ABSTRACT

Title of Final Project:	RECONSIDERING THE ROULETTE BARN
	Tabitha Mary Gold, Master of Historic Preservation, 2023
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The Roulette Farm's iconic bank barn is currently underutilized and endangered. The National Park Service has assigned a narrow period of significance to the property and barn, tying its significance solely to the American Civil War and overlooking its broader history as a center of agricultural production. The structure had fallen into disrepair before being repaired with modern building materials, and is missing key features of its original construction. The barn's untapped potential warrants structural repairs, a full restoration to its original condition, and a rethinking of its interpretive uses. This analysis develops a preservation plan to assess the history, significance, and condition of the Roulette Barn. The plan also considers the barn's construction methods, addresses its historic integrity and how the barn's narrow period of significance and interpretation methods have impacted historic integrity, suggests new interpretive possibilities, and recommends necessary repairs and maintenance requirements that would lead to the restoration of the structure. Expanding consideration of the barn's significance to include its place in the agricultural history of the region provides an opportunity to realize a more complete interpretation and increase its value as a historic resource.

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RECONSIDERING THE ROULETTE BARN

by

Tabitha Mary Gold

Master's Final Project submitted to the Faculty of the Historic Preservation Program
of the
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Advisory Committee:
Donald W. Linebaugh, PhD, Chair
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A big thanks to the NPS staff, Rebecca Cybularz and Mark Segro, who advised me on resources for my paper and allowed me to access the Roulette Barn site.

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Chapter 1: Introduction

Located on the Antietam National Battlefield, the Roulette Farm's iconic bank barn holds a wealth of untapped historic potential. Currently relegated to equipment storage, the barn has undergone multiple cycles of repair and modification. The barn's current period of significance (1861-1865) is based on its association and utilization as a field hospital by Union soldiers during the Civil War. However, a broader consideration of the barn's agricultural significance to the surrounding Sharpsburg area provides an opportunity to expand its period of significance and explore its full history.

Although the Roulette Barn's continued survival is largely due to the preservation efforts of the NPS, the structure is in need of specific repairs and full restoration to preserve its integrity as a character defining feature of the historic farmstead and battlefield. Introduction of new materials like the CMU block wall, steel support columns, and metal roof, and missing elements like the corn crib/wagon shed, affect its integrity to reflect an 1850's Pennsylvania bank barn. In addition, the east gable-end wall is in critical condition and requires stabilization.

Drawing on the Secretary of the Interior's standards for the treatment of historic properties, this project develops a preservation plan for the Roulette Barn. The plan establishes the historical, architectural, and agricultural context of the barn; examines its construction; and assesses its condition. The Roulette Barn is currently underutilized, not accessible to the public, and is only interpreted through the narrow lens of its Civil War context; it lacks any greater agricultural context. Thus, the plan

will also consider its current use for storage and examine alternative uses and interpretive options. For example, the Antietam National Battlefield works with active farming operations through an agricultural lease program, and these partners could be involved in future interpretation focusing on the impact of the war on local historical agriculture resources like the Roulette Farm.

The landscape of the Roulette Farm still consists of the entire 179 acres that William Roulette owned at the time of the Battle of Antietam.[1] Other buildings on the farm include the farmhouse and other outbuildings (store house, ice house, spring house, and smoke house) shown in Figure 1.[2] The other outbuildings were also constructed into the hillside; these outbuildings surrounded the main farmhouse separated from the barn.

Figure 1. Roulette Farm outbuildings and farmhouse. (NPS, 2003).

[1] "Roulette Farmstead Cultural Landscape" National Parks Service. U.S. Department of the Interior Accessed November 2, 2022. https://www.nps.gov/articles/600284 htm#4/35.46/-98.61
[2] "Roulette Farm (U.S. National Park Service)." National Parks Service. U.S. Department of the Interior. Accessed September 7, 2022. https://www nps.gov/places/antietam-battlefield-roulette-farm htm.

Within the farm complex the Roulette Barn is southeast of the house and the other outbuildings (store house, ice house, spring house, and smoke house). Figure 2 shows the location of the house and outbuildings as they stood in 1862.

The barn is at the center of the orchard and wheat field, and the farmstead is adjacent to the Mumma and Piper farmsteads. The cluster of buildings is surrounded by crop land and some woody vegetation growing along the creek; natural limestone outcroppings are a distinctive feature of the landscape. Currently the vegetation within the farmstead is mostly grass and some shrubs. Access to the Roulette Farm is via a lane that connects to the "Sunken Road," a road dividing the Roulette property and other nearby properties (Figure 3). The barn is not open to the public.

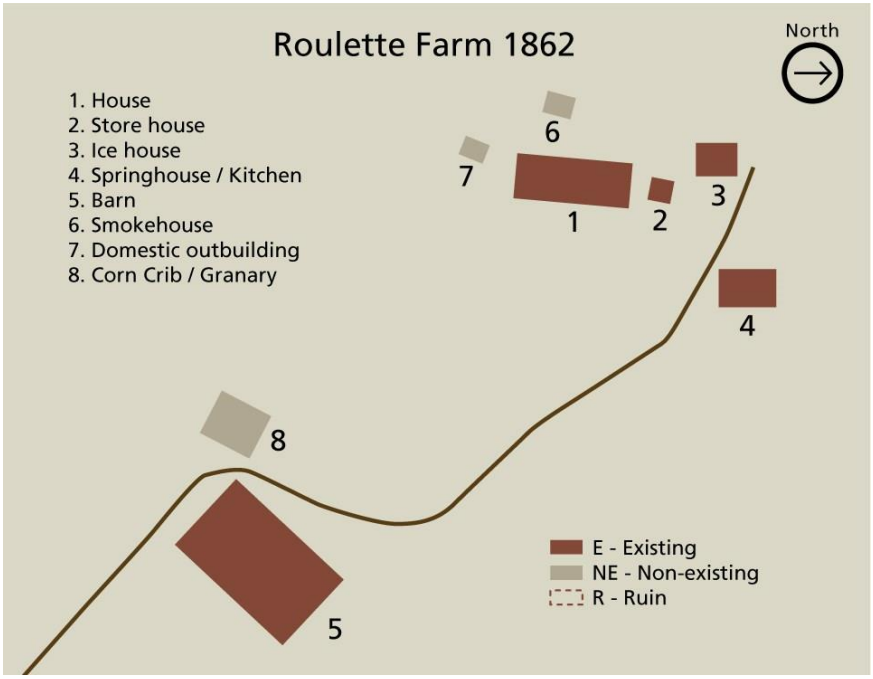

Figure 2. Map of Roulette Farm *(NPS Antietam/K.Snyder).*

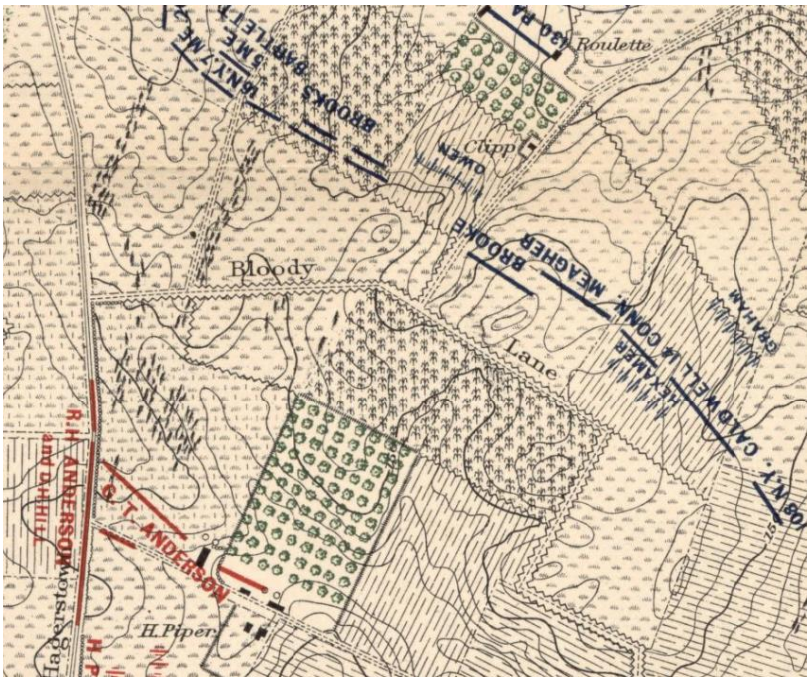

Figure 3. United States War Department. *Atlas of the battlefield of Antietam, prepared under the direction of the Antietam Battlefield Board, lieut. col. Geo. W. Davis, U.S.* [Washington, Govt. print. off, 1908] Map. https://www.loc.gov/item/2008621532/.

Research Questions

In addressing the preservation/restoration plans and interpretation for the Roulette Barn, this study will consider several pertinent research questions.

- What are the necessary steps to preserve the Roulette Barn in accordance with the Secretary of the Interior's standards for the treatment of historic properties?
- What is the agricultural context of the region and site? (i.e., crops, animals, labor including slavery)
- How can the agricultural context be incorporated into the story of the Roulette Barn?
- How have other barns of similar styles been restored and interpreted for their significance to agriculture?
- What is the chronological series of repairs and modifications that have occurred at the Roulette Barn?

- What environmental issues have caused the Roulette Barn to deteriorate over time?
- What is the economic benefit of reactivating the site as an educational center or museum?
- How can the site be better accessed for guests visiting Antietam Battlefield?
- How can the maintenance and upkeep of the site be improved?

Methodology Summary

This analysis draws on historic architecture of 18th-century Pennsylvania-German buildings, the origin of bank barns on 18th- and 19th-century American farmsteads, the construction practices that led to the longevity of bank barns, and the growth and distribution of these structures.

An investigation was conducted to support the development of a preservation plan for the Roulette Barn. Findings from field visits, investigation of construction methods, and review of historic records and archival data was used to develop a plan that outlines restoration methods and recommends necessary repairs and maintenance requirements for the barn.

The preservation plan may act as a resource to provide information necessary for addressing existing issues and concerns about the structure. The plan also includes steps and guidance for the Roulette Barn's future use and lists recommendations resulting from the investigation. Field measurements and photo documentation of the barn's current condition are used in the analysis for restoration and maintenance guidelines.

Research using scholarly publications, technical books, personal journals, government regulations, and other sources was conducted to further develop the

history of the farm and barn and provide supporting evidence for the plan's recommendations. This preservation plan will include data from a Historic Structures Report performed by the National Park Service almost a decade ago, further develop a condition assessment report, note possible archeological investigations, develop a maintenance plan, and provide a technical analysis for reconstruction of historical features of the Roulette Barn.[3]

[3] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014

Chapter 2: Historical, Agricultural, and Architectural Context

Settlement Along Antietam Creek

Permanent colonial settlement of the area along Antietam Creek first began after 1732, when Charles Calvert, First Lord Baltimore, issued a proclamation opening the Maryland frontier for settlement.[4] This land offering was intended to strengthen Maryland's western claims to areas that were then predominately inhabited by American Indian tribes and trading settlements.[5] However, it was largely unsuccessful as a majority of early purchasers were speculators with no immediate intention of settling on and developing and farming the land they purchased.[6] Pressure to establish Maryland's western borders was politically provoked by Virginia's governor, William Gooch, who had granted land in Virginia's backcountry to settlers from Pennsylvania.[7] The land policy promoted by Gooch led to a migration of settlers from Pennsylvania passing through Maryland to settle in Virginia (Figure 4).

Two routes that were used by the settlers migrating from Pennsylvania to Virginia through Maryland coalesced along what was known collectively as the "Monocacy Road."[8]

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[4] Paula S. Reed. The D.R. Miller Farm Antietam National Battlefield Sharpsburg, Maryland. Preservation Associates, Inc. Hagerstown Maryland 21740 https://www.nps.gov/parkhistory/online_books/anti/miller.pdf

[5] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.

[6] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.

[7] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014

[8] "Monocacy Battlefield" National Register of Historic Places Registration Form. NPS 2013 https://mht.maryland.gov/secure/medusa/PDF/Frederick/F-3-42.pdf

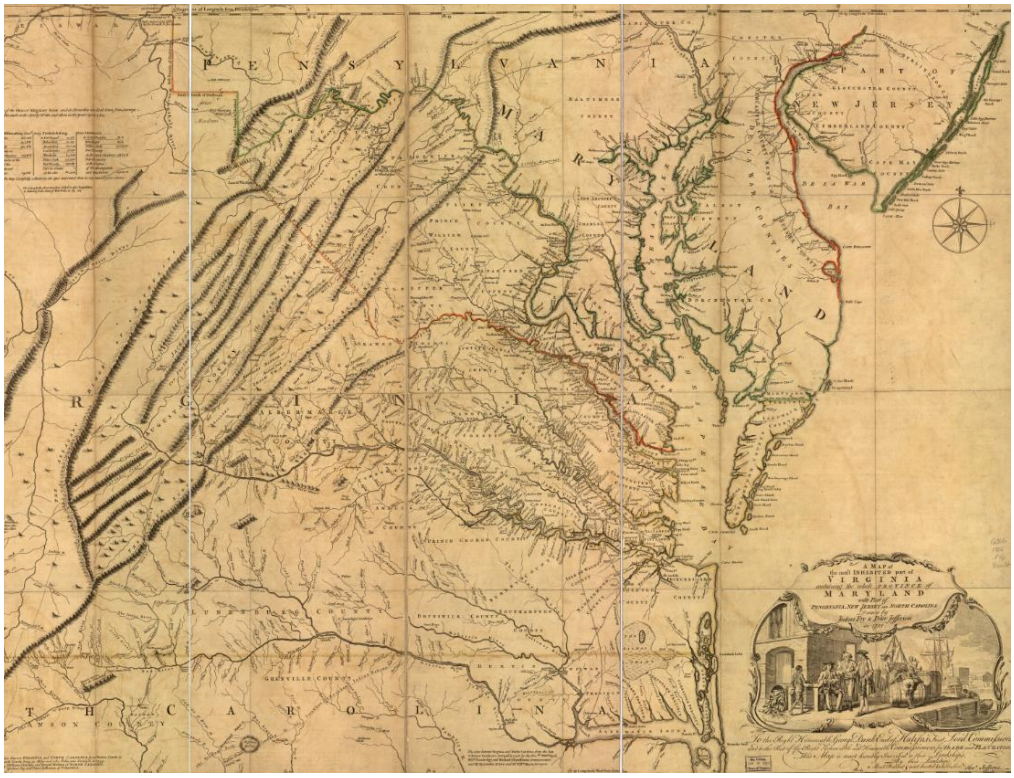

Figure 4. Fry, Joshua, Approximately, Peter Jefferson, and Thomas Jefferys. A map of the most inhabited part of Virginia containing the whole province of Maryland with part of Pennsylvania, New Jersey and North Carolina. [London, Thos. Jefferys, 1755] Map. https://www.loc.gov/item/74693166/.

Pennsylvania-German Migration

In the early eighteenth century, farmers from primarily German-speaking regions of Europe immigrated to North America and settled in Pennsylvania.[9] An agriculturally-focused economy developed from the efforts of these early settlers.

The migration pattern of 18th-century German immigrants entering the country through Philadelphia can be seen in the barns that still remain.[10] German immigrants initially settled in the Pennsylvania backcountry and many had moved into Maryland

[9] Robert F. Ensminger, *The Pennsylvania Barn : Its Origin, Evolution, and Distribution in North America. 2nd ed*. Creating the North American Landscape. (Baltimore: Johns Hopkins University Press, 2003), 67.
[10] Robert F. Ensminger, *The Pennsylvania Barn : Its Origin, Evolution, and Distribution in North America. 2nd ed*. Creating the North American Landscape. (Baltimore: Johns Hopkins University Press, 2003), 94.

by about the 1790's.[11] Settlers leased and later purchased smaller parcels of land from the large tracts held by wealthy landowners and speculators and developed a thriving agricultural economy. One such owner was Joseph Chapline who purchased multiple tracts of land in Maryland and, in 1763, founded the village of Sharpsburg in what would later become Washington County.[12] When wealthy landowners died land was further divided among their heirs, and these families continued the focus on agricultural production. Pennsylvania settlers, most of whom were Germans, moved west and south following limestone rich soils, and established farms as large as 150-300 acres to produce grain, particularly wheat, and cattle.[13]

Side-hill and multi-level dwelling and farming structures were widely adopted by the people of Switzerland and southern Germany because of the deep valleys and steep mountains in their homeland.[14] Thus, the rolling hills in southeastern and central Pennsylvania, and later Maryland were familiar landscapes to the immigrant German farmers (Figure 5). Some pioneer farmers initially dug into hillsides to house their animals, but these spaces were usually crowded and dark.[15] In order to create a proper shelter for farm animals, farmers expanded on the hillside concept and started constructing roofs for these hillside barns.

