Cultural Landscape Report

Halls Island: United States Rifle Factory and the Shenandoah Riverfront
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Harpers Ferry National Historical Park
Harpers Ferry, West Virginia

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Cover Illustration: Ruins of the U.S. Rifle Factory, c.1862-1866 (Image Courtesy of Harpers Ferry NHP Historic Photo Collection)

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EXECUTIVE SUMMARY

With one of the longest histories in town, Halls Island provides a wealth of potential for interpreting the diverse story of the historic river town of Harpers Ferry, West Virginia. Halls Island’s contributions to the historical narrative of the town include:

- The first developed site in Harpers Ferry, with Robert Harpers Mill Complex in 1751.

- As one of the first constructed pieces of the 1807 Shenandoah Canal, Halls Island played a key role in opening up the farming communities of the Shenandoah Valley to markets in Alexandria, Georgetown, Baltimore and Richmond.

- Location of Hall’s Rifle Works from 1819-1843, workshops for the inventor John H. Hall, leader in developing methods and machinery for mass production. His methods helped establish the American System of Manufacturing.

- Site of the rifle-manufacturing arm of the U.S. Armory at Harpers Ferry from 1844-1861, one of two U.S. Armories before the civil war.

- Early development of the Shenandoah Canal and the U.S. Armory in Harpers Ferry was largely influenced by George Washington.

- Major base of operations for Sheridan’s Shenandoah Valley Campaign during the Civil War, 1864.

- One of the sites of post war industry in Harpers Ferry with the Shenandoah Pulp Mill Company from 1888-1936, which are now the largest extant ruins in Harpers Ferry.

Halls Island comprises 15 of the 3,645- acres of Harpers Ferry National Historical Park and part of the original land grant for the park’s establishment in 1944. Several historical and archeological studies focused on Halls Island in the 1950s and 1960s, but otherwise limited development and maintenance has occurred on the island since the park’s establishment. The once bustling industrial center is now a quiet riparian forest community. Mature trees and herbaceous understory screen most of the remaining evidence to the island’s past. The massive ruins from the
Shenandoah Pulp Mill Company are hard to miss, but it takes a curious and careful eye to spot the above ground ruins from the U.S. Rifle Factory and the wall of the Shenandoah Canal. Challenges with the vegetation, remoteness and access to the island have led park staff to underutilize Halls Island as a resource for interpretation.

Two national register nominations, Harpers Ferry Historic District (1979) and Harpers Ferry National Historical Park (1981), include Halls Island as a contributing landscape. Halls Island is listed as significant for its association in the areas of archeology, architecture, commerce, industry, invention, military, politics and government, and social and humanitarian interests. Most notably, the site’s significance is highlighted by John Hall’s contributions to mass production and the American System of Manufacturing. However, neither of the existing nominations adequately document nor evaluate the landscape of Halls Island.

This cultural landscape report focuses on an extensive evaluation and documentation of the Island’s landscape, including an analysis and evaluation of its character defining features. The report’s findings concur with the significance outlined in the national register nominations and identifies a period of significance as 1751-1936. This period begins when Robert Harper received his first land grant for the area in 1751 and ends when the Shenandoah Pulp Mill ceased operations in 1936.

While the evaluation confirms the historical significance, Halls Island is lacking in historical integrity for the cultural landscape. Meaning, the extant historic features and characteristics cannot stand on their own to convey the landscape’s significance without the means of modification or interpretation.

An overall treatment recommendation for Hall’s Island is Rehabilitation, which allows for sustainable improvements while preserving any structural remnants. This approach includes thoughtful clearing of vegetation to improve visibility to the Rifle Factory ruins, improvements to provide universal access to the site, the development of interpretive trails and connections to other trail system, and incorporation of interpretive measures. Implementation of the treatment recommendations will improve visitor access and provide tools to tell story of the landscape’s inventive and industrial past.
ACKNOWLEDGMENTS

The Cultural Landscape report for *Halls Island: U.S. Rifle Factory and the Shenandoah Riverfront* is the result of the efforts, insight and encouragement of numerous individuals and the cooperation of many institutions. The staff of Harpers Ferry National Historical Park (NHP) was knowledgeable and supportive throughout the research and writing of this document. Invaluable to the project were Rebecca Harriett, Park Superintendent; Steve Lowe, Landscape Architect; Mia Parsons, Supervisory Archeologist; Richard Raymond, Former Curator; Peter Dessauer, Architect; Dennis Frye, Chief of Interpretation; Michelle Hammer, Museum Technician; Andrew Lee, Lands Management Assistant; John King, Interpretation; Dale Nisbet, Natural Resource Specialist; Todd Bolton, Visitor Services; Marsha Wassel, Interpretive Specialist; Michael “Cas” Castagnetto, Facility Manager; Richard L. “Tick” Gladden, Work Leader/Gardener; And thanks to all of the people working in the bookshops and visitor center whose names we did not write down.

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Part I: Site History, Existing Conditions, Analysis and Evaluation

Chapter I: Introduction
Halls Island is located in the town of Harpers Ferry, Jefferson County, West Virginia. Harpers Ferry is bordered by Maryland to the northeast and Virginia to the southeast in a Blue Ridge Mountain gap at the confluence of the Potomac and Shenandoah Rivers. North and west of Harpers Ferry is the Great Limestone Valley of the Ridge and Valley Province, or Shenandoah Valley.

**FIGURE 1: PHYSIOGRAPHIC PROVINCES OF THE APPALACHIAN REGION (COURTESY OF FENNEMAN & JOHNSON, 1946).**
Within Harpers Ferry National Historical Park (NHP), Halls Island is approximately a 19-acre linear section of land located on the shore of the Shenandoah River. Bordered on its east (downstream) by Virginius Island, Halls Island continues a few hundred yards past the Highway 340 Bridge on its upstream (west) side. Shenandoah Street and Shoreline Drive border it on its north side.

