




# Project Cost, Inc.

**Construction Consultants**

Section RESTORE & RECONSTRUCT
Subdivison: ALTERNATIVE 4

Client: ARCHITRAVE, P.C.
Project: MARY LOCHER CABIN
Location: SHARPSBURG, MARYLAND

## Cost Detail Report

Date: January 15, 2001
Status: FINAL SUBMISSION
PCI No: 20151

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | Restored/replaced windows | 59 | sf | *1* | 38.50 | 2,272 | 105 | 6,195 | | | 144 | 8,466 | 13,365 |
| 0200 | Restored/replaced doors | 55 | sf | *0.9* | 34.66 | 1,906 | 84.00 | 4,620 | | | 119 | 6,526 | 10,303 |
| 0300 | Storm windows | 59 | sf | *0.5* | 19.26 | 1,136 | 21.00 | 1,239 | | | 40.26 | 2,375 | 3,749 |
| 0400 | Paint windows and doors | 1 | ls | *16* | 616 | 616 | 105 | 105 | | | 721 | 721 | 1,138 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 5,930 | | 12,159 | | | | 18,088 | 28,555 |
| | **TOTAL D201F WINDOW AND DOOR RESTORATION** | | | | | **6,084** | | **12,212** | | | | **18,294** | **28,880** |
| **D201G** | **ROOF RESTORATION** | | | | | | | | | | | | |
| 02050 | DEMOLITION | | | | | | | | | | | | |
| 0100 | Remove existing tin roof and framing | 915 | sf | *0.035* | 1.35 | 1,235 | .16 | 146 | | | 1.51 | 1,382 | 2,182 |
| | SUBTOTAL DEMOLITION | | | | | 1,235 | | 146 | | | | 1,382 | 2,182 |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | Purlins for shingles | 1,825 | lf | *0.06* | 2.32 | 4,234 | 3.16 | 5,767 | | | 5.48 | 10,001 | 15,789 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 4,234 | | 5,767 | | | | 10,001 | 15,789 |
| 07300 | SHINGLES AND ROOFING TILES | | | | | | | | | | | | |
| 0100 | Cedar shingle roof | 10 | sq | *6* | 231 | 2,310 | 315 | 3,150 | | | 546 | 5,460 | 8,620 |
| | SUBTOTAL SHINGLES AND ROOFING TILES | | | | | 2,310 | | 3,150 | | | | 5,460 | 8,620 |
| | **TOTAL D201G ROOF RESTORATION** | | | | | **7,779** | | **9,063** | | | | **16,843** | **26,591** |
| **D201H** | **SUPPORTING UTILITIES** | | | | | | | | | | | | |
| 02780 | POWER AND COMMUNICATIONS | | | | | | | | | | | | |
| 0100 | Underground power and telephone | 300 | lf | *0* | | | 10.50 | 3,150 | | | 10.50 | 3,150 | 4,973 |
| | SUBTOTAL POWER AND COMMUNICATIONS | | | | | | | 3,150 | | | | 3,150 | 4,973 |

| | | QUANTITY UNITS | U/M | LABOR UNIT M/H | $/UNIT | TOTAL | MATL / EQPT UNIT | TOTAL | SUBCONTRACT UNIT | TOTAL | UNIT COST | TOTAL DIRECT | WITH INDIRECT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15570 | AIR HANDLING EQUIPMENT | | | | | | | | | | | | |
| 0100 | Exhaust fan in chimney | 1 | ls | 0 | | | 2,100 | 2,100 | | | 2,100 | 2,100 | 3,315 |
| | SUBTOTAL AIR HANDLING EQUIPMENT | | | | | | | 2,100 | | | | 2,100 | 3,315 |
| 16330 | PANELBOARDS | | | | | | | | | | | | |
| 0200 | Panel and receptacle | 1 | ls | 0 | | | 2,100 | 2,100 | | | 2,100 | 2,100 | 3,315 |
| | SUBTOTAL PANELBOARDS | | | | | | | 2,100 | | | | 2,100 | 3,315 |
| 16625 | SECURITY SYSTEM | | | | | | | | | | | | |
| 0100 | Smoke detector/security panel | 1 | ls | 0 | | | 1,050 | 1,050 | | | 1,050 | 1,050 | 1,658 |
| | SUBTOTAL SECURITY SYSTEM | | | | | | | 1,050 | | | | 1,050 | 1,658 |
| | **TOTAL D201H SUPPORTING UTILITIES** | | | | | | | **8,400** | | | | **8,400** | **13,261** |
| **D201K** | **RECONSTRUCT MISSING ADDITION** | | | | | | | | | | | | |
| 06100 | ROUGH CARPENTRY | | | | | | | | | | | | |
| 0100 | Allowance to reconstruct addition | 640 | sf | 3 | 116 | 74,240 | 126 | 80,640 | | | 242 | 154,880 | 244,512 |
| | SUBTOTAL ROUGH CARPENTRY | | | | | 74,240 | | 80,640 | | | | 154,880 | 244,512 |
| | **TOTAL D201K RECONSTRUCT MISSING ADDITION** | | | | | **74,240** | | **80,640** | | | | **154,880** | **244,512** |
| | **TOTAL D20 RECONSTRUCT AND RESTORATION** | | | | | **300,702** | | **167,515** | | **16,000** | | **484,216** | **764,440** |
| **TOTAL D RECONSTRUCTION** | | | | | | **300,702** | | **167,515** | | **16,000** | | **484,216** | **764,440** |