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[11] Dieter Cunz, *The Maryland Germans:* A History. Princeton, NJ: Princeton University Press, 1948.
[12] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.
[13] Paula S Reed. *The D.R. Miller Farm Antietam National Battlefield Sharpsburg, Maryland*. Preservation Associates, Inc. Hagerstown Maryland 21740 https://www.nps.gov/parkhistory/online_books/anti/miller.pdf
[14] Amos Long. *The Pennsylvania German Family Farm* (Breinigsville, Pennsylvania: The Pennsylvania German Society, 1972), 13.
[15] Amos Long. *The Pennsylvania German Family Farm* (Breinigsville, Pennsylvania: The Pennsylvania German Society, 1972), 314

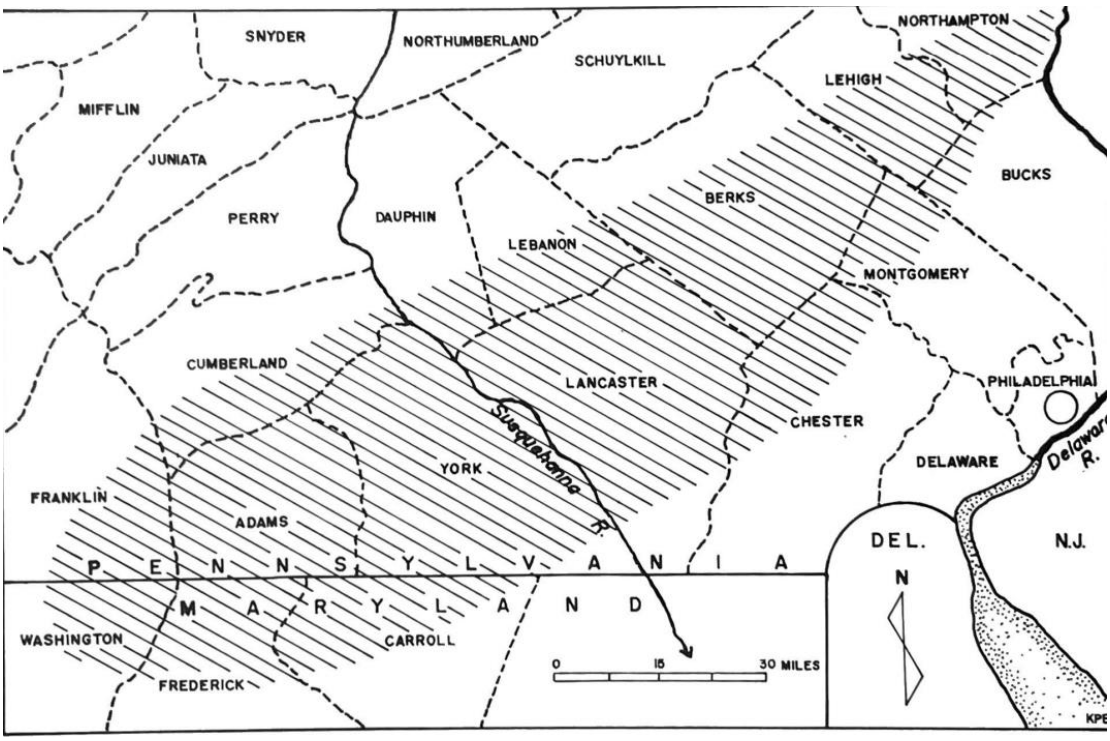

Figure 5. The Pennsylvania Barn Core Region (Map. Robert Ensminger).

The early farmers believed that the land existed for their benefit. Direct contact with the earth was essential for the farmers. Barns were constructed into the hill to maximize the use of the land, thus the bank barn design was predicated on adaption to the site. The construction almost "grows" from the hillside, making it both practical and convenient for the farmstead. The barn was the largest workspace for farming operations, often centrally located and protected from seasonal elements. The barn was used for storing grain, hay, and sheltering animals. Its arrangement created a more stable indoor environment, preventing extreme temperature differences in the winter and summer seasons.[16] Livestock was kept on the lower level and benefited from direct sun in winter and shade during high summer.

[16] Amos Long. *The Pennsylvania German Family Farm* (Breinigsville, Pennsylvania: The Pennsylvania German Society, 1972), 12.

Livestock was protected from cold temperatures and strong winds on the lower level during the colder months.[17] The south-facing cantilever allowed the low angle winter sun to reach the livestock stalls, and the stone foundation on the sides provided protection from the wind. A sloping site topography also facilitated drainage away from the barn. Multiple levels offered storage options for equipment staged in the barn such as wagons and hand tools, and hay and grain storage above to throw down to feed animals. Having separate storage for animals and equipment fostered organization and efficiency. The barn, a tangible symbol of production and future prosperity, was the central defining structure of the farmstead.

The cantilever provided a covered working area outside of the barn that offered protection for the elements. A system of organized farming developed where each section of the barn had a purpose for farming. Out-sheds, extensions on the bankside of the barn, were used as granaries. The asymmetrical gable ends of the barn, plus the external granary doors at the top of the hillside, permitted interior and external access to the granary bins. In most cases these extensions are original features of the barn structure, rather than later additions.[18] Steps were not required in the barn because the hill allowed for convenient access to both the first and the second level of the building.

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[17] Amos Long. *The Pennsylvania German Family Farm* (Breinigsville, Pennsylvania: The Pennsylvania German Society, 1972), 315.
[18] Robert F. Ensminger, *The Pennsylvania Barn : Its Origin, Evolution, and Distribution in North America. 2nd ed*. Creating the North American Landscape. (Baltimore: Johns Hopkins University Press, 2003), 97.

Regional Agricultural History

Two staple crops produced by farms in the mid-Atlantic colonies included wheat and tobacco.[19] Slavery became widespread in the Maryland colony in tobacco-growing areas– the earliest documentation of enslaved people of African descent in Maryland is 1642.[20] Slavery peaked in Maryland around the 1820s with tobacco-growing areas having the largest enslaved population.[21] By 1820, the census for Washington County listed 3,201 enslaved workers.[22] Wheat, the primary crop produced in the valley, was less labor-intensive than tobacco thus required less enslaved labor.[23]

The agricultural economy of the Sharpsburg area gradually became more focused on wheat production by the 1800s. From 1800 to 1860 Washington County's population more than doubled.[24] Washington County became the leading producer of flour because of the large number of mills in the Antietam Creek drainage.[25] The continued decline of the profitability of tobacco led to a decrease in the enslaved

[19] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.
[20] https://www.nps.gov/anti/learn/historyculture/slavery-and-emancipation-in-sharpsburg.htm
[21] "Slavery and Emancipation in Sharpsburg." National Parks Service. U.S. Department of the Interior, February 16, 2021. https://www.nps.gov/anti/learn/historyculture/slavery-and-emancipation-in-sharpsburg htm.
[22] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.
[23] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.
[24] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.
[25] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.

population of Washington County by 1860. Simultaneously, Sharpsburg developed into a Pro-Union stronghold before the start of the Civil War.[26]

Mills at Antietam Creek

Agricultural life in Sharpsburg and the surrounding area played a large role in the development and industrialization of the area. Mills were constructed near the creeks in the Sharpsburg area to process wheat into flour. The development of milling in the Antietam Creek drainage can be traced back to 1740 when two flour mills were established directly on the creek.[27] The mills were able to process wheat crops into flour in large quantities. Flour from Washington County was transported to Baltimore, the leading flour market in the United States by the end of the 18th century.[28] However, road conditions for transporting the flour produced by the Washington County mills remained unreliable. [29] The construction of canals and locks in 1802 along the Potomac River, including where Antietam Creek entered the Potomac, created alternative routes.[30]

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[26] "Slavery and Emancipation in Sharpsburg." National Parks Service. U.S. Department of the Interior, February 16, 2021. https://www.nps.gov/anti/learn/historyculture/slavery-and-emancipation-in-sharpsburg htm.

[27] Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 73.

[28] Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 77 & 80.

[29] Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 84.

[30] Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 76.

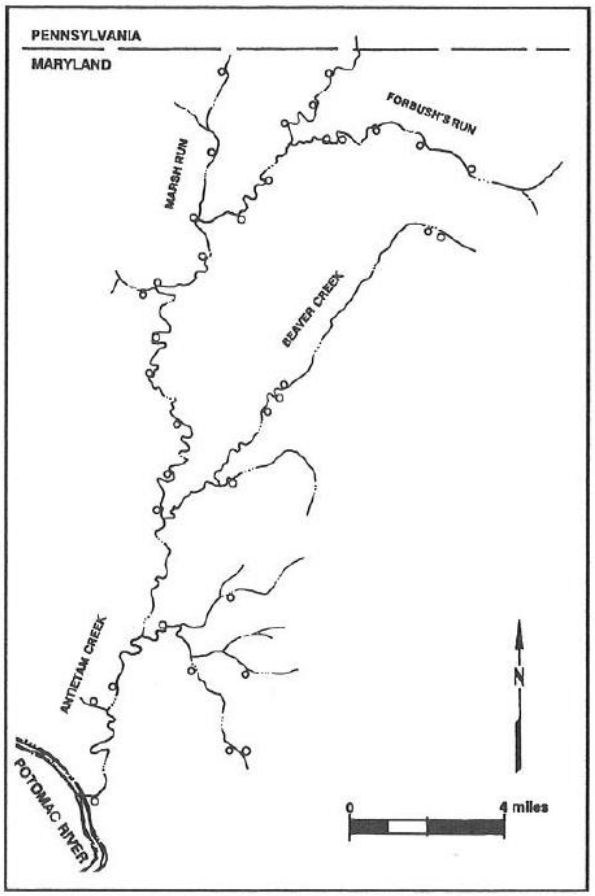

Figure 6. Mills Along Antietam Creek. (Winter, Mill Settlement Patterns, p.77).

Wheat was transported via the Boonsboro Turnpike and the canal system until the construction of Baltimore and Ohio (B&O) Railroad around 1820.[31] Although the path of the B&O railroad bypassed much of Washington County, Antietam Creek still provided access to the Potomac River to send wheat to Georgetown.

The fertile land along Antietam Creek was very productive and the area was improved with roads and water-powered mills.[32] The growth in production of flour

[31] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.
[32] K. Snyder "Newcomer Farm." National Parks Service. U.S. Department of the Interior. Accessed October 29, 2022. https://www.nps.gov/anti/learn/historyculture/newcomer-farm htm.

mills contributed to the agricultural wealth of Washington County. Between 1783 and 1820 approximately 18 new mills were constructed (Figure 6).[33] Central Maryland was known as the "bread basket" of the country by the early 1800's.[34] Antietam Creek mills increased their grain production in 1820, 1830, and 1840.[35] The increase in the Antietam Creek grain production can be attributed in part to the completion transportation networks like the National Turnpike from Baltimore to Hagerstown in 1825 and later the railroad.[36]

Throughout the mid-19th century, Western Maryland farms were focused on the production of wheat and other grains, rather than the monocrop economy of tobacco seen in Eastern Maryland.[37] Washington County dominated the production of wheat in Maryland at this time. For example, Washington County's average yield of wheat per acre in 1870 was 25-3/4 bushels, while the average in Maryland was only 14-1/4 bushels per acre.[38]

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[33]Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 77.

[34] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.

[35] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.

[36] Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 77.

[37] Paula S. Reed *The D.R. Miller Farm Antietam National Battlefield* Sharpsburg, Maryland. Preservation Associates, Inc. Hagerstown Maryland 21740, 1991 https://www.nps.gov/parkhistory/online_books/anti/miller.pdf

[38] J. Thomas Scharf, History of Western Maryland *History of Western Maryland : Being a History of Frederick, Montgomery, Carroll, Washington, Allegany, and Garrett Counties from the Earliest Period to the Present Day ; Including Biographical Sketches of Their Representative Men*. Baltimore: Regional Pub, 1968. Philadelphia: Louis H. Everts, originally published 1882. https://archive.org/details/historyofwestern01scha/page/26/mode/2up

Construction of railroads planned to supplement the main B&O railway route were delayed by the U.S. Civil War. However, the Franklin Railroad reached the northeast corner of Washington County by 1873, which increased the market opportunities, providing rail access to the Antietam Creek mills.[39] Rail was the primary mode of transport by this time and the 1880 Washington County manufacturing census listed 52 flour mills, 30 of which were in the Antietam drainage area.[40]

The developing transportation systems such as improved roads, canals and locks, and railways influenced the success of the water-powered flour mills in the area and stimulated agricultural development. While the Roulette Farm was not located directly on Antietam Creek, it produced a large amount of grain, corn, and honey for sale locally and across the region. Neighboring farms such as the Newcomer farm had mills used for processing wheat into flour (Figures 7 & 8).

[39] Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 80.
[40] Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 81.

Figure 7. *Antietam, Maryland. Newcomer's mill*. (Gardner, Alexander, photographer. United States, 1862. loc.gov/item/2018671474).

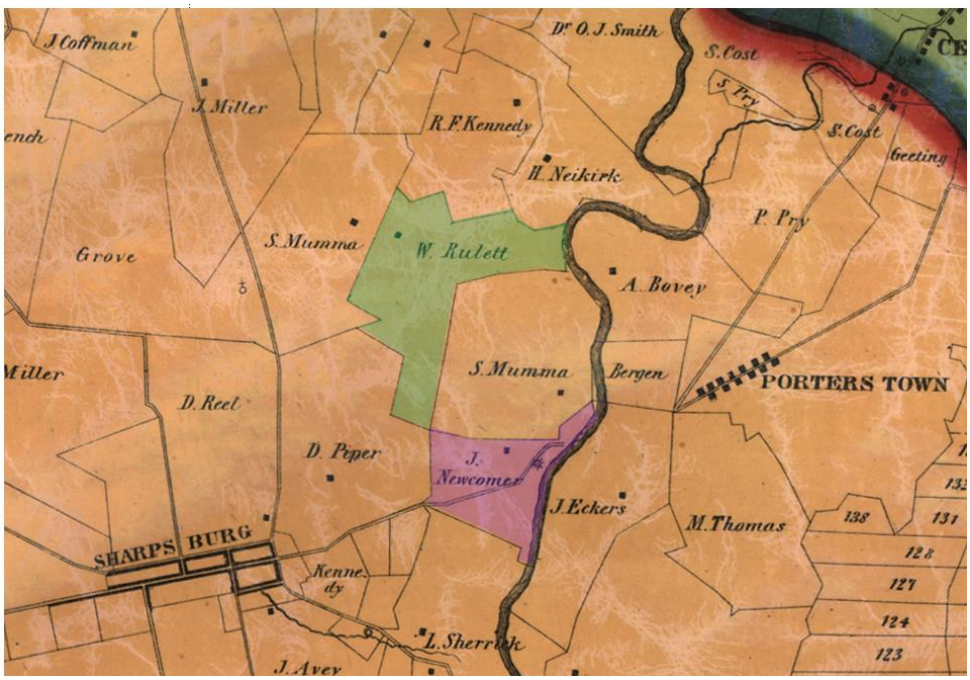

Figure 8. Map Showing the Rulett and Newcomer farms in 1859. (Taggart, Thomas, and S. S Downin. *A map of Washington Co., Maryland. Exhibiting the farms, election districts, towns, villages, roads, etc.* 1859 loc.gov/item/2002624033/).