Halls Island has been under the management of the National Park Service (NPS) since 1944 with the establishment of Harpers Ferry as a National Monument to commemorate historical events at or near Harpers Ferry. The National Monument was officially designated Harpers Ferry National Historical Park in 1963. Halls Island is one of the many dynamic landscapes within the 3,645-acre park. (Map 1: Context Map)

**Historical Overview**

In the 1730s, Europeans moved into the isolated Shenandoah Valley. Robert Harper, an early settler and the town’s namesake, arrived in the area in 1751. He established a sawmill and a grist mill utilizing the water power of the Shenandoah River on land about a half-mile upriver from the where the Shenandoah meets the Potomac River.

Thomas Jefferson travelled to Harpers Ferry in 1783 and described the landscape “…as placid and delightful, as that is wild and tremendous.” George Washington declared the Potomac River to be the best highway between the Ohio River and the new Federal City. Rapid development at Harpers Ferry, and a legacy of arms manufacturing, began in 1797 when the federal government sited the town as the location for one of two federal armories.

Through the encouragement of George Washington, the Potowmack Company initiated the construction of a system of skirting canals along the Shenandoah River. These canals were instrumental in opening up a river highway from the fertile Shenandoah Valley to markets in Georgetown and Alexandria, Virginia. By 1807, a portion of the Shenandoah Canal was completed at “Sawmill Falls” creating the island known today as Halls Island.
John H. Hall arrived in Harpers Ferry in April 1819. As an independent contractor to the federal government, Hall worked in the U.S. Armory at Harpers Ferry to manufacture his patented breechloading rifle, but more importantly to develop methods for manufacturing arms with interchangeable parts. What started out as an experimental project utilizing two wood-frame workshops developed into a series of factory buildings on the shore of the Shenandoah River known as Hall’s Rifle Works. In the pursuit of interchangeable parts, Hall developed innovative machinery for manufacturing arms. In March 1827, Hall patented his machinery and pushed the world of arms manufacturing from the artisan and craftsman to the machine aided by unskilled laborers. With the evolution of his machinery, Hall became a leader in mechanized arms manufacturing that helped to pave the way for developing mass production in America.

In the 1840s, conditions of the workshops and factories on Halls Island had significantly deteriorated, John Hall left Harpers Ferry, and the Hall’s Rifle Works transitioned into the U.S. Rifle Factory. In addition, the U.S. Armory moved away from civilian superintendents towards a full military leadership. The early military superintendents pushed hard for the renovation of the U.S. Armory at Harpers Ferry, including the U.S. Rifle Factory. With funds
approved by Congress, and design guidelines developed by armory Superintendent Major John Symington, a substantial modernization effort began at the Rifle Factory in 1844 lasting up until the start of the Civil War. During this period, the dilapidated workshops from the Hall’s Rifle Works were removed and replaced with large modern factories in a uniform Romanesque architectural style. The site underwent substantial grading to raise building floor elevations and was fully enclosed with a masonry and iron fence.

The U.S. Armory and Rifle Factory were early targets during the Civil War. The Confederate Army marched into Harpers Ferry in April 1861, stole machinery, and set fire to all the workshops. The town flipped between Union and Confederate occupation several times during the war, but the Union Army repaired some structures and transformed Harpers Ferry and Halls Island into a major base of operations for Sheridan’s Shenandoah Valley Campaign. After the war, the town and factories were left destroyed. Halls Island lay relatively dormant until March 1885 when the federal government sold the old Rifle Factory site to a group of investors led by Thomas Savery, a leader in the Delaware paper industry.

Savery demolished the old Rifle Factory ruins and constructed The Shenandoah Pulp Company on Halls Island in 1887. To power the mill and facilitate the soaking and transport of logs, a large portion of the site was dredged and flooded by an impoundment known as Lake Quigley. The lake and pulp mill operated with varying levels of production for forty-five years on Halls Island. Production ended in 1935 and the island ceased to function as a center for industry.

Harpers Ferry National Monument was established in 1944 through Public Law (P.L.) 78-386. The initial land donation to the National Park Service included Halls Island. Limited development has occurred on Halls Island since 1944, but NPS efforts have included ruin stabilization, archeological preservation, trail construction and limited wayside developments. Additional modifications developed on the Upper Halls Island with the construction of the Highway 340 Bridge, the River Access Parking Lot and Shoreline Drive. The Shenandoah Canal remains through topographical depression, but has been dry since 1949, after the first Highway 340 Bridge was constructed. The remaining portion of Halls Island has evolved into a riparian forest and sedimentation has filled the once divisive channel between Halls and Virginius Island.
**General Description**

Cultural Landscape Reports have two objectives: they explore and recommend treatments of cultural landscapes in the National Park Service, and they provide a basis for long-term or on-going interpretation and management of those landscapes. Generally, aCLR is divided into two parts. Part I explores a site’s history and evaluates the condition of existing landscape features to determine integrity and historical significance. Part II focuses on developing a management philosophy, treatment alternatives and specific treatment recommendations. The recommendations developed in Part II evolve from the findings of Part I, park management objectives and the Secretary of the Interior’s guidelines for the treatment of historic properties.

Recommendations for treatment derive from federal guidelines specific to the treatment of cultural landscapes. Cultural landscapes are defined by these guidelines as “a geographic area (including both cultural and natural resources and the wildlife or domestic animals therein) associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.”

This report generally follows the content guidelines suggested in *A Guide to Cultural Landscape Reports: Contents, Process and Techniques*. These guidelines result from evolving research into cultural landscape assessment and treatment by the NPS over many years.