# Appendix D

Minutes and Field Reports
30% and Final Draft Submittal Comments
A-E Response to Comments
Log of Artifacts and Material Samples

architrave p.c., architects

420 10th street s.e.
washington, d.c. 20003

(202) 544-1640
(202) 544-1642 fax

**meeting notes**

Reference: Mary Locher Cabin
Physical History and Condition Assessment
Antietam National Battlefield
Sharpsburg, Maryland
Contract No. 1443 CX3000-94-034
Work Order 12
architrave no. 9402.16

Meeting date: 21 July 1999

Present: Susan Trail, Assistant Superintendent, Antietam
Richard H. Brown, Sr., Project Manager, Antietam
Robert J. Kapsch, National Capital Region
Douglas Bond, McMullan Associations
Judith M. Capen, architect, **architrave p.c. architects**

Prepared by: Judith M. Capen AIA

Kick-off meeting held at Mule Barn, Antietam Cemetery

1. We discussed logistical questions for the Mary Locher Cabin (pronounced Lucker):

- gate access: one key is provided now, another will be provided later
- our park contact person will be:
- Craig Cartwright, Maintenance
- (301) 432-6035
- we can request ladders and/or other logistical support from him
- because of the condition of the structure, we should exercise all care when visiting it, including wearing of hard hats and hard toe shoes
- we will remove nothing from the site nor remove materials from the structure without clearing such with Richard Brown and receiving his permission. We will bag and label any artifacts so removed and turn them over to the park at the completion of this investigation.

judith m. capen principal
robert a. weinstein principal

2. While it is understood that this work order as negotiated does not include an architectural historian, Judith Capen mentioned the potential need to investigate some historical context for the cabin including patterns of settlement in the area, especially as related to the old National Pike. Richard Brown and Susan Trail said that a local architectural historian in Hagerstown, Paula Reed, is well qualified in this area.

3. Richard Brown, Doug Bond, and Judith Capen then went to the Mary Locher Cabin and agreed that before any significant documentation or investigation work can be done, the NPS will need to provide temporary stabilization of the structure. At this time the floor structure for the second floor/loft does not appear safe nor does one wall of the log structure. We took basic measurements to allow McMullan to do a layout of an interior structural support framework to avoid window and door openings and be placed in such a way as to allow the subsequent measuring and investigations.

4. We found and removed, with Richard Brown's agreement, some artifacts and pieces of building fabric (such as plaster with paint surface, chinking, a floor board) for potential testing.

5. McMullan site visit report attached.

If you have any additions or corrections to these meeting notes, please notify us within seven days. Otherwise we will assume that these notes are correct and accepted and will proceed accordingly.

p.c. all present

Subj: **Mary Locher Cabin 30% HRS review comments**
Date: 4/5/00 2:57:18 PM Eastern Daylight Time
Fr: Robert_Kapsch@nps.gov (Robert Kapsch)
To: ARCH1TRAV@AOL.COM
CC: Rebecca_Stevens@nps.gov (Rebecca Stevens), Gary_Scott@nps.gov (Gary Scott), Don_Filsoof@nps.gov (Don Filsoof), Darwina_Neal@nps.gov (Darwina Neal), Richard_H_Brown@nps.gov (Richard H Brown)

File: marylo~1.doc (23040 bytes)
DL Time (53333 bps): < 1 minute

See attachments

At Architrave p.c. architects.

Please see the comments received from the Park and incorporate them into the report.

As a follow-up to Sudley Post Office - would you give me a call on the structural analysis aspects of Mary Locher Cabin. I don't think we can use traditional structural analysis on these structures and certainly never intended that should be the case.

Robert J. Kapsch
202-619-6370

---

Author: Susan Trail at NP--NCR
Date: 03/28/2000 3:37 PM
Priority: Normal
To: Richard H Brown at NP--NCR
CC: John Howard at NP--NCR
Subject: Locher Report Review
---------- Message Contents ----------

Richard:

Here are my comments regarding the 30% draft submission for the Mary Locher Cabin Physical History and Condition Assessment:

The recently completed NR update should be included under the reviewed documents. It also would be a much better source for the Historical Background and Context section than those that are cited presently, as Paula Reed did considerable research on the property and provided a broad contextual background as well.

p. 9: Where did "Buffalo trails" come from - more likely Indian trails. "European intrusion" might be more neutral than "white man." Same with "Indian attacks" rather than "Indian outrages."

p. 10: Chapline did not donate land for Antietam Iron Works, but actually formed a partnership with others. "Antietam Furnace" is inaccurate, as a furnace by that name was constructed in the early 1760s in Mt. Aetna. Railroad reached what point in 1842? The canal did not become obsolete - major transport route for coal into the late 19th century. What strategic crossroads is being referred to?