U.S. Civil War and Beyond

The Roulette Farm and its iconic barn found itself at the center of the bloodiest day in American history, the Battle of Antietam, fought on September 17, 1862. The landscape of the Antietam Creek area became a barrier for the attack of General Lee. The expansive farmlands along Antietam Creek had been appropriated as a pathway for troops during the war and provided needed provisions and supplies. Sharpsburg was a busy mill town and General Lee expected to have an advantage as he traveled from Virginia to Maryland. The hilly terrain and regional landscape of rolling farms and rocky limestone outcrops made an ideal place for General Lee to position his army. The Battle of Antietam ended Confederate General Robert E. Lee's invasion of the north at the infamous Bloody Lane, resulting in the death of 3,650 men and wounding of 17,300.[41]

Many technological advancements arrived in the U.S. in the years following the Civil War. Farmers shifted from horse-powered farming to more mechanized methods, and field labor time was reduced, allowing for more large-scale farming applications to take hold.[42] Some farms in the area switched to dairy production as agricultural work became increasingly specialized.[43] A new technology called "the roller method" was brought to mills in the 1870s that allowed for less waste and increased efficiency compared to earlier stone grinding methods.[44] These inventions

[41] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014
[42] Sally MCMurry. *Families & Farmhouses in Nineteenth-Century America Vernacular Design and Social Change.* (Knoxville: The University of Tennessee Press, 1997), 89
[43] Sally MCMurry. *Families & Farmhouses in Nineteenth-Century America Vernacular Design and Social Change.* (Knoxville: The University of Tennessee Press, 1997), 94
[44] Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by

brought about an increase in the scale of commercial milling, which outcompeted smaller mills that did not have the means to install the new machinery or adapt to steam power to meet the demands of increasing production.[45]

The onset of steam power meant mills no longer needed to rely on proximity to water for production.[46] Meanwhile, farms were reorganizing to take advantage of changing economic demands. Transportation became the limiting factor for agricultural industries' success, and Washington County's transportation network was well-connected to nearby developing urban areas.[47] The advancements in production and robust transportation system allowed dairy products to be transported more quickly to cities, while the number of mills in Antietam Creek drainage declined as markets such as dairy became more sustainable and profitable for farmers.[48]

Origins of Traditional Bank Barn Construction

Pennsylvania German vernacular architecture was influenced by ethnic Germans as well as other European cultural groups that immigrated to Pennsylvania,

Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 72.

[45] Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 73.

[46] Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 73.

[47] Sally MCMurry. *Families & Farmhouses in Nineteenth-Century America Vernacular Design and Social Change.* (Knoxville: The University of Tennessee Press, 1997), 94

[48] Susan E. Winter *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland. Spatial Patterning in Historical Archeology: Selected Studies of Settlement*. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. (College of William and Mary in Virginia, 1994), 72 & 73 ; Sally MCMurry. *Families & Farmhouses in Nineteenth-Century America Vernacular Design and Social Change.* (Knoxville: The University of Tennessee Press, 1997), 94.

including the Swiss, Alsatians, Moravians, and French Huguenots.[49] In Germany, buildings were constructed by skilled masters within a guild, involving an apprentice system often established between father and son.[50] When settlers reached North America, the guilds were left behind, and craftsmen were limited to just their family's resources. Adapting traditional construction methods in a new territory preceded the rise of multi-tier bank barns that are now ubiquitous to the region.

In Sharpsburg, limestone is prominent in the soil, and it was also used for building foundations when fields were being cleared. Outcroppings of natural limestone in this rolling landscape influenced the farming methods and provided raw materials.

The earliest Pennsylvania barn types were dominated by bank barns, barns built into a hillside to provide access to the upper level, while also creating a forebay side with a cantilever, with two or three sides of the barn's foundation partly below ground level. Many of the early settlers came from cultures with a log building tradition, such as the Swiss, Finnish, and Swedish.[51] Builders would hew the logs on two sides and notch the ends. Notches that were created at the ends of the logs carefully joined the corners, commonly carved in the shape of a "V-notch". Later variations of barns were constructed with masonry, for example, sourced from brick or fieldstone in Pennsylvania. Moisture became a problem with early wood foundations leading to rot and decomposing structural elements. Thus, masonry was

[49] Kenneth R. LeVan Building Construction and Materials of the Pennsylvania Germans. Vernacular Architecture Forum Annual Meeting, 2004. Harrisburg Pennsylvania
[50] Kenneth R LeVan Building Construction and Materials of the Pennsylvania Germans. Vernacular Architecture Forum Annual Meeting, 2004. Harrisburg Pennsylvania
[51] Kenneth R LeVan. Building Construction and Materials of the Pennsylvania Germans. Vernacular Architecture Forum Annual Meeting, 2004. Harrisburg Pennsylvania

adopted for the foundation to avoid direct contact of wood and earth. The addition of a fieldstone foundation became a standard solution for stabilizing barn structures and increasing the lifespan of the buildings.

The center of the barn held the largest wood framing members called the "summer" beams. The summer beams spanned across the middle of the structure and was mortised to the end walls. It is a load bearing structure and is the largest, most prominent, and easily seen beam in the barn from the inside. It acts as an anchor for each gable end wall and supports the cantilever forebay beams (Figure 9). The other principal framing members included plates, purlins, principal rafter, posts, tie beams rafters, and queen posts, and they formed the bents in each variation of early bank barns.[52]

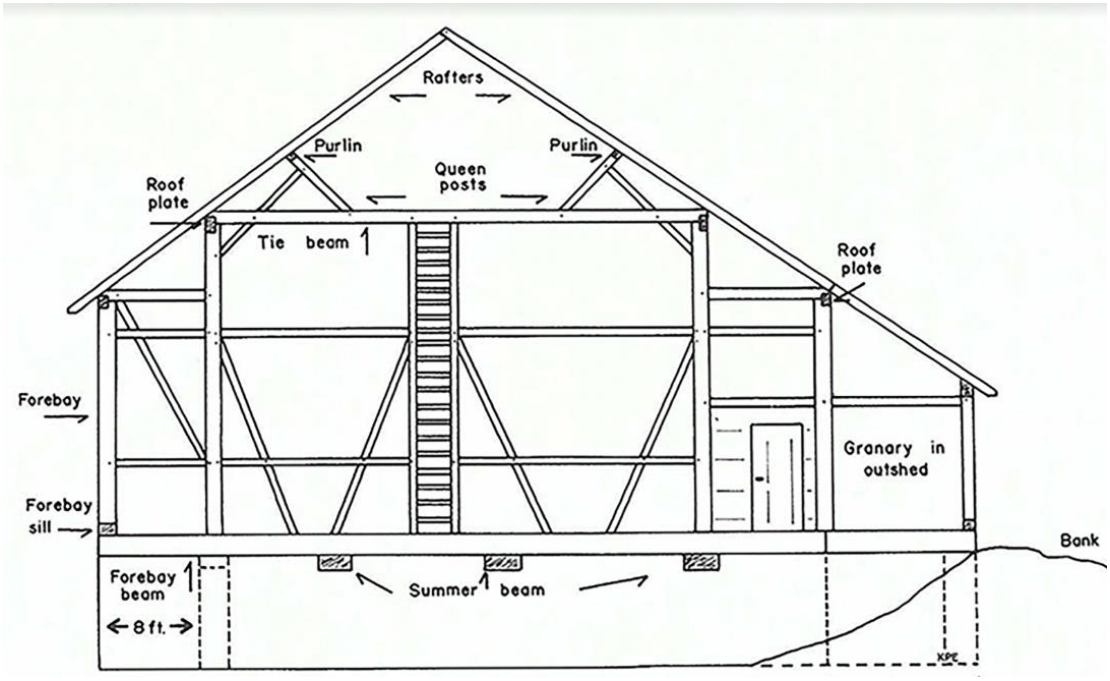

Figure 9. Framing plan of a "Bank Barn" (Ensminger, The Pennsylvania Barn).

[52] Heber Bouland. *Barns Across America.* St. Joseph, Mich.: American Society of Agricultural Engineers, 1998, 58; Kenneth R. LeVan *Building Construction and Materials of the Pennsylvania Germans*. Vernacular Architecture Forum Annual Meeting, 2004. Harrisburg Pennsylvania

Foundations of bank barns were field stone, sometimes coursed or non-coursed.[53] Farmers could also build sturdy barns by making the gable ends from stone rather than logs and cut timber.

Author William Pain's *Carpenter's Pocket Directory* (1797) explains that "Strength and convenience are the two most essential requisites in building."[54] For 18th and 19th-century builders, this philosophy was the knowledge base for erecting timber structures like barns. Knowledge was passed down through family practices and generational learning. A carpenter should "acquire the proper judgement of the materials he works on, both as to quality and quantity."[55] Typically settlers constructed their own barns or provided labor working with a master carpenter. Trees were selected from the surrounding area and cut into lengths. For example, the pocket directory provided a chart for scantlings and scalability of wooden members. However, many early farmers were unable to read or write, so this text is more a summary of past practices.

The Roulette Barn is a timber frame building with a cantilevered side characteristic of the early styles of Pennsylvania bank barns that spread through the German settled regions of the mid-Atlantic from 1790 – 1890.[56] Some of the earliest

[53] Robert F. Ensminger, *The Pennsylvania Barn : Its Origin, Evolution, and Distribution in North America. 2nd ed*. Creating the North American Landscape. (Baltimore: Johns Hopkins University Press, 2003), 69.
[54] William Pain. *The Carpenters Pocket Directory: The best methods of framing timber buildings.* Philadelphia: Published by J.H. Dobelbower and J. Thackara., 1797
[55] William Pain. *The Carpenters Pocket Directory: The best methods of framing timber buildings.* Philadelphia: Published by J.H. Dobelbower and J. Thackara., 1797
[56] Robert F. Ensminger, *The Pennsylvania Barn : Its Origin, Evolution, and Distribution in North America. 2nd ed*. Creating the North American Landscape. (Baltimore: Johns Hopkins University Press, 2003), 51.

types of bank barn structures were erected using log or wood frame systems.[57] Early Pennsylvania German timber frame barns were characterized by their distinctive bracing and heavily framed roofs.[58] The system of corner posts helped transmit the weight of the roof directly to the foundation via the connection at the sill.

Timber frames would be constructed with three common methods: individually assembled pieces, completely joined walls, or as bents.[59] A bent consists of two end posts supporting a tie beam. A ladder is built into one of the bents and uses the intermediary post to support one side. Two smaller bolster posts, in-line with the intermediary posts, separate the lower girt and upper tie beam. The bolster posts are tenoned into the girt and beam. Diagonal knee braces support the end posts to the girt and the braces are tenoned into the posts with pegs. Barns were erected by raising the bents one by one overtop of the foundations and sills.[60] These bank barns also had extending out-sheds used as granaries. These extensions would have been built using a similar framing system.

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[57] Amos Long. *The Pennsylvania German Family Farm* (Breinigsville, Pennsylvania: The Pennsylvania German Society, 1972)
[58] Gabrielle M. Lanier and Bernard L. Herman, "Looking at Building Landscapes," in *Everyday Architecture of the Mid-Atlantic*, ed. Gregory Conniff, Bonnie Lloyd, Edward K. Muller, David Schuyler, (Baltimore, Maryland: The Johns Hopkins University Press, 1997), 77-91.
[59] Gabrielle M. Lanier and Bernard L. Herman, "Looking at Building Landscapes," in *Everyday Architecture of the Mid-Atlantic*, ed. Gregory Conniff, Bonnie Lloyd, Edward K. Muller, David Schuyler, (Baltimore, Maryland: The Johns Hopkins University Press, 1997), 77-91.
[60] Gabrielle M. Lanier and Bernard L. Herman, "Looking at Building Landscapes," in *Everyday Architecture of the Mid-Atlantic*, ed. Gregory Conniff, Bonnie Lloyd, Edward K. Muller, David Schuyler, (Baltimore, Maryland: The Johns Hopkins University Press, 1997), 77-91.

Construction in German-settled areas typically utilized a distinct heavy roof framing system.[61] The wood was built into heavy trusses including principal and common rafters, and heavy frames consisting of purlins supported by posts as shown in Figures 10 & 11.

Figure 10. Bolster Posts Connecting Tie Beam (Tabitha Gold, 2022).

German-style timber frames were characterized by triangular bracing and heavily framed roofs. The trusses of the three inner bents are made of a pair of diagonal queen posts which are tenoned into the tie beam and roof purlin. This connection is with wooden pegs. The queen posts are supported by a smaller strut and tenoned into the tie beam.

[61] Gabrielle M. Lanier and Bernard L. Herman, "Looking at Building Landscapes," in *Everyday Architecture of the Mid-Atlantic*, ed. Gregory Conniff, Bonnie Lloyd, Edward K. Muller, David Schuyler, (Baltimore, Maryland: The Johns Hopkins University Press, 1997), 77-91.

Figure 11. Interior Upper Level (Tabitha Gold, 2022).

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Chapter 3: Property History

History of Roulette Farm

The Roulette farm is an example of the German farm family heritage described in Amos Long's book "The Pennsylvania German Family Farm.[62] The development of Sharpsburg was influenced by farming practices of ethnic Germans who had begun as tenant farmers in the early colonies. By 1794, German immigrant John Miller, Jr. began to purchase tracts of land that extended from Lancaster, Pennsylvania to Sharpsburg, Maryland, including the land that would become the Roulette Farm.[63]

John Miller Jr. passed away ca. 1849 without leaving a will, and an 1850 court decree appointed trustees to sell his properties.[64] William Roulette purchased a portion of Miller's land from the trustees for $8,610.[65] In 1851, Ann Miller, widow of John Miller Jr. and mother-in-law of William Roulette, conveyed her dower interest in the farm to William Roulette for $2,000.[66] The Roulettes were likely living on the former John Miller, Jr. farm when the 1850 census was taken. William Roulette, listed as "Rulet" in the 1850 U.S. Agricultural Census, was living on 179 acres of farmland in the Sharpsburg district.[67] William Roulette was also the grandson

[62] Amos Long. *The Pennsylvania German Family Farm* (Breinigsville, Pennsylvania: The Pennsylvania German Society, 1972), 321.
[63] Paula S Reed. The D.R. Miller Farm Antietam National Battlefield Sharpsburg, Maryland. Preservation Associates, Inc. Hagerstown Maryland 21740. 1991 https://www.nps.gov/parkhistory/online_books/anti/miller.pdf
[64] WCLR, Liber IN6, folio 653.
[65] WCLR, Liber IN6, folio 653.
[66] WCLR, Liber IN7, folio 394.
[67] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014

of Daniel Piper who lived on a neighboring farm to the south.[68] According to the *Piper Family History,* written by descendant S. Webster Piper, Daniel Piper was the son of John Pfeiffer (Piper) who emigrated from Germany.[69]

The Roulette family produced corn, wheat, and honey on their farm.[70] In 1850 the property that would become known as the Roulette farm was valued at $8,000 with 139 improved acres and 40 unimproved woods.[71] The Roulette family's livestock included as 8 horses, 17 cows, 7 sheep, and 20 hogs valued at $670.[72] In the 1860 U.S. Agriculture Census, the Roulette farm produced 1000 bushels of wheat, an increase compared to the 800 bushels recorded in the 1850 census.[73] While the Roulette Farm did not have a flour mill like neighboring farms such as the Mumma's, the Roulettes were a major grower of wheat in the region.[74]

Civil War History

The Roulette and Piper families' fields, divided by the Sunken Road, were the site of the most intense fighting and this area later became known as Bloody Lane.

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[68] Marry Stinson. "WA-II-703 Piper House." Medusa, Maryland's Cultural Resource Information System- Version 1.5. Maryland Historical Trust., March 12, 2004. https://mht.maryland.gov/secure/medusa/.
[69] Marry Stinson. "WA-II-703 Piper House." Medusa, Maryland's Cultural Resource Information System- Version 1.5. Maryland Historical Trust., March 12, 2004. https://mht.maryland.gov/secure/medusa/.
[70] Justin Martin. A Fierce Glory: Antietam--*The Desperate Battle That Saved Lincoln and Doomed Slavery. United States:* Hachette Books, 2018.
[71] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014
[72] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014
[73] Linda L. Green Maryland 1860 Agricultural Census Volume 2. Heritage Books. 2009.
[74] "Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.