**Project Definition**

A Cultural Landscape Report (CLR) serves the NPS as both the primary treatment document for cultural landscapes and as a tool to inform day-to-day management decisions and long-term preservation strategies. This CLR has been prepared for Harpers Ferry National Historical Park in support of project planning and compliance efforts focused primarily on providing improved public access and interpretation of Halls Island. This report narrates the history of Halls Island, identifies and evaluates significant cultural landscape features, and provides treatment recommendations that focus on preservation, stabilization, access, safety and rehabilitation of those landscapes.
Study Boundaries

Halls Island is bordered by the Shenandoah River on its south side and Shenandoah Street to its north. The eastern wall of the boiler house ruins defines the eastern boundary and to the west the boundary extends in an irregular pattern a few hundred yards upstream of the Highway 340 Bridge which approximates the historic divide between Upper and Lower Halls Island. (Fig. 3: Project Boundary)
Park Planning Efforts

A park’s plans, such as a General Management Plan (GMP) and Site Development Plan, provide the basic framework for treatment and management of cultural and natural landscapes. Treatment recommendations in a CLR guide physical implementation for specific landscape areas. Cultural landscape treatments are discussed in broad terms in the park’s overall GMP and/or site development plan, which typically recommends further study and development. The cultural landscape report focuses on a component landscape within the park allowing it to elaborate on the GMP guidance by providing specific treatment recommendations to shape the physical design and management of the landscape.

The NPS has been involved in planning efforts for the Halls Island landscape since the park’s establishment in 1944. Harpers Ferry has a history of park planning based on a series of guiding documents. The last guiding management plan was a Development Concept Plan completed in 1980. It was essentially an annotated and diagrammatic site plan of the park without an associated report. The 1980 Development Concept Plan does not specifically recognize Halls Island; however, it was often considered a part of Virginius Island during the park’s early years. The plan provides a proposal for Virginius Island to include an industrial history interpretation facility, interpretive trails and stabilized foundations.

The Cultural Landscape Report: Virginius Island, Harpers Ferry National Historical Park completed in 1993 for neighboring Virginius Island provided some treatment recommendations that included the Shenandoah Pulp Mill Ruins and adjacent property. These recommendations were reviewed, updated and incorporated as appropriate in this current study.

A General Management Plan/Environmental Impact Statement (GMP/EIS) recently completed its final review process and was adopted by the regional director in August 2010. This plan will be the base document for managing Harpers Ferry NHP for the next fifteen to twenty years.

On page seventy-eight of the document, the treatment identified as the preferred alternative categorizes Halls Island as part of an Archeological Preservation Zone, which would preserve archeological resources in place.
while implementing an active program of stabilization and preservation of remnant structures. “Excavation on Halls Island would be limited to exposing building foundations or other ruins providing interpretive and educational opportunities…”

Recommendations for Halls Island in the GMP/EIS include:

- Management for preservation of archeological resources
- Exposure and/or “ghost-in” structures
- Some natural resource manipulation for cultural purposes, wetland preservation
- Interpretation of the story of the battle between man and natural forces
- Interpretation of Halls Island
- Interpretation for stabilized/exposed ruins with signs
- Primarily self-guided and occasional ranger-led tours
- Management as an archeological preserve and natural area
FIGURE 4: HARPERS FERRY DESIGN CONCEPT PLAN (DENVER SERVICE CENTER TIC 317270).
Scope of Work

The purpose of this cultural landscape report is to document the history and significance of Halls Island, with an emphasis on the physical landscape features and to guide the future treatment of the natural and cultural resources remaining on site. A cultural landscape report (CLR), as defined by the NPS, is the principle guide for treatment and use of a cultural landscape. Referencing appropriate historical contexts, a CLR documents and evaluates landscape features and characteristics based on the National Register of Historic Places criteria. The historical timeline is typically divided into historical periods based on shifts in use, ownership or management of the landscape. Each period, including those deemed not significant are researched and analyzed for its setting, development, materials, construction activities and use. Existing site features and characteristics are then evaluated based on the historical context and assigned a level of integrity. Rooted in this historical research and analysis, preservation goals are determined and a means for meeting these goals is developed and documented in the treatment section or part II of the CLR. Preservation and treatment recommendations are focused on protecting significant cultural resources and are consistent with the Secretary of the Interior’s Standards for the Treatment of Historic Properties. The CLR for Halls Island is developed in two parts.

Part I of the report, Site History, Existing Conditions and Analysis & Evaluation, documents the site’s history and examines the site’s existing conditions by identifying the historic and existing landscape features. The Analysis & Evaluation chapter explains the identified Historical Period of Significance, evaluates the overall historical integrity of the cultural landscape as well as the integrity of individual landscape features. The existing landscape features are measured against their historic character and determined to be contributing or non-contributing elements to the landscape’s identified historical period of significance. Non-contributing elements are further identified as compatible or non-compatible.

Part II, Treatment, discusses a broad approach to treatment and management of cultural landscapes as defined by The Secretary of the Interior’s Standards for the Treatment of Historic Properties. Rehabilitation is the specific treatment approach for Hall’s Island and provides an overriding framework and philosophy for the cultural landscape. This approach is fully discussed with specific recommendations for the overall site and for individual management zones.
Methodology

Research and inventory efforts for this report occurred primarily from April 2009 through December 2009 and the final production of graphics, analysis and treatment sections occurred in January through September 2010. Research efforts included study of both primary and secondary sources acquired from Harpers Ferry NHP Archives, the National Archives, Library of Congress the Department of Interior Library, the NPS National Capital Region Cultural Landscapes Library and online resources. Primary sources included historical maps, drawings, photographs, Ordnance Department records, and National Park Service records. Secondary sources included books, web-based information and historical and archeological reports prepared by the National Park Service. These sources provided context and background for the CLR.

Field studies conducted in multiple seasons throughout 2009 and 2010 provided the basis for site analysis and evaluation. During the field studies, the CLR team examined and evaluated landscape features to determine historical significance. Base data provided by the Regional GIS Specialist included aerial photographs and GIS data for Halls Island and this data was utilized for the development of the initial basemap. GIS data included topography from aerial photography, as there have not been any recent field topographical surveys conducted for the site. Field surveys performed in 1963 and 1980 provided topographical data for portions of the site. The project basemap incorporated data from all of these sources along with supplemental field observations and limited field measurements.