Again, the sources used for this chronology are not very good, and have a lot of inaccurate information in them.

p. 10: Charleston, Virginia is now Charles Town, West Virginia. It should be "Forge Furnace," not "Frye Furnace."

p. 15: What is the source for the statement that tripartite farmhouses can still be found in western Maryland? I'm not aware of any of these having been built in this area. Where is the evidence for the Locher Cabin being a "linear 2 room plan containing a Stube and a Kuche", since it consisted of three sections built at three separate times? Where does the statement about qualities of construction and materials becoming more rustic through time come from?

p. 17: In her research, Paula Reed found that early timber frame buildings were uncommon in this area.

p. 19: Chain of title is incomplete; complete one is found in updated NR nomination.

p. 38: Given the early date of the building, and the fact that it was constructed by a tenant, it is highly likely that it was a permanent dwelling. It is not an unusual form or size for an early dwelling in this area.

p. 39: Again, it almost certainly was already a permanent dwelling, even before the addition was added.

p. 40: Roofing material for this section appeared to be shingles, not shakes.

The structural analysis and treatment recommendations appear to be well done and well thought out.

Susan

---------- Headers ----------

Return-Path: <Robert_Kapsch@nps.gov>
Received: from rly-yd03.mx.aol.com (rly-yd03.mail.aol.com [172.18.150.3]) by air-yd03.mail.aol.com (v70.20) with ESMTP; Wed, 05 Apr 2000 14:57:18 -0400
Received: from mailer.itc.nps.gov (mailer.itc.nps.gov [165.83.216.27]) by rly-yd03.mx.aol.com (v71.10) with ESMTP; Wed, 05 Apr 2000 14:57:01 -0400
Received: from ccmail.itd.nps.gov (bluto.itd.nps.gov [165.83.216.134])
by mailer.itc.nps.gov (8.9.3/8.8.7) with ESMTP id PAA11131
for <ARCH1TRAV@AOL.COM>; Wed, 5 Apr 2000 15:02:35 -0400
Received: from ccMail by ccmail.itd.nps.gov
(IMA Internet Exchange 3.13) id 001F540E; Wed, 5 Apr 2000 14:55:36 -0400
Mime-Version: 1.0
Date: Wed, 5 Apr 2000 13:40:32 -0400
Message-ID: <001F540E.C22031@nps.gov>
From: Robert_Kapsch@nps.gov (Robert Kapsch)
To: ARCH1TRAV@AOL.COM
Cc: Rebecca_Stevens@nps.gov (Rebecca Stevens), Gary_Scott@nps.gov (Gary Scott),
Don_Filsoof@nps.gov (Don Filsoof), Darwina_Neal@nps.gov (Darwina Neal),
Richard_H_Brown@nps.gov (Richard H Brown)
Subject: Mary Locher Cabin 30% HRS review comments
Content-Type: multipart/mixed; boundary="IMA.Boundary.6390694590"

April 3, 2000

Robert A. Weinstein
Architrave P.C., Architects
420 10th Street S.E.
Washington, D. C. 20003

Mary Locher Cabin
Historic Structure Report: Physical History and Condition Assessment
Antietam National Battlefield
Sharpsburg, Maryland
Contract #1443 CX3000-94-034, Work order no. 12
Architrave # 9402.16

Robert,

The Mary Locher Cabin HSR and Physical History and Condition Assessment 30% review submission comments are as follows. Assistance Superintendent Susan Trail comments, received by cc:mail, are attached.

Jane Custer, Cultural Resources Specialist, comments:

1. The Mary Locher Cabin Physical History and Condition Assessment looks good. Nice photos in the document. The alternatives and treatment options outlined the work pretty well.
2. For phase I on page 134 it is stated that the plaster and lathe debris in that upper area needs removed prior to providing support for the floor joists. Not sure how it would be safe enough for anyone to remove that stuff without some type of support first.

3. The word "PARK" needs to be drop off the ending of Antietam National Battlefield throughout the document.

4. Williamsport Preservation Training Center, Page 122 last sentence, should be Historic Preservation Training Center.

5. It's a useable document for the structure.

Richard H. Brown, Project Manager, Comments:
1. I would like to reiterate the dropping of the word "PARK".

2. Page 43:
Throughout the document the vaulted stone structure is called a root cellar, not a spring or milk house as is used on this page.

3. Pages 95 and 97:
Photographs include east and west elevations. Are the north and south elevation to be included in the 50% or 90% report?

4. Page 129:
The use of epoxy is recommended strongly as a repairs material throughout alternative 2 and alternative 3. Page 111 stated; There is too much damage to the existing logs to make epoxy injection feasible for anything but a few conditions. Clarification is needed.