The Roulette Barn sits adjacent to Bloody Lane and was used by Union troops as a field hospital.[75]

News of the impending battle reached farm families and many of them left the night before the battle. When the area's farm families returned, the scene of the post battle was horrific. Elizabeth Piper, the Roulettes' neighbor, wrote to a friend of the experience returning home: "It was sickening in the extreme. My heart bled to see human beings in such a state of suffering. The yard was filled with the dead, dying, and wounded, the latter dying from starvation."[76] Interestingly, the Roulettes had taken their chances during the battle and decided to stay in their farmhouse cellar.[77]

On September 22, 1862, just days after the union victory at Antietam, President Lincoln issued the Emancipation Proclamation to be in effect on January 1, 1863.[78] The document specified that Confederate states could rejoin the Union by January or their slaves would be "thenceforward, and forever free."[79] The enslaved did not have their freedoms guaranteed until Congress passed and the states ratified the 13th amendment, which abolished the institution of slavery, in 1865.[80] In the years between the Union victory at Antietam and the 13th Amendment, Sharpsburg was slowly rebuilding from the effects of the battle. While the Roulette family were not

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[75] "Roulette Farm (U.S. National Park Service)." National Parks Service. U.S. Department of the Interior. Accessed September 7, 2022. https://www nps.gov/places/antietam-battlefield-roulette-farm htm.
[76] Elizabeth Piper letter to Sallie Farran. *Wilmington Watchman*, October 23, 1862:
[77] James McPherson. *Crossroads of Freedom Antietam*. Oxford New York. March 5, 2002.
[78] "The Emancipation Proclamation," The Emancipation Proclamation (National Archives and Records Administration, January 28, 2022), https://www.archives.gov/exhibits/featured-documents/emancipation-proclamation.
[79] "The Emancipation Proclamation," The Emancipation Proclamation (National Archives and Records Administration, January 28, 2022), https://www.archives.gov/exhibits/featured-documents/emancipation-proclamation.
[80] "U.S. Constitution - Thirteenth Amendment ." Constitution of the United States . congress.gov. Accessed February 20, 2023. https://constitution.congress.gov/constitution/amendment-13/.

slaveowners, they employed Nancy Campbell, a former slave, as a farm hand on the property.[81] According to the property's National Register form for Piper Farmhouse, the Piper's farm was the last to retain enslaved individuals in Sharpsburg.[82] Emory Summers, who was a slave on the Piper Farm, continued to work for the Pipers after manumission at the end of the war.[83]

After the war many farm families in Sharpsburg filed claims to the federal government for damages to their properties. William Roulette filed for damages totaling over $3,500, however, he received no compensation for damages to his home or the outbuildings including the barn.[84] The Roulette's claims did not include damage to the farm house and barn, but the claims did include details for repairing fences.[85] Eventually the Roulettes received a payment of $371 for a hospital claim due to the barn's use as a field hospital for wounded Union soldiers.[86]

By the 1870 U.S. Census, William Roulette was recorded as a farmer aged 45 and the value of his farm was listed at $20,000.[87] The production of wheat on the Roulette farm increased to 1,400 bushels in 1870.[88] Following the Civil War, farms started to list farm wages in the agricultural data. Nancy Campbell, a former slave to

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[81] "The People of Tolson's Chapel," Tolsons Chapel (Tolsons Chapel Sharpsburg MD , April 26, 2013), https://tolsonschapel.org/history/people-tolsons-chapel/.
[82] Marry Stinson. "WA-II-703 Piper House." Medusa, Maryland's Cultural Resource Information System- Version 1.5. Maryland Historical Trust., March 12, 2004. https://mht.maryland.gov/secure/medusa/.
[83] https://tolsonschapel.org/history/people-tolsons-chapel/
[84] "Roulette Farm (U.S. National Park Service)," National Parks Service (U.S. Department of the Interior, March 21, 2021), https://www.nps.gov/places/antietam-battlefield-roulette-farm.htm.
[85] Rebecca Cybularz,. *Roulette Barn Historic Structure Report*. Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014
[86] "Roulette Farm (U.S. National Park Service)," National Parks Service (U.S. Department of the Interior, March 21, 2021), https://www.nps.gov/places/antietam-battlefield-roulette-farm.htm.
[87] United States. U.S. Census of Agriculture. United States, 1870 https://www.census.gov/history/www/through_the_decades/questionnaires/1870_2.html
[88] United States. U.S. Census of Agriculture. United States, 1870 https://www.census.gov/history/www/through_the_decades/questionnaires/1870_2.html

Peter Miller (a neighboring farmer), was the only employee listed for the Roulettes household as a worker (Figures 12 & 13).[89] She was manumitted in 1859 and was employed by the Roulette Family until her passing in 1892.[90] In her will, Nancy Campbell left $100 to Susan Roulette.[91]

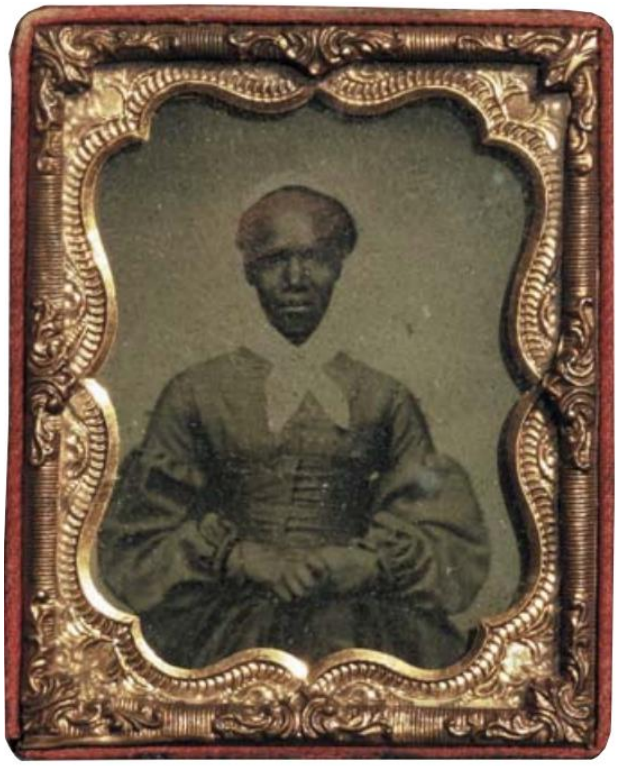

Figure 12. Photograph of Nancy Campbell. (MSA SC 5765 Earl Roulette Collection)

[89] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014
[90] WCLR, IN 14, folio 129
[91] WC Will Book H, folio 404

Figure 13. Map showing the Miller and Rulett farms. (Taggart, Thomas, and S. S Downin. *A map of Washington Co., Maryland. Exhibiting the farms, election districts, towns, villages, roads, etc.* 1859 loc.gov/item/2002624033/).

Susan was the second daughter of William and Margaret Roulette. The 1870 census record of William Roulette's family included his wife Margaret Ann, age 40; "Annie," age 21; John D., age 18; Joseph C., age 17; Susan R., age 13; "Franklin B." Benjamin F., age 11; and Ulysses, age 5.[92] In the 1880 census, John D. Roulette and his brother Joseph C. were no longer listed at the home. Nancy Campbell, listed as "Nannie Camel," age 67 was described as a "Servant," unmarried, in their household and the Roulette sons Benjamin F. and Ulysses were recorded as "Farm Laborer."[93]

[92] United States. U.S. Census of Agriculture. United States, 1870 https://www.census.gov/history/www/through_the_decades/questionnaires/1870_2.html
[93] United States. U.S. Census of Agriculture. United States, 1880 https://www.census.gov/history/www/through_the_decades/questionnaires/1870_2.html

William Roulette died in 1901 and the estate was divided among his heirs Joseph C. & Catherine Roulette, Annie E. & Rueben Keedy, John D. & Anna M. Roulette, Benjamin F. & Elizabeth Roulette, S. Rebecca & Charles Santee, and Ulysses & Lela Roulette.[94] The Roulette farming operations remained under the care of Benjamin Roulette until his death in 1910.[95] An appraisal of the Roulettes farm in January 1911 listed:

> 8 horses, 6 colts, 3 cows, 1 black calf, 1 heifer, 9 brood sows, 26 shoats, 43 sheep 4 wagons, manure spreader, sell binder, mower drill, drill harrow, 2 cultivators, wind mill, 2 chill plows, 2 shovel plows, spring harrow grain cradles, rakes, oil tanks, meat buck, mowing scythe, corn sheller, grain sacks,15 tons hay, 1000 bundles fodder, 455 barrels corn, 900 bushels wheat, 44 acres growing wheat, seed sown, blacksmith tools.[96]

The farm stayed within the Roulette family until 1956, when the farm was sold by S. Patterson and Leoda Roulette to Howard and Virginia Miller (not associated with the neighboring Miller farm).[97]

Sale of Property to the National Park Service

Starting in 1940, Congress allowed for donations for the battlefield to be accepted to preserve the Antietam Site.[98] Land was available for purchase in 1960 from the congressional act entitled "An Act to provide for the protection and preservation of Antietam Battlefield in the State of Maryland," signed by President

[94] WCLR Liber 115, folio 95.
[95] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014
[96] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014
[97] WCLR Liber 311, folio 631
[98] Charles W. Snell and Sharon A. Brown " Antietam National Battlefield and National Cemetery an Administrative History". Antietam National Battlefield NR Update 1999.

Dwight D. Eisenhower, which allowed for scenic easements on over 1,000 acres.[99] In September 1998, the Roulette Farm consisting of 179 acres was sold by the Miller family to the Richard King Mellon Foundation Conservation Fund who transferred the property to the Antietam National Battlefield along with a scenic easement originally purchased by the park in 1986.[100] After the sale, the NPS began leasing the lower level of the Roulette Barn to local farmers for agricultural use and park storage.[101] In 2018, the NPS Historic Preservation Training Center made repairs to the Roulette Barn.

[99] Charles W. Snell and Sharon A. Brown " Antietam National Battlefield and National Cemetery an Administrative History". Antietam National Battlefield NR Update 1999.
[100] WCLR, Liber 828, folio 696.
[101] Rebecca Cybularz,. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014

Chapter 4: Architectural Description

Description of the Roulette Barn

The Roulette Barn has a unique layout making the interior an all-purpose barn for agricultural use. The barn style is classified as a closed forebay barn with rear extensions and double out-shed used for a granary. The structure is comprised of a queen post timber-frame clad in vertical board siding and painted corrugated metal roof. The overall structure is supported by a random rubble limestone foundation. Various board and batten doors make up the envelope of the barn.

Dendrochronology performed as part of the HSR done by the National Park Service dated the Roulette Barn to ca. 1855, though the HSR speculates that, based on varying wood species of different ages identified, some older than 1855, the barn may have been reconstructed from an existing barn at the former Miller farm.[102] The Roulette family's decision to construct a bank barn was likely influenced by the Pennsylvania Bank Barn style that was popular in the area at this time. Figures 14, 15, & 16, below, show the exterior of the Roulette Barn. Figure 17 shows the Roulette Barn ca. 1890.

[102] Rebecca Cybularz.. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014

Figure 14. Roulette Barn, west gable end. (Tabitha Gold 2022).

Figure 15. Roulette Barn, bank side showing outsheds. (Tabitha Gold 2022).

Figure 16. Roulette Barn, bank side showing earthen ramp and outsheds. (Tabitha Gold 2022).

Figure 17. Roulette Barn ca. 1890. (Antietam National Battlefield archives, Battlefield Farms Box. Historic Structures Report, NPS).

Frame

The Roulette barn has a large gable roof, constructed of massive trusses with queen posts and a tie beam. The Roulette Barn's bracing is connected using downbraces from the corner posts to the sill, rather than sill to the plate or the end girt in some variations of German-style framing. The Roulette Barn has more support at each corner post than intermediate framing members spanning the length of the barn. Diagonal downbrace framing members like the corner post bracing in the Roulette Barn provide a more rigid wall-to-roof structure (Figures 18 & 19). Corner braces joined diagonally to either post and sill help stiffen the entire frame. This helps reduce twisting and buckling in the frame because the posts can transmit the weight of the roof directly to the foundation via the connection at the sill and corner post.[103]

[103] Gabrielle M. Lanier and Bernard L. Herman, "Looking at Building Landscapes," in *Everyday Architecture of the Mid-Atlantic*, ed. Gregory Conniff, Bonnie Lloyd, Edward K. Muller, David Schuyler, (Baltimore, Maryland: The Johns Hopkins University Press, 1997), 77-91.

Figure 18. Roulette Barn down braces connecting from corner post to sill. (Tabitha Gold 2022).

Figure 19. Roulette Barn, down braces on east gable wall. (Tabitha Gold, 2022).

The triangulation of the sill, corner post, and brace also helps reduce twisting and buckling in the timber frame.

The large structural timbers of the barn are hand hewn and are connected by pegged mortise and tenon joints. The construction of the barn was done with scribe rule framing. Scribe rule is a marking device scratched into timbers to mark the corresponding joining wood members. This was a method done by early carpenters to ensure that the correct wood members were joined together when planning the

construction of the building. The girts are tenoned into posts anchored with pegs. The posts connect to both a tie beam and the girts. Two bolster posts connect the tie beam and girt that runs from the north and south walls. Most early nineteenth-century timber framed buildings were made of, chestnut, tulip poplar, and pine.[104] The Roulette Barn's original construction is a mix of white oak and pine trees. The species of the wood was confirmed by a dendrochronological analysis reported in the HSR and sampled July 2013.[105] Some of the logs used in the barn have notches on the ends which suggest that some of the wood could have been used from an earlier log structure on the site. The earliest timber framed buildings made of logs were cut by hewing shallow notches with a broad axe or felling axe.[106] The most common joints for wood construction at this time included mortise and tenon, bridle, and lap joints.[107]

Figure 20 shows the current makeup of the upper level. The rafters are a variation of historic and modern framing members. Modern 2"x6" replacements were installed sometime before NPS ownership. The sloping roof members are lapped at the mid-point with the modern and historic materials and are supported by the lower end with a roof plate. A plywood member connects the rafters with the nailer strips

[104] Gabrielle M. Lanier and Bernard L. Herman, "Looking at Building Landscapes," in *Everyday Architecture of the Mid-Atlantic*, ed. Gregory Conniff, Bonnie Lloyd, Edward K. Muller, David Schuyler, (Baltimore, Maryland: The Johns Hopkins University Press, 1997), 77-91.
[105] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014
[106] Gabrielle M. Lanier and Bernard L. Herman, "Looking at Building Landscapes," in *Everyday Architecture of the Mid-Atlantic*, ed. Gregory Conniff, Bonnie Lloyd, Edward K. Muller, David Schuyler, (Baltimore, Maryland: The Johns Hopkins University Press, 1997), 77-91.
[107] Gabrielle M. Lanier and Bernard L. Herman, "Looking at Building Landscapes," in *Everyday Architecture of the Mid-Atlantic*, ed. Gregory Conniff, Bonnie Lloyd, Edward K. Muller, David Schuyler, (Baltimore, Maryland: The Johns Hopkins University Press, 1997), 77-91.

for the metal roof. The roof members above the barn's outshed granary roof are made of smaller purlins and what appear to be historic rafters.

Figure 20. Roulette Barn, main section of the upper level. (Tabitha Gold 2022).

Interior Layout

The main section of the barn was used for processing and storing wheat. In the main section of the barn, the threshing floor was used for wheat and the grain bins or "garners" were constructed along a side access isle that opened into the threshing floor. [108] A corn crib and wagon shed was attached to the east gable end of the barn in 1863. The addition of the corn crib helped increase the number of farming tasks that could be completed at the barn. Corn houses at this time period were typically

[108] Orlando Ridout V, "Agricultural Buildings," in *Chesapeake House*, ed. Cary Carson, Carl R. Lounsbury, (Chapel Hill, North Carolina: University of North Carolina Press, 2013), page 179-203.

separate buildings as corn requires curing in a dry, well-ventilated environment.[109] A study of early corn houses by Orlando Ridout V identified them as heavy timber framed buildings in a rectangular plan typically 12-20 feet wide and 18-30 feet long with ventilation from vertical slats joined to the principle structural posts.[110] His research found that corn houses were constructed in a similar fashion to the Roulette Barn (or other German built heavy timber frames buildings). "Timbers were robustly proportioned, and principal members were braced and joined with carefully carpentered mortise-and-tenon joints."[111]

The lower floor or ground level takes up the entire space under the barn. This large space was likely divided into separate stalls for livestock. Modern dairy equipment such as steel feed troughs and milking equipment were added sometime in the 1950's along with a loafing shed. A stairway at the northwest portion of the lower floor is accessible through an exterior opening that connects to the east elevation.

The northeast foundation wall on the interior has small cubby shelves, at a similar height to the ventilation windows. The lower level also accessed the wagon shed and corn crib. A floor plan of the barn is shown in Figures 21 & 22.

[109] Orlando Ridout V, "Agricultural Buildings," in *Chesapeake House*, ed. Cary Carson, Carl R. Lounsbury, (Chapel Hill, North Carolina: University of North Carolina Press, 2013), page 179-203.
[110] Orlando Ridout V, "Agricultural Buildings," in *Chesapeake House*, ed. Cary Carson, Carl R. Lounsbury, (Chapel Hill, North Carolina: University of North Carolina Press, 2013), page 179-203.
[111] Orlando Ridout V, "Agricultural Buildings," in *Chesapeake House*, ed. Cary Carson, Carl R. Lounsbury, (Chapel Hill, North Carolina: University of North Carolina Press, 2013), page 179-203.