The treatment recommendations developed from a synthesis of the site history and the evaluation of the modern landscape. The CLR team identified seven landscape character areas/management zones for the formation of design development. Treatment concepts were presented by the CLR team in meetings with park personnel in 2009 and early 2010 where a broad discussion of management issues were considered. All treatment recommendations included in this CLR support or follow federal standards, pre-existing park planning documents, and park needs for management, visitor access and interpretation.
**Summary of Findings**

This study identifies a period of significance for Halls Island from 1751 (Robert Harper’s first land grant in Harpers Ferry) to 1936 (Shenandoah Pulp Mill operations cease). Halls Island and its related features are significant for their association with events that have made a significant contribution to the broad pattern of our history (National Register Criterion A), its association with the lives of persons significant in our past (National Register Criterion B) and for information about our history or prehistory that it may be likely to yield (National Register Criterion D).

Today the site’s past is revealed through ruins and remnants from multiple historical periods. These include the following landscape features: stone wall remnants and the time-altered topography of the Shenandoah Canal (1807); Winchester & Potomac Railroad bridge abutment remnants under the existing railroad tracks (1836); foundation ruins from U. S. Rifle Factory workshops (1844-1859); turbine pit ruins from the Rifle Factory machine shop (1853); Shenandoah Pulp Mill and Boiler House ruins (1887); Lake Quigley wall ruins (1887).

Contributing landscape characteristics identified for Halls Island through the analysis and evaluation of existing features include: natural systems and features; spatial organization; the transportation as a land use; primary circulation features including Shenandoah Street, the canal, the river and the railroad; some aspects of the topography; archeology; and in the category of vegetation, there are two sycamores on the site that date back to the 1880s.

**Terminology**

**Annealing:** The process of softening metal by heating to a uniform dark-red. After a tool has been forged, it is best to anneal it, or soften it, before hardening and tempering.

**Breechloading rifles:** A breechloading rifle is one that is loaded at the breech or near the rear of the gun.

**Canal Prism:** A reference to the cross-sectional shape of a canal.

**Factory:** In this report, the term Factory refers to a collection of buildings or workshops utilized in the manufacture of arms at the U.S. Armory in Harpers Ferry. The armory included two factories, the U.S Rifle Factory
located along the Shenandoah River and the U.S. Musket Factory located along the Potomac River. Both factories ceased operations at the onset of the Civil War.

**Forging & Tempering Shop**: A shop for forging, hardening and tempering of steel tools for cutting metals as a part of blacksmithing. Also called a Smiths Shop.

**Forging**: The shaping of metal using localized compressive forces traditionally performed by a blacksmith using hammer and anvil. At the Rifle Factory, forging was typically performed with a tilt-hammer.

**Freshet**: A flood resulting from heavy rain or a spring thaw. It is most commonly used to describe a spring thaw resulting from snow and ice melt in rivers located in the northern latitudes of North America, particularly Canada, where rivers are frozen each winter and thaw during the spring. A spring freshet can sometimes last several weeks on large river systems, resulting in significant inundation of flood plains as the snow pack melts in the river's watershed.

**Headrace**: A watercourse that feeds water into a mill, water wheel or turbine.

**Historical Base Map**: An old term used to describe the graphic format used to record a landscape during a designated period or specific date. The contemporary term is “Period Plan” as used to title the plans associated with the historical periods outlined in the site history chapter of this report.

**Impoundment**: A civil engineering term for a body of water that is used to save or collect water in a dam or reservoir.

**Interchangeable firearms**: An advancement in manufacturing firearms that John Hall perfected during his tenure at the Harpers Ferry Armory. Hall successfully achieved this method in 1822. His advancement provided a means for economically fabricating arms exactly alike by unskilled workers. Each rifle or musket was manufactured in such a manner as to ensure a perfect observance of any established model and to furnish in the arms themselves a complete test of their conformity to it.

**Jobbing Shop**: A manufacturing facility designed to produce several different products of specialized items in small quantities. A machine shop is a type of job shop.
**Machine Shop:** A factory or workshop where metal is cut and shaped by machines.

**Path:** An exterior or interior way of passage provided for pedestrian travel.

**Perch:** A traditional unit of measure being standardized to equal 16.5 feet. Also, a traditional unit of volume for stone and other masonry. A perch of masonry is the volume of a stone wall one perch (16.5 feet) long, 18 inches high, and 12 inches thick. This is equivalent to exactly 24.75 cubic feet, 0.916667 cubic yard, or about 0.700842 cubic meter.

**Rood:** An area equal to approximately one quarter of an acre or 40 square rods.

**Smiths Shop:** A Blacksmiths Shop. Often referred to as the forging and tempering shop, or forge shop. A furnace would be incorporated into the smiths shop.

**Tailrace:** A channel for conveying water away from a point of industrial application (as a waterwheel or turbine) after use.

**Tempering:** To impart strength or toughness to metal by heating it to some temperature below the transformation point, maintaining it there for some time, then cooling it under controlled conditions.

**Tilt-hammer:** A heavy forge hammer with a pivoted lever by which it is tilted up and then allowed to drop. The tilt-hammers at the Rifle Factory would have been powered by a water wheel.

**Trail:** A pedestrian route developed primarily for outdoor recreational purposes. A pedestrian route developed primarily to connect elements, spaces, or facilities within a site is not a trail.

**Walk or sidewalk:** An exterior prepared surface for pedestrian use.
Context Map

National Park Service
National Capital Region
Cultural Landscapes Program
www.nps.gov/ncro

SOURCES
1. 2009 GIS Basemap / T. Stidham
2. Aerial photograph, 2005

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September 20, 2010

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National Park Service, D. Poss
National Capital Region / Cultural Landscapes Program
Illustrator / Photoshop CS4

DRAFT

Scale: 1" = 800'

LEGEND
- Harpers Ferry NHP
- Canal River
- Railroad
- Roads
- Trails

Visitor's Center
Bolivar
Camp Hill
Halls Island
Virginius Island
Harrower Heights

Potomac River
C&O Canal
C&O National Park Service
National Capital Region
Cultural Landscapes Program
www.nps.gov/ncro

Cultural Landscape Report
Halls Island/
U.S. Rifle Factory
Harpers Ferry National Historical Park
Harpers Ferry, West Virginia
Part I: Site History, Existing Conditions, Analysis and Evaluation