5. Appendices:
Material list for lime:
Add the following local vendor;
Steffy and Findlay, Inc
177 S. Burhans Blvd
Hagerstown, Md, 21740
Phone: 1-301-733-16

6. A well prepared report. The Development History of Building and Site indicates extensive research and provide much needed information. Treatment and Use section has potential of being a very workable document.

Richard H. Brown
Project Manager
Antietam and Monocacy National Battlefields

cc:

John Howard, ANTI
Rebecca L. Stevens, NCR
Robert Kapsch, NCR
Susan Trail, ANTI
Jane Custer, ANTI

10 August 2000

Reference: Mary Locher Cabin
Physical History and Condition Assessment
Antietam National Battlefield
Contract #1443 CX3000-94-034, Work order no. 12
architrave no. 9402.16

## Final Draft Submittal
## A-E Response to NPS HSR 30% Submittal Comments

Following is the response to the 30% Draft Submittal Review Comments and where to find the reference in the Final Draft Report:

Notes: Richard Brown supplied copies of the Final Draft National Register Nomination Update for Antietam Battlefield (by Paula S. Reed and Associates, Inc.) and the Final Draft Phase II Archeological Report (by Bruce B. Sterling and Elise H. Manning-Sterling) for our review and use in preparing this Final Draft Submittal. Ted Alexander has recently acquired a 1940s era color photograph of the Mary Locher Cabin reproduced in a magazine article of the same vintage. He is in the process of having this reproduced for inclusion in the final printing of this report. A place is reserved for the photograph in the final draft.

Comments by Susan Trail (ANTI):

- Most comments (30% pgs 9, 10) relate to the accuracy of the Historical Background and Context Section – Regional Development. All specific references were corrected to read as represented in the National Register Nomination Update, as suggested (FD pgs. 4-13). The NR Nomination was also used in refining the background information on local development of log houses (FD pgs. 14-18) and local development of timber frame dwellings (FD pgs. 19-21). These changes addressed 30% comments pgs. 15, 17. The Chain of Title was revised with additional information (FD pgs. 22-23). This study was very helpful, especially in establishing an historical framework from which to reasonably evaluate the physical development of the Mary Locher Cabin found in final draft on pages 36-47 (30% comments pgs. 38, 39, 40).
- The discussion of patterns in Southern Germanic and British dwellings originating on the continent, and later translated to the American frontier is intended to show how long standing cultural traditions influenced and inspired how the "modern" dwellings of the day were constructed, modified and used over time. However, these traditions took on regional characteristics specific to the Hagerstown Valley in response to its rocky terrain, availability of building materials and local timber mills, and the relative skills of those erecting the structure. And of course, the structures became in time as individual as the people living in them, whether owners or tenants. There is no real design formula that ruled architectural development in this vernacular setting. This is hopefully clarified in the final draft version.

Comments by Jane Custer (ANTI):

- The final draft includes debris removal as part of the Stabilization Plan to be accomplished in stages at the First Floor level and then the Second, after the Second Floor floor joists are supported adequately.
- The use of the word "Park" has been removed throughout the report as an ending for Antietam National Battlefield.
- *Williamsport Preservation Training Center* now reads *Historic Preservation Training Center* (FD p. 120).

Comments by Richard Brown (ANTI):

- The vaulted stone structure is referred to consistently in the final draft as a *root cellar*, and additional information is provided to support the likelihood that this was the actual intended use for the structure.
- Photographic analysis of the building envelope has been expanded to include all exterior elevations and pertinent details, (FD pgs. 97-102).
- Concerning the recommended use of epoxy materials on this structure, epoxy cannot be viewed as a **structural** repair method that would significantly increase the ability for this building to remain standing – the deterioration is too advanced. However, it is a valuable **non-structural** repair material if used selectively in conjunction with other recommended repair methods. The use of consolidating epoxy materials injected into timbers with only moderate decay will assist in preserving the historic fabric that can remain in place. Also, the use of epoxy adhesive and fiberglass rods in connecting replacement timber sections with historic sections that can be salvaged is also recommended repair method. To assist in understanding the use of epoxy materials and its various applications, reference material has been included in Appendix B5 of the final draft.
- The local vendor for lime was added to the *Chinking Repair Recipe* – Appendix B4 in the final draft.

Robert Kapsch
October 30, 2000

# COMMENTS
# FINAL SUBMISSION
# MARY LOCHER CABIN
# ANTIETAM NATIONAL BATTLEFIELD

The following are the National Park Service's final comments on the Final Draft Submission, "Mary Locher Cabin, Historic Structures Report, Physical History and Condition Assessment, Antietam National Battlefield," dated August 10, 2000.

These comments do NOT include the Historic American Buildings Survey (HABS) comments on the HABS drawings and photographs prepared by the consultant, architrave p.c. architects. These will be forwarded to you by John Burns of the HABS/HAER Division, National Park Service.

As a reminder, your Scope of Work requires that the following, related to the final report, be submitted:

> 3. Final Report - The A/E shall submit fifty (50) reproduced bound copies of the final report and a 3-1/2 inch diskette. This final report shall meet all of the requirements of the Draft Final Report, specified above, and in addition shall include any modifications requested by the Project Manager following his/her review of the Draft Final Report. The A/E shall submit the original final report on archival bond paper and in a loose leave format with original print photographs. Three additional bond copies of the original reports with photographs shall be submitted.