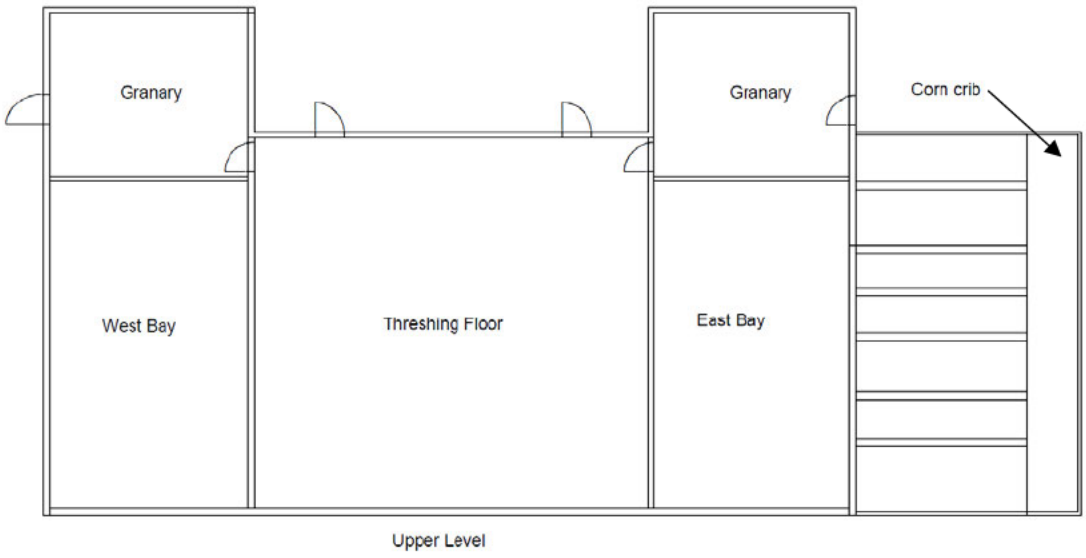

Figure 21. Upper level of the Roulette Barn. (Tabitha Gold, 2023).

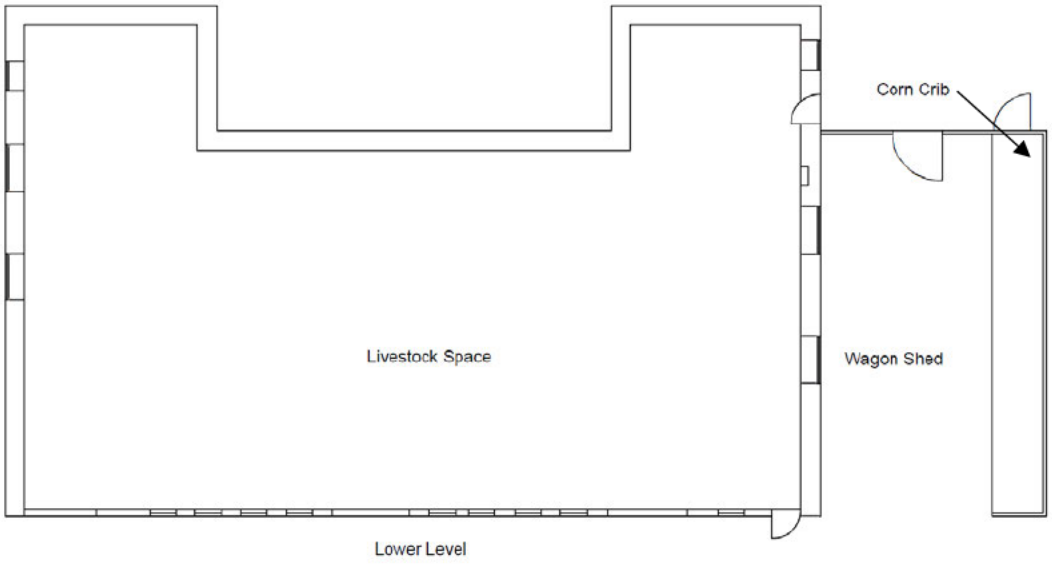

Figure 22. Lower level of the Roulette Barn. (Tabitha Gold, 2023).

The ground floor or upper level of the barn (Figure 23) has 3 major spaces and two granaries. The two granaries are in the northwest and northeast outsheds of the barn. The main threshing floor is accessed by two large swinging doors on the north elevation. The two granaries each have smaller doors for access on the west and east elevations of their respective location.

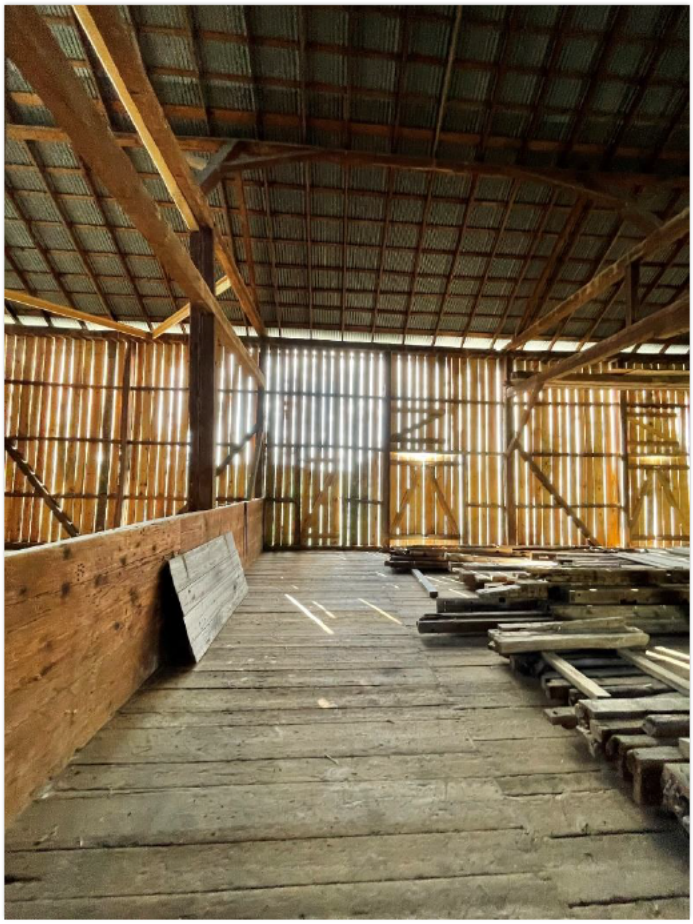

Figure 23. Roulette Barn, Upper Level Interior Main Level. (Tabitha Gold, 2022).

Foundation

The barn has a fieldstone foundation that supports the timber frame. The limestone wall foundations are believed to be original to the construction of the barn ca. 1855. The width of the foundation walls is approximately 2'-2" thick and the limestone is laid in a randomly coursed pattern with lime mortar. The foundation includes ventilation windows and small cubby shelving shown in Figures 24 and 25.

Figure 24. Roulette Barn, Northeast Foundation Wall Interior View Cubby Shelving. (Tabitha Gold, 2022).

Figure 25. Roulette Barn, Ventilation Windows on Northeast Foundation Wall. View from Exterior. (Tabitha Gold, 2022).

Figure 26. Roulette Barn, Whitewash remnants on stone foundation wall (Tabitha Gold, 2022).

The foundation of the Roulette Barn also has remnants of whitewash on the interior of the foundation wall shown in Figure 26.

The corn crib has four limestone piers that are approximately 5’-1” wide by 2’-2” deep. The pattern of the limestone piers is also randomly coursed with lime mortar similar to the main foundation of the barn. The corn crib piers are at an unknown depth. Figure 27 shows the piers in their current state.

Figure 27. Roulette Barn, corn crib/wagon shed piers. (Tabitha Gold, 2022).

The interior walls of the limestone foundation are covered with a white paint known as lime wash or "whitewash," and the original mortar for the barn used a lime base. Whitewash is a type of paint made from slaked lime that cures to an opaque color. Lime was an essential component in mortar and paint for whitewashing. The lower level has whitewashed joists throughout the basement. Whitewashing buildings was a method commonly employed in barns to improve the health of the animals due to its antimicrobial properties.[112]

[112] Gordon H. Bock. *Old House Journal.* Old House Journal Corporation Brooklyn, NY. August 1991.Date Accessed March 7, 2023 https://books.google.com/books?id=7CipCkCeRwwC&pg=PA54&dq=whitewashing+old+buildings&hl=en&sa=X&ved=2ahUKEwjg7ebksrT9AhWtElkFHZ5TCwIQ6AF6BAgBEAI#v=onepage&q=whitewashing%20old%20buildings&f=false

Exterior/Site

The exterior facade of the Roulette Barn is comprised of vertical wood siding that varies in both width and thickness. The barn's hillside construction took advantage of a hierarchical approach organizing farming tasks.

The location and orientation of the barn was most likely chosen for its south-east facing hillside location, allowing protection from the wind and solar heating in winter, and cooling in summer. Designing a building to maximize its heating and cooling with the sun and seasons is called passive solar design. Passive solar design began without scientific analysis; it started with a builder's intuition. Natural cooling, passive heating, and daylighting were obtained by the orientation of a structure on the North-South axis.

For the Roulette Barn, the angle of the sun in winter is lower at 27 degrees at the southern orientation. In the summer, the sun is at a much larger angle of 73 degrees at the southernmost point. (Figure 28).

Thus, farmers and their animals enjoyed protection from extreme and more mild temperatures in the winter and summer due to the Roulette Barn's orientation. Being excavated into the hillside also provided additional cooling from the ground during the summer.

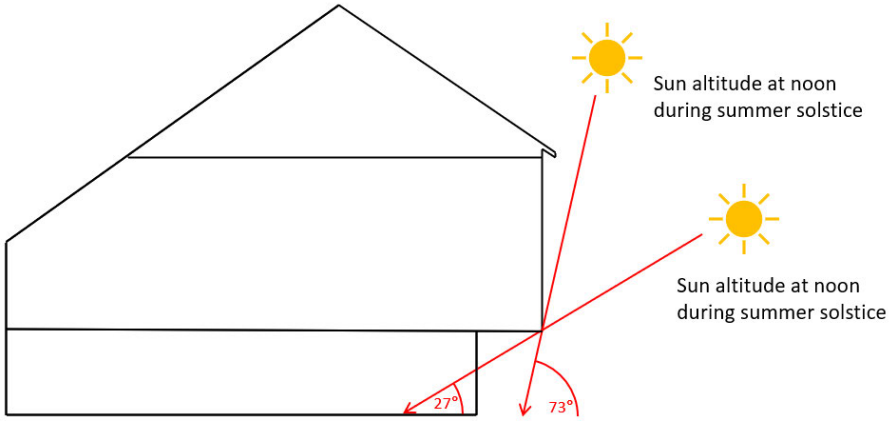

Figure 28. Sun Angle Diagram. (Tabitha Gold, 2023).

The Roulette Barn also has stone gable end walls built flush with the overhanging forebay to strengthen the ends of the overhanging second level. The extended stone walls also help enclose the lower-level working space, providing protection from the wind in the outdoor workspace. At the Roulette Barn, the prevailing wind direction is 241 degrees (WSW). The overhanging forebay side of the barn faces south-east providing a barrier to shield the open workspace from wind.

Character-Defining Features

The hillside construction, stone foundation, large roof, cantilever, and corn crib/wagon shed addition comprise the overall shape and setting of the Roulette Barn. Interior character-defining features and spaces include the threshing floor, granaries, and diagonal wood framing. These elements are critical when considering the barn's overall visual character and significance.

When evaluating historic resources, assessments are outlined by NPS Preservation Brief #17 "Architectural Character: Identifying the Visual Aspects of

Historic Buildings as an Aid to Preserving Their Character."[113] Preservation Brief #17 divides the assessment of character-defining features into three steps:

1. Identify the Overall Visual Aspects,

2. Identify the Visual Character at Close Range,

3. Identify the Visual Character of Interior Spaces, Features, and Finishes.

The purpose of Preservation Brief #17 is to help the owner or the architect identify those features or elements that give the building its visual character and that should be taken into account in order to preserve them to the maximum extent possible. Character-defining features are outlined in the *Cultural Resources Management Guidelines* in Director's Order 28.[114] The guidelines are intended to preserve the historic materials of the resource and aid in the long-term preservation of a building's distinguishable character. By following this process, the Roulette Barn can be preserved and returned to its original form.

The hillside location is one of the main character-defining features of the Roulette Barn. The Roulette Barn retains some but not all of its original shape and character. The north elevation bank entrance allows access to the upper level. The steep gable roof of the barn is also of the German timber structure style typical of the early to mid-nineteenth century. The Queen Post trusses are instrumental to this type of German barn framing. The limestone foundation walls laid in a random coursed pattern and crafted from local materials are another defining feature of the Pennsylvania German barn. The Roulette Barn is also distinguishable for its unique

[113] Lee H. Nelson, FAIA "Architectural Character: Identifying the visual Aspects of Historic Buildings as an Aid to Preserving their Character. U.S. Government Printing Office Washington DC.
[114] Robert Stanton *Director's Order #28: Cultural Resource Management* . June 1998. https://www.nps.gov/policy/DOrders/DOrder28 html

and evident historic construction methods. The construction of the wood timbers represents the skilled craftsmanship of early builders in Washington County. The early construction methods of German builders are visible in the hand-hewn logs, heavy timber framing, mortise-and-tenons joints, and pegged wood members. Scribe rule, a method of marking and joining wood, is also seen on a number of wood members at the barn.

The Roulette Barn has retained many of its character defining features due to the continued agricultural use of the barn.

Chapter 5: Record of Treatment & Current Conditions Assessment

Record of Treatment

This chapter will describe NPS interventions and repairs and provide a condition assessment of the areas of the barn that need repairs, and the aspects of the barn that need to be reconstructed using historic building materials and methods.

Modifications and Preservation Efforts

Throughout its life the Roulette Barn has been damaged, repaired with modern building materials, and lost key features of its early configuration. The barn was constructed ca. 1855 and has undergone multiple cycles of repair and modification.[115] The construction date of the corn crib and wagon shed is ca. 1863, and the barn appears to have been whitewashed by the time of an 1890 photograph (Figure 29).[116] A 1940 HABS photograph shows the corn crib and wagon shed and the structure is no longer whitewashed (Figure 30).[117] A 1989 HABS photograph shows the addition of a concrete-block wall under the forebay side of the barn (Figure 31).[118]

[115] *Historic Structure Treatment Record.* Preserve and Repair the Historic Roulette Barn. Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, October 2020

[116] Antietam National Battlefield Archives, *Historic Structure Treatment Record.* Preserve and Repair the Historic Roulette Barn. Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, October 2020

[117] Historic American Building Survey (Waterman), Library of Congress no. 084915p, 1940. https://www.loc.gov/pictures/resource/hhh md1284.photos.084915p/

[118] Historic American Building Survey (Boucher), Library of Congress no.084917p https://www.loc.gov/pictures/item/md1284.photos.084917p/

Figure 29. Original Forebay Wall in ca. 1890 photograph. (Antietam National Archives, Farm Box. Cited from Roulette Barn HSR).

Figure 30. Roulette Farm, Barn, Sharpsburg, Washington County, MD. (Waterman, Thomas T., creator Historic American Buildings Survey, Thomas T. Waterman, Photographer 1940).

Figure 31. Perspective view of south end and east (rear) – 1989 Roulette Farm, Barn, Sharpsburg, Washington County, MD. (Boucher, Jack E., creator Historic American Buildings Survey).

Figure 32. North elevation with addition and silo in foreground – 2004 Roulette Farm, Barn, Sharpsburg, Washington County, MD. (Boucher, Jack E., creator Historic American Buildings Survey).

A 2004 HABS photo of the east elevation (Figure 32) shows the corn crib and roof intact.[119] The overall form of the Roulette Barn stayed consistent, however, the modifications over time have resulted in a significant loss of integrity to the barns vernacular origin.

Description of NPS Repairs

The Historic Treatment Record performed by NPS in 2018 details the scope of repairs. The scope included:

(1) Repointing and Repairing Portions of the Masonry Foundation and Wagon shed Piers.
(2) Basement Post Repairs
(3) Summer Beam Replacement, Joist Replacement, and Sill Replacement. The summer beam was replaced in sections with in-kind matching white oak timbers.
(4) Repair and Replacement of Timber Components on Interior Bents and Gable-End Walls and out sheds.
(5) Repair and Replacement of Wood Flooring
(6) Repair, Prep, Paint Metal Roof and Install Half-Round Gutters and Downspouts.
(7) Repair and Replace Exterior Siding Doors and Windows
(8) Repair and Reroof the Corn crib/Wagon shed.

[119] Historic American Building Survey (Boucher), Library of Congress no.205084p https://www.loc.gov/pictures/item/md1284.photos.205084p/

In 2018, the National Park Service's Historic Preservation Training Center made repairs to the timber components on the interior beams, gable-end walls, summer beam, and joists and sills.[120] The National Park Service also replaced the metal roof and added half-round gutters and downspouts. In 2018, deteriorated siding on the barn was replaced. NPS also made repairs to the metal roof and added a multi-coat fluid-applied elastomeric acrylic coating.[121] This system helped further weatherproof the barn's roof.