Chapter II: Site History
PREHISTORY - 1818: EARLY SETTLEMENT TO ARMORY ESTABLISHMENT

_Halls Island Setting_

Halls Island is located in Harpers Ferry, Jefferson County, West Virginia. The town of Harpers Ferry is bordered by Maryland to the northeast and Virginia to the southeast, situated in a gap within the Blue Ridge Mountain chain at the junction of the Potomac and Shenandoah Rivers. North and west of Harpers Ferry is the Great Limestone Valley of the Ridge and Valley Province, or Shenandoah Valley. The region is rich in natural resources, which provided a bounty for early indigenous groups and later European settlers. During early European settlement, the land in the valley was described by a Swiss explorer, Franz Louis Michel, as a “considerable tract of wild and uncultivated deserts” that lay along the lower stretches of the Shenandoah River. “There is good land, where are great forest trees of oak, and where much game abounds. All this country is uninhabited except by some Indians.”1

_Prehistoric Occupations_

Although the earliest evidence of human occupation in the Potomac Valley dates from the Paleo-Indian Period (ca. 11,000 B.C.), the earliest evidence of prehistoric use of Harpers Ferry, discovered thus far, dates to the Late Archaic Period (ca. 1,500 B.C.). However, archeological excavations conducted in the backyards of park Buildings 32 to 36 uncovered “relatively dense prehistoric usage of the area, circa 1,200 to 500 B.C.”2 The earliest occupation dates to the beginning of the Early Woodland Period, approximately 1,200 B.C., and is identified by sherds of Marcey Creek pottery, one of the earliest, ceramic types found in the Potomac Valley. Marcey Creek pottery is modeled after bowls made of soapstone (steatite) quarried from sources along the fall line in the vicinity of Washington, D.C. Interestingly, Marcey Creek pottery is tempered with crushed soapstone and sometimes includes broken pieces of the earlier, Late Archaic Period soapstone bowls.3

Archeological studies indicate that remaining Archaic Period sites are more likely to be located on bluffs overlooking a river and that Woodland Period
sites are more typically found in the bottomland; the floodplain of the river. Halls Island’s location in the floodplain of the Shenandoah River makes it a high potential for seasonal occupation during the Woodland Period, though it should be noted that earlier sites have probably been lost to erosion.

A few pieces of Seldon Island Ware Pottery were also found in Harpers Ferry. These vessels are similar to Marcey Creek Ware, but thought to date slightly later, circa 1000 to 700 B.C. The third and most dense occupation dates to the Early Woodland Period from 900 to 500 B.C. and is characterized by Accokeek ceramics. The Accokeek Ware was mostly tempered with sand from the coastal plain portion of the Potomac Valley.

Only two of the vessels identified with this period were tempered with shale instead of sand. The shale, which is available locally, indicates that these two pots were most likely made at Harpers Ferry. Marcy Creek, Seldon Island, and Accokeek pottery represent the development and succession of the three earliest ceramic types in the Potomac Valley, from earliest, ca. 1,200 B.C. to most recent, ca. 500 B.C. This indicates Harpers Ferry was visited regularly during all of these periods.

Archeological investigations of the 522 Bridge Site in nearby Warren County, Virginia, revealed nine, round, house patterns in association with sherds of Accokeek pottery, similar to that found at Harpers Ferry. The houses were about twenty feet in diameter and defined by dark, oval stains resulting from small posts being driven into the ground to create the frame of the structure. Because of the depth of the excavations at Harpers Ferry, measuring more than six feet, it was not possible to open up a large area. Even so, some postholes were discovered that were similar in size and spacing to several of the structures at the 522 Bridge Site, suggesting that similar structures may have been present during the Accokeek occupation at Harpers Ferry.

The local vegetation during these early occupation periods was predominately a mixed hardwood forests of alder, hickory, pecan, chestnut, walnut, hazel, pine, oak, hemlock, elm, linden and basswood. Archeological analysis indicates there were naturally occurring clearings in the forest along the river banks. They were enlarged over time, likely due to additional clearing for an increased occupation of base camp sites during the Accokeek period of occupation.
The first domesticated plants in the Potomac Valley were sunflowers (2100 B.C.), gourds, squash and sumpweed. However, horticultural practices were not utilized until 800-1100 A.D. Beans were not introduced until approximately 900 A.D. and maize not until 1100 or 1300 A.D. Settled village life was a result of highly developed horticultural practices and would have occurred considerably later than occupations identified at Harpers Ferry. Indian occupations prior to 800 A.D. would have been solely based on a hunter/gatherer existence with seasonal villages; clearings in the forest for housing at seasonally advantageous times of the year throughout the bottomland areas of Harpers Ferry. There is evidence of later indigenous farming in the Harpers Ferry area based on the legend of “The Pumpkin Flood” in 1753, so named for the great numbers of pumpkins that washed down from the gardens of nearby Indian Villages.

The strategic confluence of the Shenandoah and Potomac Rivers were most likely the primary draw for early seasonal occupations in Harpers Ferry. The rivers provided transportation and trading opportunities, and an ample source of food and water. The rivers’ confluence created an advantageous meeting place, or trading spot that would have received its highest use after a large harvest. Generally this was in the late fall to early winter, when plenty of nuts and berries are readily available and deer hunting is at its prime. Bands of Accokeek people could have converged at the intersection of the Shenandoah and Potomac Rivers from places like the 522 Bridge site and other spots in the Potomac Valley.

The next occupation did not occur again until the late prehistoric/proto-historic period, as evidenced by sherds from a Qualla Ware vessel and a Levanna triangular arrowhead. The closest source for Qualla pottery is northwestern North Carolina, where it has been defined archeologically as the pottery of the proto-historic Cherokee. How this single, Qualla Ware vessel came to be at Harpers Ferry is open for speculation. Most likely, it was carried north on the old Indian path that became the ‘Great Wagon Road.’ The path led through the Great Valley from Yadkin River in North Carolina to Philadelphia and was a major Indian trade route. It is also cited as a motive for major territorial battles during the historic period between the Five Nation Iroquois and the Cherokees.
The Iroquois were a powerful nation who claimed hunting rights for the entire Appalachian region from North Carolina to New York and into Canada. Their people travelled the old path through the Great Valley and were known to have traveled as far south as South Carolina to attack the Cherokees. Early Cherokee occupation in Harpers Ferry may have been a potential reason for the later intense territorial wars between the two nations. Warfare in the region became endemic around 1400-1550 A.D.