## TITLE PAGE

1. I believe that everyone in the National Park Service that has been associated with this project believes that the A-E has done an outstanding job. Therefore, I think it would be appropriate to list the names of the principal contributors to this report in descending order of magnitude of contribution (rather than just listing the corporate name which they worked for). I would also suggest that the same be done for NPS names, such as Rebecca Stevens, NPS Regional Architect; Robert Kapsch, Ph.D., Project

Manager; Richard H. Brown, Chief, Cultural Resources Management, Antietam National Battlefield.

Page iv

2. It would be appropriate to list the Park Superintendent and Assistant Superintendent. It would also be appropriate to list the Regional Director (Terry Carlstrom).

3. List of Consultants. See comment 1 above. It would be appropriate to list these individuals here also.

Page 2 – Project team reviewed documents provided by National Park Service

4. Please check this – this list does not seem to agree with the Scope of Work list of documents provided by the National Park Service, which is:

> Memorandum From: NPS Historic Architect Thomas T. Waterman to Acting Chief of Planning, dated March 30, 1940.
> Memorandum From: Chief Historian, NCR, Cultural Resource Services Division Gary Scott, to Superintendent Antietam and Monocacy National Battlefields, Subject: XXX form 630-95-04, dated February 23, 1995.
> Article: Elise H. Manning-Sterling and Bruce Sterling, "Battlefield and Farmstead, The West Woods Survey, Antietam, presented at the Conference of the Society for Historical Archaeology, Cincinnati, Ohio, January 4, 1996, 11 pages.
> Memorandum From: Archeologists Elise H. Manning-Sterling and Bruce B. Sterling to Regional Archeologist Stephen Potter and Robert Sonderman, Subject: "Recent disturbances from stabilization efforts at the Locher/Poffenberger cabin site," dated: October 14, 1996.

Please coordinate with your bibliography.

Page 23. – Grove-Locher Poffenberger Farmstead: Ownership…

5. Typo, "tat land…" on line beginning, "1792 Land advertised…" Following line, spell out, "Apx."

6. Third line on entry beginning, "1811 Deed of sale..." Delete line contained in "may have tenants_"

Page 29 – Wednesday, September 17, 1862 ...

Last two lines on this page:

a. Change "Stuart's (rebel)" to read, "Stuart's (Confederate)."
b. Capitalize "Union" as in. "Doubleday's (union)."

Page 30 – (continuation of Wednesday, September 17, 1862...

7. Fifth paragraph. Up to this point the writer has done a very good job of identifying the units as to whether they were Union or Confederate. Continue this for the reader, i.e. for Pelham, Grisby, Dana, etc.

Page 34

8. Footnote 52. Correct title, "The Photographic Legacy of America's Bloodiest Day..."

Page 36 – Illustration 3. *Sketch Plan Drawings Illustrate Chronology of Building Development...*

9. The sketch plan suggests that Mary Locher cabin was constructed before 1800 (PERIOD I) and added to between 1800 and 1811 (PERIOD II) yet the search shown on pages 22 to 23 don't support this – i.e. that before 1814 the land was owned by speculators who, presumably, would not have built. Also, there is no evidence from the deeds that the land conveyed has a building on it. Please clarify.

Page 43 – Photo from Magazine

10. Insert photo from Holiday Magazine, as indicated.

Page 44 – Developmental Period I

11. This report does not make the case that this structure is an eighteenth century structure – a very important point. Specifically, the section on deed research is very quiet on this point and that is where this point should be made. Archeological artifacts recovered on site are, of course,

inconclusive since they would presumably have been used many years before being discarded. The evidence for eighteenth century dating must be made based on written records and if this case can not be made, then we need to soften the language contained on this and other pages, such as, "possibly as early as the late eighteenth century..."

12. The report should indicate, through a paragraph, why the researchers believe that this was the earliest portion of the building.

Page 45 – Developmental Period II

13. This report does not make the case that this structure is as early as 1811. Specifically, the section on deed research is very quiet on this point and that is where this point should be made. The evidence for 1811 dating must be made based on written records and if this case can not be made, then we need to soften the language contained on this and other pages, such as, "possibly as early as 1811..."

14. The report should indicate, through a paragraph, why the researchers believe that this was added on in the manner displayed.

Page 46 – Developmental Period III

15. This report does not make the case that this structure is as early as 1820. Specifically, the section on deed research is very quiet on this point and that is where this point should be made. The evidence for 1820 dating must be made based on written records and if this case can not be made, then we need to soften the language contained on this and other pages, such as, "possibly as early as 1820..."

16. The report should indicate, through a paragraph, why the researchers believe that this was added on in the manner displayed.