The corn crib and wagon shed were dismantled, and salvageable pieces were tagged and placed in the center of the barn for storage. The siding that was salvaged from the corn crib appeared to be different sizes than the vertical wood siding on the main section of the barn. The documentation performed by HPTC in the Historic Structures Report includes measurements of the corn crib before it was taken down. The remains of the corn crib foundation piers are shown in Figure 33.

[120] *Historic Structure Treatment Record.* Preserve and Repair the Historic Roulette Barn. Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, October 2020

[121] *Historic Structure Treatment Record. Preserve and Repair the Historic Roulette Barn.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, October 2020

Figure 33. Roulette Barn, Corn crib/wagon shed stone pier. (Tabitha Gold, 2022).

A CMU block wall with windows was added to the cantilevered side of the barn sometime in the 1950's and replaced the original forebay wall was removed; the summer beams were supported by metal posts.[122] A loafing shed was also added to the forebay side of the barn sometime after the 1950's. When the barn's overhang was built up with concrete blocks, the open staging space for animals was likely lost and a new covered space was needed. A loafing shed is a space built to protect animals from the elements like the hot sun or cold winds.[123] In April 2013 the loafing shed was removed due to issues with the wagon shed roof structure it was attached to (Figure 34).[124] Over time the corn crib suffered deterioration from beetles and

[122] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014
[123] Esh's Utility Buildings "Loafing Sheds: The Important Facts." https://www.eshutilitybuildings.com/articles/loafing-sheds-the-important-facts/ 2023
[124] *Historic Structure Treatment Record.* Preserve and Repair the Historic Roulette Barn. Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, October 2020

weathering, more so than the main section of the barn. The National Park Service made some repairs in 2013 shown in Figure 35.

Figure 34. Roulette Barn, Loafing Shed Removed. (HPTC Historic Structures Report, 2013).

Figure 35. North and East Elevations. (HPTC Historic Structures Report, 2013).

Condition Assessment

Stone Walls

In some locations on the west wall, the stone was replaced with modern concrete block materials at an unknown date. These modern concrete block materials are considered incompatible with the barns original building materials that are

mortared with Portland cement. Areas where modifications have been done on the interior of the barn can be easily identified as locations without whitewash. The 2'-0 thick limestone wall foundation can be seen in Figure 36. Some sections have been patched and the mortar was reappointed with compatible lime mortar in 2004.[125]

Figure 36. Roulette Barn, Foundation Walls With Vents. (Tabitha Gold. 2022).

East Elevation Issues

The east elevation of the barn is in need of repair due to deteriorating wood where the corn crib and wagon shed had previously been attached. The repairs for the corn crib were in the scope of the 2018 project, but NPS was unable to complete the

[125] Rebecca Cybularz,. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014

task for a complete replacement due to the deterioration of the wood. Pieces of the timber that were salvageable were documented and are currently in the main level of the barn cataloged and in storage. As shown in Figures 37 and 38, the east gable wall, where the corn crib had previously been located, has vertical siding that is severely weathered and exhibiting signs of rot.

Figure 37. East gable side of the Roulette Barn. (Tabitha Gold, 2022).

Figure 38. Corn crib/wagon shed stone piers. (Tabitha Gold, 2022).

Major repairs to the northeast gable-end wall were not completed during the 2018 project. Two 40' timbers serving as the main structural components of the gable-end wall need to be replaced and will require structural shoring to temporarily support the gable-end wall. While the Roulette Barn's continued existence is largely due to the preservation efforts of the National Park Service, the structure is in need of key structural repairs and restoration of its missing components. With the loss of its original extension and addition of modern materials, the barn does not resemble an 1850's bank barn and has lost historic integrity.

The Forebay Wall

The original wall under the forebay (shown previously in Figure 29, page 53) was removed by the Millers sometime in the 1950's.[126] A new wall made of concrete blocks was constructed 7'-0" forward of the original location flush with the outside edge of the forebay. The CMU wall is unpainted and has nine windows (Figures 39 & 40). When the forebay wall on the lower level was removed, 7" hollow metal poles were added to support the summer beam shown in Figure 41.

Figure 39. Roulette Barn, View of South Wall. (Tabitha Gold, 2022).

[126] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014

Figure 40. Roulette Barn, View of South Wall. (Tabitha Gold, 2022).

Figure 41. Hollow metal poles added ca 1950's by the Roulette Family. (Tabitha Gold, 2022).

Chapter 6: Preservation Recommendations and Conclusions

Scope

This preservation plan recommends fully restoring missing features of the Roulette Barn without the use of modern materials. A reconstruction of the corn crib is possible with the proper selection of wood materials and craftsmanship in the same style of the original construction. The removal of the CMU wall and replacement of the original forebay wall would provide a more original appearance to the 1850's bank barn style. The recommendations below were developed in accordance with industry standards and best practices. Please refer to Appendix A for further discussion and supporting analysis for these recommendations.

Restoration

Foundations

The limestone foundation for the main section of the Roulette Barn is in good condition and the exterior faces were repointed with compatible lime mortar in 2004.[127] The interior portion of the stone foundation is in fair condition, though sections of the whitewash are missing. The interior of the stone foundation should be repointed with a lime mortar. The stone piers that comprise the corn crib foundation also require repair. Before the corn crib can be reconstructed, salvageable stones or similar limestone rock should replace the top approximate 6" of the piers. The mortar joints have deteriorated and developed voids that will contribute to diminishing the

[127] Rebecca Cybularz. *Roulette Barn Historic Structure Report.* Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014

structural integrity of the piers. The new stone used to replace the top of the piers should be matched to the original appearance, dimension, and random course pattern of the stone piers.

Frame

The forebay wall should be rebuilt with a wood wall below to match the appearance in the 1890's photo of the Roulette barn (Figure 29, page 53). The forebay wall should be located at approximately 7'-0" from the present CMU wall beneath the front summer beam. The installation of the CMU wall flush with the forebay side was likely intended to modernize and enclose the space of the barn for the later dairy operation, not support the cantilever. The gap in the wall seen in the top left corner of Figure 42 shows the location of the original forebay wall, while Figure 43 shows an exterior view of the intersection of the CMU wall and limestone foundation.

Figure 42. Viewpoint of CMU wall intersecting with limestone foundation wall (Tabitha Gold 2022).

Figure 43. Exterior showing CMU wall intersecting with limestone foundation wall (Tabitha Gold, 2022).

The cantilever will extend approximately 7’-0” when the CMU wall is removed. A historically appropriate wall, preferably made from white oak timbers, shall be constructed on the lower level. Currently wood posts were installed in the HPTC 2018 repair project to support the summer beam (Figure 44).

Figure 44. Post replacement under the summer beam on the lower lever (Tabitha Gold, 2022).

Siding for the new wood wall should be southern yellow pine board to match the repairs done by NPS. The new wall's wood siding should also be treated with a borate treatment as a preventative measure against termites. The joists supported by the summer beam are in good condition and deteriorated joists were replaced by NPS in the 2018 repair project. For reconstructing the wall under the forebay, historic joinery techniques should be used as necessary to incorporate the wall. Doors and windows also need to be incorporated into the new wood wall under the forebay.

Siding

On the east gable wall six panels of wood siding need to be replaced where the corn crib was previously attached. The replacement wood for the exterior siding of the barn should be southern yellow pine to match the repairs previously done by NPS on other elevations of the barn's siding.

Roof

The metal roof is an incompatible material for the historic appearance of the barn. While work was completed in the 2018 repair project for repainting the roof and installing half-round gutters and downspouts, a wood shingle roof or slate would be more compatible with the historic appearance. The original makeup of the roof is unknown. A slate roof is recommended due to the lifespan of slate being longer than a wood shingle roof.

Missing Elements

The corn crib/wagon shed will need to be reconstructed by using structural scaffolding. The new posts for the corn crib will need to be connected to the

limestone foundation and the structural components, including new sills, joists, posts, girls, and plates, will need to be erected. Corner posts will need to be joined with historically accurate techniques such as mortise and tenon joints. Once the framing members are erected, the vertical wood siding can be installed. The corn crib/wagon shed should also have a corresponding slate roof to match the main portion of the barn. In order to prevent future stress on the east gable wall, the corn crib/wagon shed should be reconstructed in a manner that allows it to be freestanding on the limestone foundation piers. This new frame would transfer all loads to the existing limestone piers.

The corn crib/wagon shed used to include an opening on the plan north and south elevations. Photos from the HSR performed by the NPS should be included in the documentation used to inform the reconstruction of the corn crib. White oak timber should be sourced that meets the specifications of NELMA (Northeastern Lumber Manufacturers Association) and NHLA (National Hardwood Lumber Association).

Some wood members of the corn crib have been salvaged and stored in the Roulette Barn (Figure 45).

Figure 45. Roulette Barn, Salvaged corn crib members stored in the main area of the barn (Tabitha Gold, 2022).

Original elements should be reused whenever possible. However, elements that are deteriorated or are from a more recent replacement (1950's), it is appropriate to replace the boards with white oak or southern yellow pine.

The corn crib was divided into three bays separated by posts. The north and south walls were connected by large tie beams at each corner post. The posts on the west side of the corn crib supported a roof plate that was 7" wide and 8" deep. The posts on the east side of the corn crib supported a roof plate that was 5" wide and 8" deep.

Figure 46. Photo of the corn crib and wagon shed in 2012 before the removal (HSR Rebecca Cybularz).

In order to start the process of reconstructing the corn crib, new sills need to be installed in the existing stone foundations. The top sections of the piers need to be reappointed with stone and mortar before new wood framing can be installed.

Maintenance

Historic preservation projects can be affected by hazards such as natural, building system, or human-influenced vulnerabilities, and regular inspection and maintenance are critical.

Maintenance Plan

The project will follow the Secretary of the Interiors Standards for restoration for the barn, and reconstruction for the corncrib/wagon shed. Standards 1-5 for

reconstruction and restoration will be followed for the Roulette Barn project.[128] Standard 7 which states: *Replacement of missing features from the restoration period will be substantiated by documentary and physical evidence. A false sense of history will not be created by adding conjectural features, features from other properties, or by combining features that never existed together historically.* will need careful evaluation because of the proposed reconstruction of the corn crib wagon shed and the removal of the CMU. Standard 8 states: *Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.* The chemical treatments proposed for the new wood members do not change the overall appearance of the barn and will help prevent termite damage and fungi growth. Standard 9 states: *Archeological resources affected by a project will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.* Careful archeological investigations should take place during the removal of the CMU wall. Standard 10 states: *Designs that were never executed historically will not be constructed.* If the area where the CMU wall exists requires supplemental supports such as posts, standard 10 will be difficult to abide by. However, wood materials such as posts are a more historically accurate representation of features that may have been added to a barn. CMU block is a modern material and should be removed to reach the requirements of standard 10.

[128] "The Secretary of the Interior's Standards for the Treatment of Historic Properties." National Parks Service. U.S. Department of the Interior. Accessed March 11, 2023. https://www.nps.gov/orgs/1739/secretary-standards-treatment-historic-properties htm.

i) **Short-term:** Short-term maintenance is defined as annual repairs required to the barn. A well-maintained property is one of the best investments for reducing future damage from vulnerability hazards. Some examples of short-term maintenance include regular cleaning of gutters and downspouts, and pest control measures to prevent, mice, rats, racoons, and pigeons from claiming territory in the unused spaces of the barn.

ii) **Long-term:** When the corn crib is reconstructed it is important to ensure that the wood used has been treated to extend the lifespan of the materials. Three factors that negatively affects the condition and lifespan of timber structures are improper wood treatment, inappropriate design of structural joints, and poor ventilation.[129] Treated wood has significantly less bore holes and fungal decay. Ventilation also helps wood structures from developing wet conditions that can also lead to decay. Biocides are a treatment option developed to control decay in wood and help control the effects of moisture on wood. Biocide systems were tested in American Wood-Preservers' Association soil block tests for decay fungi and for the American Society for Testing and Materials standard tests.[130] Another product that can be used for the corn crib is Bor8 rods. These can help control decay fungi that can cause structural failure in wood.[131] Bor8 rods

[129] Mariño R.A, X.C Carreira, Fernández M.E, and C Fernandez-Rodriguez. "Durability of Timber Structures in Agricultural and Livestock Buildings." Biosystems Engineering 104, no. 1 (2009): 152–60. https://doi.org/10.1016/j.biosystemseng.2009.06.009.
[130] Mariño R.A, X.C Carreira, Fernández M.E, and C Fernandez-Rodriguez. "Durability of Timber Structures in Agricultural and Livestock Buildings." Biosystems Engineering 104, no. 1 (2009): 152–60. https://doi.org/10.1016/j.biosystemseng.2009.06.009.
[131] Woodcare System Bor8 Rods. 2023 https://ewoodcare.com/store/ols/products/bor8-rods-34-x-3

also help prevent termites, beetles and other wood-boring insects. To prevent any water infiltration issues on the lower level, grooves can be carved into the existing slab-on-grade to help direct water out of the barn. Modern water proofing materials would not be historically accurate to the slab on grade in the lower level of the barn. If ponding persists outside of major rain events, a floor drain may be required to direct a larger amount of water out of the lower level. The barn's hillside setting naturally diverts water away from the structure; however, some standing water has been observed after large rainfalls. By including a preventative maintenance design into the reconstruction of the corn crib, the lifespan of the new attachment will be expanded. The Roulette Barn should also be painted to give the appearance of its white-washed look from the era of its peak agricultural use.

Interpretation

The designated period of significance for the Roulette Barn should be expanded to highlight its agricultural history in addition to addressing its historic use as a Civil War field hospital. The Roulette Barn retains its original setting in an agricultural landscape. Although the corn crib/wagon shed postdates the current period of significance (the battle of Antietam) it is a historic feature representing traditional 19th-century agricultural developments. The barn is distinguishable for its unique construction that represents the skills and craftsmanship of early barn builders in Washington County and immortalizes the Pennsylvania German migration.

Nancy Campbell's manumission and her life as a paid laborer on the Roulette Farm should also be incorporated into the interpretation of the barn. Developing these interpretive uses will better connect the Roulette Barn with Antietam National Battlefield and expand the public's exposure to the park overall.

Historical Agricultural Uses

The historic agricultural uses of the Roulette Barn provide the context and justification for why original features such as the cantilevers and addition of the corn crib should be restored. The barn overhang is a character defining feature of bank barns and their operation. Farm life revolves heavily around the seasons, and farmers took advantage of the angles of the sun in winter and summer for warming and cooling the barn. The summer was the critical productive time leading up to the important fall harvest. In fact, a key structural element of a bank barn is named the summer beam, after the summer season. The Roulette Barn is more than a representation of the stylistic Pennsylvania-German bank barn, it is a symbol of an era of migration and agricultural development culminating in a tumultuous time in the nation's history. A full restoration of the Roulette Barn will celebrate the original and continued agricultural development of the area.

Other barns in the United States have had success in renovating agricultural structures into interpretive museums and educational centers. A full restoration would celebrate its original use and importance beyond recognizing it as a Civil War witness. The designated period of significance should be expanded from 1861-1865 to 1855-1910. The architectural characteristics of a large timber bank barn in its rural setting is an example of mid- to late 19th-century family farms (Figures 47 & 48).

Figure 47. Rear View of the Roulette Barn (Tabitha Gold, 2022).

Figure 48. Landscape and setting of the Roulette Farm. (Tabitha Gold, 2022).

Repairing and preserving the historic features of the Roulette Barn will improve tourism opportunities in Antietam Battlefield Park. Various non-historic and

non-contributing additions and alterations have been removed by the NPS since acquiring the property. However, more work needs to be done to complete a full restoration. To change the use of the Roulette Barn for the public, it must meet the life safety requirements for Risk Category II. If the Risk Category is increased to have the space accessible to the public, exhibits can also be added with signage and educational information. The planned use of the Roulette Barn relies on the acceptable loading capacities in Risk Category II. The upper level can showcase to visitors the unique German-framed structural system of heavy timbers. The barn can also display its threshing level and educate visitors on the agricultural history of the area.

The Roulette Barn has historically been utilized for a variety of agricultural purposes and can now be used as an exhibition space to highlight its full history, its significance to the Civil War, and explore its continued use in the post-war agricultural economy of Antietam.