The Susquehannocks came to the lower Susquehanna Valley between 1550 and 1575. Within a short period of time they became the region’s dominant ethnic group. Though the Susquehannocks were known to live in large villages, no permanent villages have been discovered in the Great Valley. This area was contested ground and the region continued as a conflict zone in the seventeenth century for the Delaware and Catawba tribes. Tuscarora and Shawnee tribes also erected temporary villages of bark huts and continued to hunt deer and elk during this period in the valley. The rich natural resources available in Harpers Ferry were characteristic of many areas in the Shenandoah Valley, likely fueling the region’s identity as a place for raiding and exchange that led to a culture of persistent warfare between northern and southern Indian nations. Consequently, when Europeans first began to settle in the Shenandoah Valley around 1600, the area lacked any firmly established indigenous settlements and had not supported any for about 100 years.

**European Arrival in the Shenandoah Valley**

In 1649 King Charles II of England set aside this entire tract of land, (known as the Northern Neck Proprietary and comprising more than five million acres), for two Virginia Culpeper family members in honor of their faithful services rendered to the crown. In the mid-seventeenth century, Europeans had little knowledge of the upper Potomac and Shenandoah Valley. Jon Lederer, an explorer commissioned by Virginia’s Governor Sir William Berkeley, was the first European to visit the Shenandoah Valley. He was to investigate the area in three expeditions between 1669 and 1670. The first map of the area was developed thirty years later by Swiss visitor Francis Louis Michel, in 1701. The Northern Neck Proprietary would pass into the sole ownership of Lord Culpeper in 1688, and eventually transferred to his grandson Thomas, the sixth Lord Fairfax, who claimed the estate in 1736 and was officially confirmed as the owner in 1745.
Europeans first moved into the Shenandoah Valley in the early 1730s. Their settlement in this area was due in part to economic and demographic pressures that pushed them out of earlier settled areas of Pennsylvania and the Mid-Atlantic. The Shenandoah Valley was an isolated territory that may have escaped their attention had it not been for land policies of Colonial Virginia’s Governor William Gooch. With Spanish and French territories pushing in from the south and west, and unsettled boundary disputes between Maryland and Fairfax to the north, there was persistent Indian warfare within the entire Shenandoah Valley. Fear of escaped slave uprisings was also pressing. Governor Gooch was quick to devise a plan to persuade white Protestant farmers to settle in the Shenandoah Valley. Additional “backcountry settlements” were developed as a means of protecting the security of already established settlements. “According to Virginia land policy, frontier buffers allowed for the initial dispersal of farm families occupying land holdings averaging three to four hundred acres.”22

The first of these backcountry settlements was in 1731, when a group of German-Irish settlers led by Joist (or Jost) Hite embarked on a journey to the Shenandoah Valley. He developed land along the Opequon River called the Opequon Settlement. The group was primarily made up of Hite’s family members, but also included Hite’s business partner, Robert McKay, and a friend, Peter Stephens. They likely crossed the Potomac River at a shallow ford approximately ten miles above the mouth of the Shenandoah River and proceeded southwest toward Opequon. This route was an old Indian path which later became known as Jost Hite’s Road or “Hite’s Wagon Road”.23

Meanwhile, territorial disputes were developing between Indians and European settlers, leading to a series of treaties that evolved to set territorial boundaries; each new treaty pushed the Indians farther and farther west. The 1684 Treaty of Albany blocked English settlement from the Iroquois-controlled Piedmont, restricting Northern Virginia occupation to the Tidewater area. Next, the 1722 Treaty of Albany restricted the Iroquois to west of the Blue Ridge Mountains. The Shenandoah Valley finally succumbed to English control in 1744 with the Treaty of Lancaster through which the Iroquois sold to the Virginia Colony their claims of lands "to the setting sun." This pushed the nation west of the Allegheny Mountains. Soon thereafter in 1754, was the onset of the French and Indian War, which lasted until 1763. As the war ended, Indians abandoned much of the
region around Harpers Ferry and beyond the Alleghenies in favor of land farther removed from settlers’ reach.24

**First European Settlers in Harpers Ferry**

The first European settler in Harpers Ferry was a squatter, Peter Stephens, likely the same Peter Stephens that traveled into the area with Jost Hite in 1731. He settled in Harpers Ferry in 1733 with his family and an Indian named “Gutterman Tom.” Identifying the increased trade traffic that was beginning to move through the area, Stephens built and operated a ferry for crossing the Potomac River. This remote and rugged spot become known as “The Hole,” due to the extreme topography surrounding the two rivers which resembled a hole cut into the earth.25

The Stephens ferry was never thought of as more than a “foot-man crossing” and was not adequate to assist wagons crossing the river. Therefore, the majority of settlers in the region were inclined to seek out the principle ferries located farther north and west on level land five to ten miles up on both rivers. The ferry’s secondary status, along with the mountainous landscape of the area, created little competition for the settlement of the “The Hole”.26

In about 1747, the Society of Friends hired Philadelphia builder and millwright Robert Harper to erect a church and mills on the Opequon River near Winchester, Virginia. While traveling to Winchester, he met itinerant trader, Peter Hoffman. Upon learning of Harper’s destination, Hoffman told him the shortest and most scenic route was through “The Hole” and agreed to accompany him as a guide. Hoffman described “The Hole” as a location with great economic possibility. “His ideas based upon principles, its nearness to the Atlantic cities, its natural outlet from a great growing region and its water power, with other advantages were given with much force and reason.”27 When he arrived, Harper was instantly struck by the beauty of the place and, noting the water power available, decided to settle there. He made an offer to Peter Stephens to buy out his land claims and shortly after submitted a request for a patent of land ownership from Lord Fairfax. 28