17. Is this what we think the cabin looked like at the time of the battle. If so, we should so state.

Page 55 - South Elevation – Round Log Section

18. Spell out notations: 1x; T & G, etc.

Page 64 – COMPONENTS OF TIMBER FRAMING SYSTEM AT MARY LCOHER'S CABIN

19. Is this a sketch of the actual structural system at Mary Locher cabin? If so, indicate corner depicted. If not, indicate that this is a glossary and does not depict actual structure.

Page 65 – East elevation – Timber Frame Section

20. Spell out notations: T & G, etc. Show dimensional marks, e.g. 1 ¾" x 7" etc. Continue on other pages throughout this section.

Page 76 E. PHYSICAL CONDITION INSPECTION AND EVALUATION...

21. Inspection Methodology. Identify the individual and do not refer to the firm. For example, "Doug Bond of McMullan and Associates undertook a ..." Continue this practice throughout this section.

22. Third Paragraph. Refer to the "National Building Code" and footnote that it is promulgated by Building Officials and Code Administrators, Inc. (BOCA). The footnote should continue, "The NPS is not, of course, legally bound to use the Basic building code but, as a matter of policy, tries to meet all local building code and regulations."

23. The reader is entitled to know the shortcomings of this inspection methodology and the resultant developed recommendations. For example:

> The structural inspection methodology used on the Mary Locher House, and the recommendations developed therefrom, is based on accepted American structural engineering practices, procedures, standards and codes. However, it should be noted that these standard and accepted practices, procedures, and codes are almost entirely intended to be applied to new construction and not existing standing historic vernacular buildings such as the Mary Locher Cabin. Results from such a methodology, therefore, must be tempered with judgement and

expertise on the performance of historic buildings, such as the Mary Locher Cabin.

24. Throughout this (and other) section(s), use dimensional notations. For example, (page 77, first paragraph) use 2" x 6" and not 2x6.

Page 77 – Existing Conditions

25. Last paragraph. Use 5.6" x 6.5" and not 5.625"x6.5". Check appropriate spacing of dimensions throughout this section, as shown above.

Pages 81 to 87 – Photographs

26. Date and attribute all photographs, as with other photographs.

27. Provide these photographs in color as has been done with other photographs in this report.

Page 88 – Structural System Analysis

27. Provide a basis for comparison for the reader for values discussed, such as live load of 14 psf. What does the National Building Code say? This is later done on page 90 but should be discussed. For example, NPS has the ability to limit the use of the building and therefore a 14 psf live load rating might be adequate, on certain conditions.

28. There should be a paragraph indicating the limitation of tradition, new-construction oriented analysis. For example, the National Building Code indicates that a minimum 16 psf snow load is required but this structure is still standing despite a calculated 14.7 psf. That is, traditional frame structures such as the Mary Locher Cabin typically possess a higher factor of safety then engineered structures and typically have a degree of resistance to loadings in excess of that calculated by traditional analysis.

Page 95 – Identification of Deficiencies in Building Envelope

29. Foundation: Elsewhere we identify sleepers bearing immediately on the soil. This should also be reflected in this section.

Pages 97 to 102 – Photographs

30. Please provide these photographs in color as to make them easier to read.

First HABS Drawing – Sheet 1 of 5

31. Narrative on this sheet states, "The modest, multi-cell structure was originally built in the late 18th century..." We have not identified that this is, in fact, the case. Unless we can do so we need to change this statement to be more tentative, such as, ... possibly as early as the late 18th century."

Fourth HABS Drawing – Sheet 4 of 5

32. The quality of the reproduction of these photographs is not very good, as compared to the quality of the same photos contained has full sheet size photographs in the 30$% submission. Part of the problem is, of course, the reduction in size from the 30% submission. Yet these four photographs of all elevations are very important in this report. Include these four photographs as full size pages in the final report with suitable captions. As was done in the 30% submission.

Page 155 - BIBLIOGRAPHY

33. Accessibility: Delete reference to BOMA manual and insert, "Uniform Federal Accessibility Standards (UFAS; 49 FR 31528.)"

Page 156 - BIBLIOGRAPHY (Continued)

34. Credit individual authors of AASLH Technical Leaflets. For example, credit Lee Nelson for AASLH Technical Leaflet 48.

Page 157 - BIBLIOGRAPHY (Continued)

35. Include material provided to you at the beginning of the project, specifically:

Article: Elise H. Manning-Sterling and Bruce Sterling, "Battlefield and Farmstead, The West Woods Survey, Antietam, presented at the Conference of the Society for Historical Archaeology, Cincinnati, Ohio, January 4, 1996, 11 pages.

Memorandum From: Archeologists Elise H. Manning-Sterling and Bruce B. Sterling to Regional Archeologist Stephen Potter and Robert Sonderman, Subject: "Recent disturbances from stabilization efforts at the Locher/Poffenberger cabin site," dated: October 14, 1996.

36. Last line, include on same line, "McLaw's Advance..."

Appendix A – 1940 "Thomas Waterman" NPS Memorandum

37. Include or otherwise note the photographs originally attached to this memorandum but not included in this appendix.

Appendix B – Unpaginated, Dell Corporation, Log Chinking Repair Recipe

33. Revise second sentence which reads, "The National Park Service believes that the log cabin may date to the 18th century. They also believe that the frame addition was probably built during the..." See above comments related to the issuing of dating the construction of this building.