Comparative Case Study Examples

Other agricultural farm sites in the Northeast of similar periods of significance have turned the farms into educational centers for interpretation. Historic sites that have been transformed into museums provide a unique opportunity for visitors to learn about past agricultural and rural life. In Albany, New York, the Shaker Heritage Society preserves and interprets the family site, including a 1916 barn that visitors can view.[132] In Germantown, New York, an 1860 carriage barn was rehabilitated for

[132] Falk, Cynthia G. *Barns of New York: Rural Architecture of the Empire State* (Cornell University Press, 2012), 203.

tours hosted by the New York State Parks program.[133] The Clermont State Historic Site in Columbia County, New York is another example of active historic preservation of agricultural resources for public use.

Public Expansion

Antietam National Battlefield shares the land operations with ongoing farming practices to this day through an agricultural lease program. However, this section of the park containing the barn is not open to the public for battlefield tourism. Repurposing the Roulette Barn for the public at Antietam National Battlefield Park would allow for the public to interact with not only the barn's agricultural history, but also allow for an expansion of the park's U.S. Civil War history. Emphasizing and showcasing the Roulette Barn as a field hospital adjacent to the Sunken Road, as well as the site of Bloody Lane, will connect the farm's history with the remainder of the park. Presently, the Roulette Farm driveway has signage for maintenance vehicles only. However, it connects the barn with the park and tourists could go from the Miller Farm, Mumma Farm, and the Roulette Farm via the viewpoint from the Sunken Road. Currently the Roulette Barn is not accessible to the public and only has a gravel driveway.

The story of Nancy Campbell can also be told at the Roulette Barn. Nancy Campbell's story of manumission before the Battle of Antietam is important to the record of African American life in Maryland. The years leading up to the Civil War saw a transition as neighboring farms had both enslaved and free laborers. Maryland

[133] Falk, Cynthia G. *Barns of New York: Rural Architecture of the Empire State* (Cornell University Press, 2012), 203.

did not secede from the Union, though it initially remained a slaveholding state and many areas were sympathetic to the Confederacy.[134]

After Nancy's manumission, her options were still limited. She spent the rest of her years working as a farm laborer for the Roulettes until her death.[135] Jerry Summer, who was on the neighboring Piper Farm, was still enslaved after the Battle of Antietam and the subsequent Emancipation Proclamation.[136] When Maryland abolished slavery in 1864 Jerry Summers gained his freedom.[137] Jerry Summers continued to live and work on the Piper Farm as a paid laborer.[138]

Although neighboring farms continued to enslave African Americans, Nancy Campbell gained her freedom five years before Jerry Summers. Nancy Campbell and Jerry Summers's stories provide insight into post-war life in Sharpsburg. The expanded interpretive plans for the Roulette Farm should encompass several topics: Agricultural history, bank barn construction, the Civil War hospital site, and Nancy Campbell's story.

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[134] "At the Crossroads of Conflict." VisitMaryland.org. Maryland Office of Tourism Development. Accessed May 2, 2023. https://www.visitmaryland.org/article/civil-war-history.
[135] "Archives of Maryland (Biographical Series) Nancy Campbell." Maryland State Archives. Maryland State Archives, November 16, 2010. https://msa maryland.gov/megafile/msa/speccol/sc5400/sc5496/024600/024669/html/024669bio.html.
[136] "Slavery and Emancipation in Sharpsburg." National Parks Service. U.S. Department of the Interior, February 16, 2021. https://www.nps.gov/anti/learn/historyculture/slavery-and-emancipation-in-sharpsburg.htm.
[137] "A Guide to the History of Slavery in Maryland." Maryland State Archives. Maryland State Archives, 2007. https://msa.maryland.gov/msa/intromsa/pdf/slavery_pamphlet.pdf.
[138] "Slavery and Emancipation in Sharpsburg." National Parks Service. U.S. Department of the Interior, February 16, 2021. https://www.nps.gov/anti/learn/historyculture/slavery-and-emancipation-in-sharpsburg.htm.

Conclusion

The Roulette Barn is emblematic of the cultural and physical migration of settlers that culminated in a successful Western Maryland agricultural society. It represents the Pennsylvania bank barn style that evolved from cultural knowledge and practices employed by Pennsylvania German farmers and their ability to apply those practices on a new and rural landscape. It represents farming that was the foundational economy in the region, and the designs utilized by these farmers that lasted for generations. A reverence for the land is evident from the way barn elements are developed in harmony with the layout of their farming practices, such as employing cantilevers and using construction techniques to expand the farming complex as needed. The first bank barns were built out of the hillside, as if they were growing from the ground. As techniques developed, so too did the size and ambition of these characteristic structures. The knowledge and building practices brought by these farming cultures influenced and gave rise to enormous timber structures that can still be seen today on the sides of the rolling hills throughout Pennsylvania and Maryland.

This restoration project aims to replicate the appearance of the historical building as a 19th-century bank barn. The proposed preservation plan will substantially alter the exterior features of the Roulette Barn in a way that will enhance the historic agricultural features of the barn and connect the agricultural history with the Civil War history. The Roulette Barn has significant character defining features for 19th-century agricultural timber structures. The barn embodies the distinctive characteristics of a vernacular bank barn, evoking images of the region's broader

agricultural history, and expanding context of this physical historic location beyond its association with the Battle of Antietam. By extending the period of significance and restoring the barn, it can be utilized to showcase not only a moment in history where the barn was caught in the crossfire of war, but as a symbol and representation of the area's rich agricultural traditions and cultural history.

Appendix A –Repair Analysis

Design Analysis

The load capacity of the floor joists of the main barn will need to be analyzed with materials testing to determine the strength and properties of the wood. These floor joists are also supported by the summer beams. A full engineering analysis is required to determine if any reinforcement is required for the increased loads for the summer beam. The IRC (International Residential Code) guidelines are based on platform and balloon framing, a construction method to transmit vertical loads directly to the foundations. Balloon framing postdates the Roulette Barn and was a design where buildings had a continuous (non-interrupted) loading of the building to the foundations. Nails and hardware were essential for balloon framing in the late 19th century and platform framing was not well introduced until the early 20th century. Complex older buildings such as the Roulette Barn included corner posts, intermediate posts, and principle beams and posts were typically tenoned at intervals into the sills.[139] If the engineering analysis determines that posts need to be added on the exterior where the CMU wall is currently present, the quantity of posts can be difficult to calculate without modern guidelines to follow such as the IRC because the methods used in the charts are based on platform and balloon framing. The tables in the IRC provide guidelines for post placement and quantity based on span distances, not tributary areas. The tributary area is the portion of a deck that is supported by a

[139] Gabrielle M. Lanier and Bernard L. Herman, "Looking at Building Landscapes," in *Everyday Architecture of the Mid-Atlantic*, ed. Gregory Conniff, Bonnie Lloyd, Edward K. Muller, David Schuyler, (Baltimore, Maryland: The Johns Hopkins University Press, 1997), 77-91.

single post. This distance is half, or the mid-span, of the beam (in this case the summer beam) to the post. To calculate the design load for a post is to multiply the tributary area with the sum of the live and dead loads. The dead load is the self-weight of the structural members and the supported structure. If the Roulette Barn is accessible to the public, then the live load capacity needs to be at least 100PSF per ASCE-7-10.[140] There are four categories for designing a building for determining the occupancy in Table 1.5-1 of ASCE-7-10.

(1) Risk category I: Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agriculture facilities, certain temporary facilities, minor storage facilities.

(2) Risk category II: Buildings and other structures except those listed in Risk Categories I, III, and IV.

(3) Risk category III: Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300.

(4) Risk category IV: Buildings and other structures designated as essential facilities, including but not limited to: Group I-2 occupancies having surgery or emergency treatment facilities. Fire, rescue,

[140] MiTek, "ASCE 7 Occupancy/Risk Categories. February 13, 2020 https://www.mitek-us.com/wp-content/uploads/uploadedFiles/_RedesignSite/Content/documents/engineering/tech-articles/getting-started/TECH2-%20wyntk-%20asce%20occupancy%20categories.pdf

ambulance, and police stations and emergency vehicle garages.

Designated earthquake, hurricane, or other emergency shelters.[141]

Category I is intended for low-risk structures where there are no regular human occupants or only for a short amount of time. Category II is commonly used for buildings that have regular human use and can have less than 300 people congregate in one day. Category III serves groups of 300 or more congregating in one area. Category IV is intended for extreme and specific use buildings such as hospitals.

If the Roulette Barn's future use is intended for people to occupy for activities such as tours, the barn should be considered a category III for designing the cantilever supports. After the consideration of the dead loads and live loading requirements for the intended use of the Roulette Barn, a licensed Structural Engineer can finalize the design for the supports once the exact loading is determined. Alternatively, since the IRC does not provide a table for tributary areas for wood species and posts, and my qualifications are EIT and not PE, the American Forest & Paper Association (AF&PA) has guidelines on tributary areas that are supported by a wood post based on the species, cross section, and length. Most jurisdictions require an engineer to perform calculations, my recommendations are purely design recommendations, not construction documents. IRC table R507.4 provides maximum deck posts heights considering the wood species and tributary area.

The simplest form of modern construction, deck framing, is similar to old construction methods used in the Roulette Barn. However, the issue with the table is

[141] American Society of Civil Engineers. 2017. *Minimum Design Loads and Associated Criteria for Buildings and Other Structures : Asce.* Reston Virginia: Published by American Society of Civil Engineers.

the live load consideration is only up to 40 psf. Southern pine was used in the 2018 repair project and is recommended to select again for matching post materials. The height of the posts is predetermined because of the overhang from the upper level. If the smallest post size is desired to not obstruct the view of the cantilever a 4”x4” post can be used with a tributary area of 80 ft^2 however, this will require at least an addition of 10 posts to cover the span of over 100’ along the south cantilever side. If posts are added, it is recommended to increase the post size to 8”x8” allowing for a larger coverage of tributary area to support the cantilever for 160 ft^2. This greatly reduces the required number of posts to only 5 posts over the 100’ span. Each post would require a shallow foundation of cast in place concrete and this may require an on-site archeologist during ground disturbance.

In terms of the mechanical properties of wood, it is a plastic material, meaning that it does not return to its original position once loads are released. Once wood has reached its yield strength it does not “bounce back” and will continue to sag. Early builders discovered this issue and would often add later supports to address the material properties of wood over time. The cantilevered wood is in good condition and pieces that were suffering from termites and beetles were replaced by NPS in the 2018 repair project. In order to support large crowds of over 300, posts would need to be added to support the cantilever. It is not recommended to increase the live load requirements to risk category III for the Roulette Barn. Posts would take away from the original form of the cantilever.

If the Risk Category II for increasing the live load of the Roulette Barn is not required, then the posts are not required for supporting the overhang. The cantilevered

wood is in good condition and pieces that were suffering from termites and beetles were replaced by NPS in the 2020 repair project. A new wood wall will be installed 7'-0" in of the overhang.

Figure 49. Post and beam replacements previously performed by NPS in the 2018 repair project (Tabitha Gold, 2022).

Figure 50. Post and Beam replacements near CMU wall (Tabitha Gold, 2022).

Foundation Assessment

The depth of the stone foundations is unknown, so an investigative analysis should be performed to document the depth of the stone foundations. If the conditions of the foundations are good, they can be used for the reconstruction project. However, any stone foundations showing deterioration or missing stone should be replaced if the depth of the foundations is less than 2'-6". Footing depths should be below the zone of seasonal volume changes due to freezing, thawing, ground water, or frost zones.[142] Several factors go into the calculation for foundation depths and footers. The bearing capacity of the soil and the self-weight (dead load) of the structure are the two major factors in determining the new foundations. Typically, smaller structures such as sheds and small farm buildings have shallow foundations as opposed to deep foundations. Shallow foundations are used when the loads transmitted to the soil are relatively small- as opposed to deep foundations where the load coming from the superstructure is transferred to the soil vertically.[143] Shallow foundations can be used when the natural soil at the site has an acceptable bearing capacity, such as well drained acidic loam and clay soils in the Antietam National

[142] Kamesswara Rao N.S.V *Foundation Design Theory and Practice*. John Wiley & Sons Singapore. 2011. Date Accessed March 7, 2023. https://books.google.com/books?id=AY93DJMXPeYC&printsec=frontcover&source=gbs_ViewAPI#v=onepage&q&f=false

[143] Kamesswara Rao N.S.V *Foundation Design Theory and Practice*. John Wiley & Sons Singapore. 2011. Date Accessed March 7, 2023. https://books.google.com/books?id=AY93DJMXPeYC&printsec=frontcover&source=gbs_ViewAPI#v=onepage&q&f=false

Battlefield Area.[144] The soils in the park are primarily limestone, well-drained loam and clay with exposed patches of bedrock per the USDA soil survey.[145]

This calculation was performed by evaluating the mixture of different soil types in Antietam National Battlefield. A geotechnical sample should be conducted for the exact makeup of the soil at the corn crib location. However, the area has been surveyed by multiple cultural landscape reports and the USDA soil surveys throughout the years that it is safe to assume the composition of the soil at the Roulette Barn is like the other areas in the park. Bedrock soil is considered to have the highest bearing capacity. Clay has a significantly lower bearing pressure than bedrock, but is still considered acceptable for shallow foundations.[146] The well-drained loam has a lower bearing capacity than the clay and bedrock mix, however, the loam is typically located at the top of the soil profile close to the surface.

Wood Pegged Timbers Feasibility Study

For the reconstruction of the corn crib/wagon shed frame, a system of wood pegged timbers is acceptable. Bending tests performed on wood pegs by Daniel P. Hartman Ph.D, P.E. with the Department of Sustainable Biomaterials, at Virginia Tech, proved that wood pegs have a high resistance to shear forces.[147] The ASTM F 1575 standard test method for determining bending yield moments was adjusted for

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[144] T. Thornberry-Ehrlich, *Antietam National Battlefield, Chesapeake and Ohio Canal National Historical Park, & Harpers Ferry National Historical Park, Geologic Resource Evaluation Report. Natural Resource Report NPS/NRPC/GRD/NRR— 2005/006* (Denver, CO: National Park Service, 2005)
[145] Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.
[146] "Chapter 4: Foundations, Residential Code 2015 of Maryland." UpCodes. IRC International Residential Code , 2015. https://up.codes/viewer/maryland/irc-2015/chapter/4/foundations#4.
[147] Daniel P Hindman,. *Measuring the Bending Yield Strength of Timber Frame Pegs.* Final Report presented to Timber Frame Engineering Council. Department of Sustainable Biomaterials, Virginia Tech. January 5, 2017.

the experiment to represent two equally spaced loads, rather than one, to represent the double shear forces on a peg in a mortise and tenon joint. The ASTM F 1575 test is a methodology used for the bending yield moment of nails. [148]

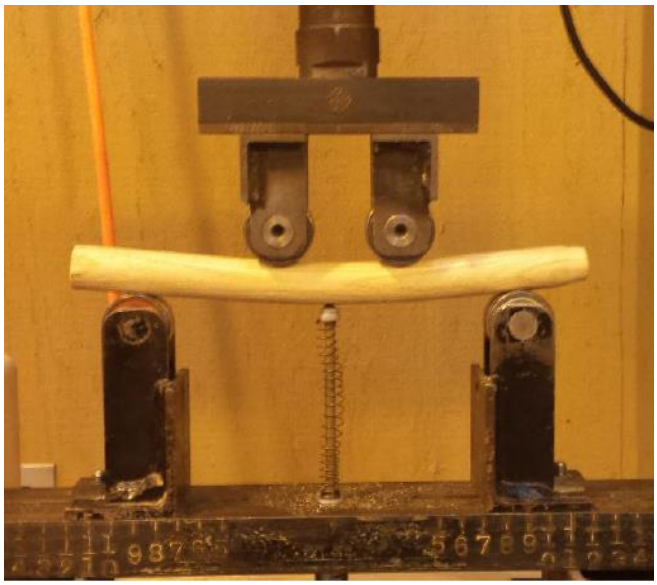

Figure 51. Virginia Tech, Peg Analysis. ASTM F 1575 Test. Report by Daniel P. Hindman

The results for varying types of wood species in the analyses by Daniel P. Hartman Ph.D, P.E confirm that wood pegs are an acceptable construction method for the reconstruction of the corn crib/ wagon shed. Four wood species were evaluated: white oak (Quercus alba), red oak (Quercus rubra), black locust (Robinia psuedoacacia) and hard maple (Acer saccharum and Acer nigrum).[149] The Roulette Barn includes a combination of wood species including white oak and southern yellow pine. The types of failures in the pegs observed in the test were splintering,

[148] ASTM Standard F1575/F1575M-21 "Standard Test Method for Determining Bending Yield Moment of Nails" ASTM International, West Conshohocken, PA, 2003. DOI: 10.1520/F1575_F1575M-21. ICS Code: 21.060.50 https://www.astm.org/f1575_f1575m-21 html

[149] Daniel P Hindman. *Measuring the Bending Yield Strength of Timber Frame Pegs.* Final Report presented to Timber Frame Engineering Council. Department of Sustainable Biomaterials, Virginia Tech. January 5, 2017.

cross-grain tension, simple tension, brash tension, and horizontal shear.[150] White oak was found to have a higher yield strength than the black locust, however, maple had the highest yield strength and ultimate strength. The yield point is the maximum stress the wood can endure before it becomes permanently deformed, while ultimate strength is the condition when the peg breaks entirely. In the sample of tests from Daniel P. Hartman's experiment, white oak had a significantly lower cross-grain failure compared to all other wood species in the sample. Cross-grain failure is like splintering; however, the break reaches the full span of the wood grain direction, and the peg pulls apart leading to a complete failure White oak mainly splintered in each test when failing, rather than a full cross-grain failure. White oak has been used in other replacement projects on the Roulette Barn such as wall replacements. White oak is found to be an acceptable material for reconstructing the corn crib with new pegged joints. In order to prevent future stress on the East gable side of the Roulette Barn, the corn crib should be constructed in a way that allows it to be freestanding. This new frame would transfer all loads to the limestone piers.