15 January 2001

Reference: Mary Locher Cabin
Physical History and Condition Assessment
Antietam National Battlefield
Contract #1443 CX3000-94-034, Work order no. 12
architrave no. 9402.16

# Final Submittal

## A-E Response to NPS - HSR Final Draft Submittal Comments

(responses by Marianne M. Graham, AIA)

Following is the response to the Final Draft Submittal (dated 10 August 2000) Review Comments and where to find the corrections or reference in the Final Report:

TITLE PAGE/Page iv

1. – 3. An internal cover page was added so that there would be space to list the primary authors of the report, and the Project Team list on page iv was revised to add the NPS/Antietam Battlefield Superintendents and other participants. Members of the Field Survey Team and draftsmen of HABS Drawings (architrave) were added to the Consultant List and also added as a note to the HABS Drawings as per John Burn's request (HABS Comments).

Page 2

4. These materials were added to the list of documents provided by the NPS and reviewed by the A-E (also added to Bibliography) – however, later versions of the archeology studies (Final Draft) with a more thorough investigation and the updated NR Nomination Update became available to the A-E (provided by Richard Brown) during this project, and both provided critical background information for this report.

Page 23/Page 34

5., 6., 8.Typographical errors were corrected.

Page 29 through Page 32

7. Although most of these statements of the battle details were direct quotes taken from books and publications, the notations of (Confederate) or (Union) were added to all soldiers' names listed in order to clarify for reader of report.

Page 36

9. Because this property, and specifically the cabin, were likely farmed and inhabited by tenants rather than landowners from the beginning of the cultivation of the land, the property deeds are insufficient means to determine the construction chronology of this structure. The owners prior to P. Grove starting in 1792 would likely have tenant farmers in place on the property – property that was reportedly under cultivation at that time. John McPherson, John Brien and Philip Grove were all local merchants – not farmers. Philip Grove, a man of means, may never have lived on the property during his ownership, because his going merchant-related concerns were in the town of Sharpsburg - he also built a grand house near town in the Federal Style in 1821, yet he retained property ownership to his death in 1840. However, having fathered 6 children with his first wife by the time he acquired the property in 1814 (two sons were farmers), and three

children with his second wife after 1816, they may have lived there or assisted with management of the property. It is purely speculation to assign construction dates based on this information solely.

Examining the extant building materials and techniques, and comparing the architectural evidence with regional patterns of building adds a defensible position to these dates. It is helpful to parallel the architectural evidence with the events associated with the ownership of the property to see overall patterns. The Development dates assigned on page 36 (30% and FD report) were also developed in regards to the early results of the archeological investigation. These dates were somewhat revised in the final draft archeology report, so the dates surmised in our building development study (in final report) were also revised to reflect this. For instance, by 1860, Alfred Poffenberger has a growing family, and it is reasonable to ascertain that as a long term tenant, he constructed the timber frame section to improve his residence. The use of heavy timber construction and riven lath as the base for interior plaster is not likely used after the Civil War. Therefore, it is most likely that this building section was intact during the Battle. This is substantiated with the results of the archeology related data although the conclusions drawn do not necessarily reflect this. (Possible reason is that many assumptions are based on surmised building development on the property suggested by the West Woods Study – these dates were not based on physical examination of the resources, but a documentary landscape related study.)

Page 43

10. 1940s Color photo from Holiday Magazine was inserted in the final report; however, it was not a view of the Mary Locher Cabin.

Pages 44-46 Development Periods

11.-17. As explained above, this report uses physical examination of the architectural evidence as the primary means of determining/dating the sequential development of the cabin: first-round log section, second-hewn log section, third-timber framed section. Therefore, since it is impossible to date with total accuracy, the language concerning the original construction date has been softened throughout the report and in the HABS Drawings. Again, it is the "surmised" development that is presented. We can only use our most professional, educated *guess* to defend.

Pages 48-75 Physical Description Section – Characteristics and Features

18., 20. All notations have been revised to spell out abbreviations and dimensional marks have been added.

Page 64 Timber Framing System Diagram

19. Sketch was revised to reflect actual conditions at the Mary Locher Cabin.

Pages 76-94 Physical Condition Inspection and Evaluation Section (Structural)
(response to these comments by Doug Bond, PE – McMullen & Associates, Inc.)

21. The entire section will be revised to refer to the individual.

22. The paragraph (third) will be revised.

23. Statement of shortcomings of inspection methodology based on accepted engineering practices and modern codes is needed: A paragraph will be added to this section regarding this concern.

24., 25. Dimensional notations were revised throughout the section.

26. Dates and photographer's name was added to all photographs in this section. (pages 81-87) As discussed with Bob Kapsch, color printing of photographs in the bound reports will be limited to the architectural characteristics and features **Description** sections (eliminating color in the building envelope and structural **Analysis** sections ), due to high costs of color reproduction. The original "electronic" version of this report (Microsoft Word) contains these digital photos in color.

27. Structural System Analysis – Page 88: The results of the analysis are presented in the structural system analysis section. The national building code requirements will be clarified and compared to the analysis results in the load compliance evaluation section.

28. A statement will be added clarifying that load capacities are calculated using assumed allowable stress values that are based on factors of safety that vary from 30% to more than 100% so that ultimate material failure occurs under a loading that exceeds the load capacity.

Pages 95-102 Architectural Enclosure System – Deficiencies in Building Envelope

29. Reference to sleepers was added to description of Foundation (page 95).

30. See note 26 above.

31. The narrative – HABS Drawing Sheet 1 - has been revised accordingly.

32. The photographic elevations of HABS Drawing Sheet 4 have been included in the report to scale (1/4" = 1'- 0") in the Graphic Documentation Section (beginning page 103).

Pages 154-158 Bibliography

33.-36. All revisions were made in the bibliography, as requested.

Appendix A 1940 Waterman NPS Memo

37. All photographs provided by the NPS were reproduced in the Final Draft report with the written memo. It was later discovered that these 3 photographic views became part of the HABS Collection under HABS No. MD-90. Much better quality photographs are inserted into the Final Report – all available in digital form over the internet directly from the Library of Congress. In 1989, HABS Photographer Jack Boucher further documented the cabin and barn with additional large format photographs, also available digitally. These have also been included in Appendix A for reference and representation of the progressive condition of the structure over time from 1940 through 1999.

Appendix B Chinking Repair Recipe

38. Statement was revised to reflect development periods presented within Final Historic Structures Report.

15 January 2001

Reference: Mary Locher Cabin aka A. Poffenberger House (after Civil War tenant farmer)
Historic Structures Report: Physical History and Condition Assessment
Antietam National Battlefield
NPS Contract #1443 CX3000-94-034, Work order no. 12
architrave no. 9402.16

## Final Submittal

## Log of Artifacts and Material Samples collected at the Mary Locher Cabin throughout the duration of this Project

| No. | Description/Location Found: | Collected by: | Date: |
|---|---|---|---|
| 1 | Nails (4 qty.)/<br>SE Exterior corner - Round Log Section | Susan Buchan | 10/15/99 |
| 2 | Exterior Chinking/<br>S Exterior Wall - Round Log Section | Susan Buchan | 10/15/99 |
| 3 | Exterior Chinking w/Daubing intact/<br>S Exterior Wall – Round Log Section | Susan Buchan | 10/15/99 |
| 4 | 6" Section of Riven Lathe and Lathe Nail (1 qty.)/<br>West Interior Wall – Round Log Section | Susan Buchan | 10/15/99 |
| 5 | Hand wrought hinge/<br>E Exterior Wall – Timber Frame Section – lying on sill | Susan Buchan | 10/15/99 |
| 6 | Early cut nail at base of Diagonal Brace/<br>West Exterior Wall at NW corner – Timber Frame Section | Susan Buchan | 10/15/99 |
| 7 | Small sample of Interior Plaster w/trace of Paint Finish/<br>South Interior 1st Flr. Wall at SE corner – Timber Frame Section | Susan Buchan | 10/15/99 |
| 8 | Large sample of Interior Plaster w/trace of Paint Finish/<br>North Interior 1st Flr. Wall – Timber Frame Section | Susan Buchan | 10/15/99 |
| 9 | Cut nails (1 qty. long + 1 qty. short)/<br>West Exterior Wall – Timber Frame Section | Lynn Alsmeyer | 11/15/99 |
| 10 | Iron Tool head found on ground/<br>Near West Wall – Round Log Section | Mark Clark/<br>Margaret Mook | 11/15/99 |
| 11 | Stove Part (?) found on flooring surface/<br>Center of 1st Flr. Room near North Interior Wall– Round Log Section | Margaret Mook | 11/19/99 |
| 12 | Small sample of plaster base coat with hair – fallen off lathe<br>East Interior 1st Flr. Wall – Round Log Section | Margaret Mook | 11/30/99 |

Log of Artifacts and Material Samples

| No. | Description/Location Found: | Collected by: | Date: |
|---|---|---|---|
| 13 | Chunk of crudely mixed concrete from floor of fireplace/ South Interior 1st Flr. Wall of – Timber Frame Section | Margaret Mook | 11/30/99 |
| 14 | Pottery Sherd – one-half lid, blue delft pattern on off white Found in dirt below floor (missing boards), 1st Flr. – Round Log Section | Margaret Mook | 12/20/99 |
| 15 | Metal Shoe Horn Found in dirt below floor (missing boards), 1st Flr. – Round Log Section | Margaret Mook | 12/20/99 |
| 16 | Fragment of wallpaper/found loose on stairs 2nd Flr. - Timber Frame (Note: only image remains of wallpaper grid on all 2nd Flr. plaster walls and hipped ceiling. | Marianne Graham | 4/07/00 |