[150] Daniel P. Hindman. *Measuring the Bending Yield Strength of Timber Frame Pegs.* Final Report presented to Timber Frame Engineering Council. Department of Sustainable Biomaterials, Virginia Tech. January 5, 2017.

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Bibliography

Aggour M. Sherif. *Updated Bearing Capacity – SPT Graphs.* Maryland State Highway Administration Office of Policy and Research. Civil and Environmental Engineering Department. College Park, Maryland. March 2002. https://www.roads.maryland.gov/opr_research/md-02-sp007b49-updating-bearing-capacity-spt-graphs-report.pdf

American Society of Civil Engineers. 2017. *Minimum Design Loads and Associated Criteria for Buildings and Other Structures : Asce*. Reston Virginia: Published by American Society of Civil Engineers.

"Antietam National Battlefield Cultural Landscape Report." National Park Service U.S. Department of the Interior, December 2021. http://npshistory.com/publications/anti/clr.pdf.

"Archives of Maryland (Biographical Series) Nancy Campbell." Maryland State Archives. Maryland State Archives, November 16, 2010. https://msa.maryland.gov/megafile/msa/speccol/sc5400/sc5496/024600/024669/html/024669bio.html.

ASTM Standard F1575/F1575M-21 "Standard Test Method for Determining Bending Yield Moment of Nails" ASTM International, West Conshohocken, PA, 2003. DOI: 10.1520/F1575_F1575M-21. ICS Code: 21.060.50 https://www.astm.org/f1575_f1575m-21.html

"At the Crossroads of Conflict." VisitMaryland.org. Maryland Office of Tourism Development. Accessed May 2, 2023. https://www.visitmaryland.org/article/civil-war-history.

Balcomb, J. Douglas. 2008. *Passive Solar Buildings. Solar Heat Technologies, Fundamentals and Applications.* Cambridge, Mass.: MIT Press

Bock, H. Gordon. *Old House Journal.* Old House Journal Corporation Brooklyn, NY. August 1991.Date Accessed March 7, 2023 https://books.google.com/books?id=7CipCkCeRwwC&pg=PA54&dq=whitewashing+old+buildings&hl=en&sa=X&ved=2ahUKEwjg7ebksrT9AhWtElkFHZ5TCwIQ6AF6BAgBEAI#v=onepage&q=whitewashing%20old%20buildings&f=false

Boucher, Jack E. "6. Closer View of Farm Complex Looking from the East Southeast; Note East (Rear) Elevation and North End of Barn (Habs No. MD-85-A) and East (Rear) Elevation of Springhouse/Kitchen (Habs No. MD-85-B) - Roulette Farm, House, Sharpsburg, Washington County, MD." Library of

Congress, January 1, 1970.
https://www.loc.gov/pictures/item/md1283.photos.205057p/resource/.

Bouland, Heber. *Barns Across America*. St. Joseph, Mich.: American Society of Agricultural Engineers, 1998.

"Chapter 4: Foundations, Residential Code 2015 of Maryland." UpCodes. IRC International Residential Code , 2015. https://up.codes/viewer/maryland/irc-2015/chapter/4/foundations#4.

Cybularz, Rebecca. *Roulette Barn Historic Structure Report*. Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, June 2014

Cunz, Dieter. *The Maryland Germans*: A History. Princeton, NJ: Princeton University Press, 1948.

Elizabeth Piper letter to Sallie Farran. *Wilmington Watchman*, October 23, 1862:

Ensminger, Robert F. 2003. *The Pennsylvania Barn: Its Origin, Evolution, and Distribution in North America*. 2nd ed. Creating the North American Landscape. Baltimore: Johns Hopkins University Press.

Esh's Utility Buildings "Loafing Sheds: The Important Facts." https://www.eshutilitybuildings.com/articles/loafing-sheds-the-important-facts/ 2023

Falk, Cynthia G. *Barns of New York: Rural Architecture of the Empire State* (Cornell University Press, 2012)

Glanville, Abby. "Preservation Guide for Stone Masonry and Dry-Laid Resources ." Crater Lake National Park. NPS, 2008. http://npshistory.com/publications/crla/preservation-guide-stone-masonry.pdf.

Green, L Linda Maryland 1860 Agricultural Census Volume 2. Heritage Books. 2009.

"A Guide to the History of Slavery in Maryland." Maryland State Archives. Maryland State Archives, 2007. https://msa.maryland.gov/msa/intromsa/pdf/slavery_pamphlet.pdf.

Hindman, Daniel P. *Measuring the Bending Yield Strength of Timber Frame Pegs.* Final Report presented to Timber Frame Engineering Council. Department of Sustainable Biomaterials, Virginia Tech. January 5, 2017.

Historic American Buildings Survey, Creator, Howard Miller, Kathryn A Fallwell, Michael Gibble, Khanh Dao, and Robert R Arzola, Boucher, Jack E, Thomas T Waterman, and Jack E Boucher, photographer. Roulette Farm, Barn, Sharpsburg, Washington County, MD. Maryland Sharpsburg Washington County, 1933. translated by Wagner, Marthamitter, and Price, Virginia Barrettmitter Documentation Compiled After. Photograph. https://www.loc.gov/item/md1284/.

Historic Structure Treatment Record. Preserve and Repair the Historic Roulette Barn. Frederick Maryland: National Park Service Department of the Interior. Historic Preservation Training Center, October 2020

Kamash, Walis E, and Jie Han. "Numerical Analysis of Existing Foundations Underpinned by Micropiles." ASCE Library . Univ. of Kansas, Lawrence, K, May 3, 2016. https://ascelibrary-org.proxy-um.researchport.umd.edu/doi/full/10.1061/%28ASCE%29GM.1943-5622.0000833.

Lanier, Gabrielle M. and Herman, Bernard L. "Looking at Building Landscapes." In *Everyday Architecture of the Mid-Atlantic*, edited by Gregory Conniff, Bonnie Lloyd, Edward K. Muller, David Schuyler, p. 77-91. Baltimore, Maryland: The Johns Hopkins University Press, 1997.

LeVan Kenneth R. *Building Construction and Materials of the Pennsylvania Germans.* Vernacular Architecture Forum Annual Meeting, 2004. Harrisburg Pennsylvania.

Long, Amos. The Pennsylvania German Family Farm. Breinigsville, Pennsylvania: The Pennsylvania German Society, 1972.

Mariño R.A, X.C Carreira, Fernández M.E, and C Fernandez-Rodriguez. "Durability of Timber Structures in Agricultural and Livestock Buildings." Biosystems Engineering 104, no. 1 (2009): 152–60. https://doi.org/10.1016/j.biosystemseng.2009.06.009.

Martin, Justin. *A Fierce Glory: Antietam--The Desperate Battle That Saved Lincoln and Doomed Slavery.* United States: Hachette Books, 2018.

"Maryland's National Register Properties." Maryland Historical Trust. Accessed September 7, 2022. https://mht.maryland.gov/nr/NRDetail.aspx?NRID=12.

McMurry, Sally. *Families & Farmhouses in nineteenth-century America. Vernacular Design and Social Change.* The university of Tennessee Press Knoxville, 1997

McPherson James, *Crossroads of Freedom Antietam*. Oxford New York. March 5, 2002.

MiTek, “ASCE 7 Occupancy/Risk Categories. February 13, 2020 https://www.mitek-us.com/wp-content/uploads/uploadedFiles/_RedesignSite/Content/documents/engineering/tech-articles/getting-started/TECH2-%20wyntk-%20asce%20occupancy%20categories.pdf

“Monocacy Battlefield” National Register of Historic Places Registration Form. NPS 2013 https://mht.maryland.gov/secure/medusa/PDF/Frederick/F-3-42.pdf

“New Stone Foundation For An Equipment Shed.” Masonry Restoration . Fitzgerald Heavy Construction Inc. Accessed February 22, 2023. https://fitzgeraldtimberframes.com/new_stone_foundation_equipment_shed.html.

Nelson, Lee H. FAIA “Architectural Character: Identifying the visual Aspects of Historic Buildings as an Aid to Preserving their Character. U.S. Government Printing Office Washington DC.

Pain, William. 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 Ledgment, Their Lengths and Backings ; Trussed Roofs, Spires, and Domes ; Trussing-Girders, Partitions, and Bridges, with Abutments ; Centering for Arches, Vaults, &c. Cutting Stone Ceilings, Groins, &c. with Their Moulds ; Centers for Drawing Gothic Arches, Ellipses, &c. &c. Philadelphia: Published by J.H. Dobelbower and J. Thackara, 1797. link

Pomeroy, Ellen R. C. “The Woodstock Foundation, Inc.. Billings Farm & Museum.” Woodstock Foundation, 2019. https://billingsfarm.org/wp/wp-content/uploads/2021/04/2019-BFM-Annual-Report.pdf.

Radford William A. Framing : A Practical Manual of Approved Up-To-Date Methods of House Framing and Construction, Together with Tested Methods of Heavy Timber and Plank Framing As Used in the Construction of Barns, Factories, Stores, and Public Buildings ; Strength of Timbers. Forgotten Books, 1901. https://babel.hathitrust.org/cgi/pt?id=mdp.39015020071703&view=1up&seq=8

Rao, Kamesswara N.S.V *Foundation Design Theory and Practice.* John Wiley & Sons Singapore. 2011. Date Accessed March 7, 2023. https://books.google.com/books?id=AY93DJMXPeYC&printsec=frontcover&source=gbs_ViewAPI#v=onepage&q&f=false

Reed, Paula S. *The D.R. Miller Farm Antietam National Battlefield Sharpsburg, Maryland.* Preservation Associates, Inc. Hagerstown Maryland 21740, 1991 https://www.nps.gov/parkhistory/online_books/anti/miller.pdf

Ridout V, Orlando. “Agricultural Buildings.” In *Chesapeake House*, edited by Cary Carson, Carl R. Lounsbury. Chapel Hill, North Carolina: University of North Carolina Press, 2013, page 179-203.

“Roulette Farm (U.S. National Park Service).” National Parks Service. U.S. Department of the Interior. Accessed September 7, 2022. https://www.nps.gov/places/antietam-battlefield-roulette-farm.htm.

“Roulette Farmstead Cultural Landscape” National Parks Service. U.S. Department of the Interior Accessed November 2, 2022. https://www.nps.gov/articles/600284.htm#4/35.46/-98.61

Scharf, J. Thomas. *History of Western Maryland : Being a History of Frederick, Montgomery, Carroll, Washington, Allegany, and Garrett Counties from the Earliest Period to the Present Day ; Including Biographical Sketches of Their Representative Men*. Baltimore: Regional Pub, 1968. https://archive.org/details/historyofwestern01scha/page/26/mode/2up

Snyder, K. “Newcomer Farm.” National Parks Service. U.S. Department of the Interior. Accessed October 29, 2022. https://www.nps.gov/anti/learn/historyculture/newcomer-farm.htm.

“Slavery and Emancipation in Sharpsburg.” National Parks Service. U.S. Department of the Interior, February 16, 2021. https://www.nps.gov/anti/learn/historyculture/slavery-and-emancipation-in-sharpsburg.htm.

Stanton, Robert *Director’s Order #28: Cultural Resource Management* . June 1998. https://www.nps.gov/policy/DOrders/DOrder28.html

T. Thornberry-Ehrlich, *Antietam National Battlefield, Chesapeake and Ohio Canal National Historical Park, & Harpers Ferry National Historical Park, Geologic Resource Evaluation Report. Natural Resource Report NPS/NRPC/GRD/NRR—2005/006* (Denver, CO: National Park Service, 2005)

Tepper, Audrey T, and United States. National Park Service. Denver Service Center. The Mumma Barn : Antietam National Battlefield, Maryland. Denver, Colo.: United States Department of the Interior, National Park Service, Denver Service Center, 2000. https://babel.hathitrust.org/cgi/pt?id=mdp.39015042643919&view=1up&seq=7

“The Emancipation Proclamation.” The Emancipation Proclamation. National Archives and Records Administration, January 28, 2022. https://www.archives.gov/exhibits/featured-documents/emancipation-proclamation.

"The People of Tolson's Chapel." Tolsons Chapel. Tolsons Chapel Sharpsburg MD , April 26, 2013. https://tolsonschapel.org/history/people-tolsons-chapel/.

"The Secretary of the Interior's Standards for the Treatment of Historic Properties." National Parks Service. U.S. Department of the Interior. Accessed March 11, 2023. https://www.nps.gov/orgs/1739/secretary-standards-treatment-historic-properties.htm.

Thorburn S. *Underpinning and Retention*. S.l.: CRC PRESS, 2020 https://www.routledge.com/Underpinning-and-Retention/Thorburn-Littlejohn/p/book/9780367865955

"Timber Frame Engineering Council." Timber Framers Guild. Accessed September 7, 2022. https://www.tfguild.org/timber-frame-engineering.

"Slavery and Emancipation in Sharpsburg." National Parks Service. U.S. Department of the Interior, February 16, 2021. https://www.nps.gov/anti/learn/historyculture/slavery-and-emancipation-in-sharpsburg.htm.

Stinson, Marry. "WA-II-703 Piper House." Medusa, Maryland's Cultural Resource Information System- Version 1.5. Maryland Historical Trust., March 12, 2004. https://mht.maryland.gov/secure/medusa/.

Snell, Charles W and Sharon A. Brown " Antietam National Battlefield and National Cemetery an Administrative History". Antietam National Battlefield NR Update 1999.

"U.S. Constitution - Thirteenth Amendment ." Constitution of the United States . congress.gov. Accessed February 20, 2023. https://constitution.congress.gov/constitution/amendment-13/.

United States. U.S. Census of Agriculture. United States, 1870 https://www.census.gov/history/www/through_the_decades/questionnaires/1870_2.html

United States. U.S. Census of Agriculture. United States, 1880 https://www.census.gov/history/www/through_the_decades/questionnaires/1880_2.html

WCLR, Liber 828, folio 696.

WCLR, Liber IN6, folio 394.

WCLR, Liber IN7, folio 653.

WCLR, Liber 115, Folio 95

WCLR, Liber 311, folio 631

WC Will Book H, folio 404

"Wind Map," NOAA Climate (National Oceanic and Atmospheric Administration, February 26, 2023), https://www.climate.gov/teaching/resources/wind-map

Winter, Susan E. *Mill Settlement Patterns Along the Antietam Creek Drainage, Washington County Maryland.* Spatial Patterning in Historical Archeology: Selected Studies of Settlement. Edited by Donald W. Linebaugh and Gary G. Robinson. King and Queen Press. College of William and Mary in Virginia. 1994

Woodcare System Bor8 Rods. 2023 https://ewoodcare.com/store/ols/products/bor8-rods-34-x-3

YR Architecture + Design. "Passive Solar Design". Columbus. OH. 2023. Date Accessed: March 7, 2023. https://yr-architecture.com/an-intro-to-solar-orientation/

"112 – Roulette Farm, Late 18th Century, Sharpsburg, MD." Washington County Historical Trust. Accessed September 7, 2022. https://washingtoncountyhistoricaltrust.org/112-roulette-farm-late-18th-century-sharpsburg-md/.

1860 Census: Agriculture of the United States. https://www.census.gov/library/publications/1864/dec/1860b.html