Possibly prompted by Harper’s patent request, Lord Fairfax hired a second survey crew in 1748 to lay out tracts of land in the lower Shenandoah Valley, including Harpers Ferry. County surveyor James Genn led the
survey a crew of two young apprentices, George Washington and George William Fairfax. 29 This survey expedition was Washington’s first exposure to Harpers Ferry. Harper received a patent for land ownership in 1751. His initial allotment included 125 acres of what was deemed “waste and ungranted land” at the junction of the Shenandoah and Potomac Rivers. 30

Figure 5: Survey of the Northern Neck of Virginia, 1737 (Map Courtesy of Library of Congress).
**Robert Harper’s Mill Complex**

Robert Harper made numerous enhancements to the landscape of Harpers Ferry by improving both the roads and the ferry on the Potomac River. Harper built a grist mill and a saw mill at Halls Island on the Shenandoah River, a tavern for the town, and supervised construction of other mills in the area. Harper’s brother-in-law operated the two mills, freeing Harper to focus on his other enterprises. “This entrepreneurial spirit was typical of colonial farmers who employed a variety of talents and skills throughout the course of the year.”

Halls Island was the first area within Harpers Ferry to be developed. Harper initiated the first use of water power from the Shenandoah River by locating his sawmill and grist mill on Halls Island as early as 1748. Harper carefully chose the site, “after examining a number of sites with a great water we selected a spot on the Shenandoah.” The site for Harper’s mills was likely chosen because the available waterpower from the Shenandoah had a strong, consistent flow at this location. The mills were located just above the “staircase” rapids adjacent to Hall’s Island, named for the treacherous rocky waters in the Shenandoah, and were accessible to the upper portion of his tract (presently known as Camp Hill). The steep cliffs of shale that formed the mainland shore towered above the low floodplain of Halls Island and continued down toward the Potomac River. It was relatively easy to build a pathway following the natural contours and ridges down to Halls Island from the upper fields by way of the Cliff Trail (See Map 2: Prehistory to 1818 Period Plan).

Harper was quickly introduced to the unpredictability of life on the river when, in 1748, the first recorded freshet flooded the area and drove the Harpers from their log cabin at the confluence of the two rivers. Soon after the 1748 flood, Harper built his house on higher ground overlooking his mills on Hall Island. He lived at this location until his death in 1782. The exact date of construction of the residence is estimated to have been sometime between 1751 and 1775.

The typical colonial mill site included a grain (grist) and flour mill and a sawmill, similar to that at Harpers Ferry. Harper’s sawmill and grist mill shared the same mill race with support structures clustered along both the mill race and shoreline. The collective site was developed into a commercial and residential commercial crossroads complex located at the foot of a natural declivity in the hillside (present-day Union Street). The crossroads
were the intersection of the road or pathway to Harper's upper fields and the road to Winchester that connected with Harper's Shenandoah enterprises. 36

Once adapted as a functioning mill complex, it is possible that the mill race carried soil and debris downstream to Virginius Island. “These deposits, would have, in turn accelerated the otherwise gradual process of accumulation eventually transforming the collection of small islands located below Harper's mills into nineteenth century Virginius Island.” 37

The Harpers Ferry gristmill was a forerunner of a later mill type known as a merchant mill. 38 These merchant mills were established in post-revolutionary America, and were large enough to process grain and other materials for regional as well as local customers. Flour from Harper’s mill was sent to markets in Baltimore, by wagons, and Bellhaven (now Alexandria), by flat boats. 39 Over the years, Harper worked to increase business by offering free passage across the Potomac and Shenandoah rivers to farmers in Loudoun County or Maryland who brought their grist to his mill. 40 As a community began to grow at the confluence of the two rivers, the Virginia General Assembly passed an act to establish the town of “Shenandoah Falls of Mr. Harper’s Ferry” in 1763. It was later shortened to “Shenandoah Falls” and finally incorporated as “Harpers Ferry” in 1851. 41

When Robert Harper died on September 26, 1782, he bequeathed the western half of his land, including Halls Island, his residence, and both mills on the Shenandoah River, to his nephew Robert Griffith. His ferry rights on the Potomac River and the eastern half of his property were bequeathed to his niece, Sarah Harper, the wife of John Wager, Sr. 42 Robert Griffith ultimately sold the land, including Halls Island, to Thomas Rutherford, William Darke Van Rutherford, and Mary Rutherford on January 9, 1797. The Rutherfords were land speculators and quickly sold approximately 310 acres to the federal government for $10,000 on February 20, 1797. 43 This purchase was made under the authority of the April 2, 1794 “Act to provide for the erecting and repairing of Arsenals and Magazines, and other purposes.” 44
Thomas Jefferson’s Views

While Robert Harper could envision the commercial potential for Harpers Ferry, other visitors were taken by the natural and picturesque beauty of the place. Thomas Jefferson visited Harpers Ferry during his travels to northwestern Virginia in 1783. While Jefferson acknowledged that “all the world is becoming commercial…,” he advocated for a more agricultural use of the land. During his Harpers Ferry visit, he climbed the path to the hillside tavern located in Lower Town and continued up the hill until he reached a large rock outcrop (now known as “Jefferson’s Rock”), where he was inspired to write a description of one of the “most stupendous scenes in nature.” His famous description of the Potomac and Shenandoah River gap is described in his Notes on the State of Virginia, and is portrayed as a “war between rivers and mountains”:

...You stand on a very high point of land. On your right comes up the Shenandoah, having ranged along the foot of the mountain an hundred miles to seek a vent. On your left approaches the Patowmac, in quest of a passage also. In the moment of their juncture they rush together against the mountains, rend it asunder, and pass off to the sea. The first glance of this scene buries our senses into the opinion, that this earth has been created in time, that the mountains were formed first, that the rivers began to flow afterwards, that in this place particularly they have been dammed up by the Blue ridge of mountains, and have formed an ocean which filled the whole valley; continuing to rise they have at length broken over at this spot, and have torn the mountain down from its summit to its base. The piles of rock on each hand, but particularly on the Shenandoah, the evident marks of their disruption and avulsion from their beds by the most powerful agents of nature, corroborate the impression. But the distant finishing which nature has given to the picture is of a very different character. It is a true contrast to the fore-ground. It is as placid and delightful, as that is wild and tremendous. For the mountain being cloven asunder, she presents to your eye, through the cleft, a small catch of smooth blue horizon, at an infinite distance in the plain country, inviting you, as it were, from the riot and tumult roaring around, to pass through the breach and participate of the calm below. Here the eye ultimately composes itself; and that way too the road happens actually to lead. You cross the Patowmac above the junction, pass along its side through the base of the mountain for three miles, its terrible precipices hanging in fragments over you, and within about 20 miles reach Frederic town and the fine country around that. 45

The Shenandoah Canal and George Washington

George Washington and his family began a long and historic association with Jefferson County (then Frederick County) and the Shenandoah Valley around the time of Washington’s initial survey visit for Lord Fairfax in 1748. Shortly thereafter, Washington and his brothers began purchasing many large tracts of land in the lower valley. Washington initially purchased approximately 500 acres of land near Bullskin Run, located halfway between...
present day Charles Town, West Virginia and Winchester, Virginia. He steadily increased his holdings around this tract and named the land Bullskin Plantation (Fig. 6: Washington’s Potomac Neighborhood above the Falls). Washington leased the plantation to several tenants for farming. His half-brother Lawrence purchased several large tracts of land in either 1747 or 1748. Following his death in 1752, Lawrence’s half-brothers inherited his land. Samuel and Charles were the only two to actually live in the county while George and John Augustine managed the land from afar. Charles built his home, Happy Retreat, on the edges of Charles Town where he laid out and designed the town plan of the village. Samuel built his homestead, Harewood, on a 1600 acre tract of land just southwest of Charles Town.

Washington recognized the potential source for industrial water power from the falls in the Potomac and Shenandoah River as well as the iron ore and timber rich mountains surrounding Harpers Ferry. These resources, along with the ample supply of produce from the fertile Shenandoah Valley,
contributed to Washington’s vision for the area and the future economic development of the entire Potomac Valley Region. He shares his vision in a letter to Sir John Sinclair in 1796 where he claims the “Waters of Potomack will, in a few years, be in greater demand, and in higher estimation than in any other part of the United States.” He goes on to support his statement by indicating the temperate climate of the region, the direct course of the river westward and identifies it as the nearest connection to the Ohio than any other eastern river enabling it to become “the best highway” to the western regions. This “highway” would then lead directly to the soon to be established Capital in Washington. With access to the Potomac from easily improved tributaries leading to the “most fertile parts of Virginia”, the new Capital would surely become “the great emporium of the United States.”

To enable this river “highway,” improvements were needed to aid in its navigation. With a primary interest in providing better transportation into the contested territories of the Ohio Valley at the onset of the French and Indian War, The Potowmack Company was established in 1785. George Washington played an integral role in the company’s establishment and was elected as its first president. The company’s mission was to deepen existing river channels and construct a series of small canals and lift locks around hazardous falls and rapids in the Potomac River, as well as improve navigation on five of the significant tributary streams and rivers of the Potomac. The most important was the Shenandoah River as it was a critical link in bringing produce from the Shenandoah Valley to the markets in the port cities of Georgetown, Alexandria, Fredericksburg, and Richmond. Washington visited Harpers Ferry during his tenure as president of the Potowmack Company, in 1785 and in 1788. By 1795, Washington, now President of the United States, was anxious to move forward with plans for accessing the Shenandoah and encouraged the new canal company president, Tobias Lear, to “proceed vigorously to the improvement of the Shenandoah River: for that is the source from whence the wealth of the city is to be derived.”

In 1806, the federal government and the Potowmack Company made an agreement granting the canal company a right-of-way on Halls Island along the Shenandoah River for the purpose of building a canal. By 1807, the Shenandoah Canal was built with two series of locks at the upper and lower ends of the island. Harper’s old sawmill was destroyed during construction of the locks, however, the canal company built a replacement as shown in the 1807 Plat of the Island in the Shenandoah (Fig. 9). The new canal at
“Sawmill Falls” provided a bypass around the treacherous rocky waters adjacent Halls Island, known as “The Staircase”. This was only a portion of the planned canal projects at Harpers Ferry. A second phase was planned to extend the canal through the town and connect into the Armory Canal on the Potomac River. However, the later phase was never realized. 

Figure 7: Plan and Section of a Canal at the Lower Falls of the Shenandoah, 1803 (Map Courtesy of National Archives).
After completion of the Saw Mill Falls canal at Halls Island, an additional four canals upstream, and clearing of obstructions in the Shenandoah by the Potowmack Canal Company, the Shenandoah River was fully navigable. This allowed cargo to be shipped down the Shenandoah to Harpers Ferry. Typically, a type of river boat called a “gundalow” was used and carried iron, flour and lumber which was unloaded near the site of the old Harper Mill Settlement. These early river transportation enhancements undoubtedly increased the development of Harpers Ferry as well as the use of the Shenandoah shoreline.55
Establishment of the Harpers Ferry Armory

Rising conflicts between Britain and France, and a need to reduce the United States dependence on foreign arms suppliers, led President George Washington to sponsor the 1794 arsenal legislation. Previous to this act, all arms for U.S. troops had been supplied by foreign and private manufacturers under a contract system with many flaws, resulting in many deceptions and forfeitures. With the enacted arsenal legislation, Washington was given the discretionary authority to choose up to four arsenals, determine the location of each armory, spend appropriated funds and appoint superintendents and master armors at will. Springfield, Massachusetts was immediately selected and approved as the location of the first national armory with Harpers Ferry identified for the second. Washington’s selection of Harpers Ferry met with favorable endorsements from Georgetown and Alexandria merchants and the stock holders of the Potowmack Canal Company; both anticipated favorable gains from the proposed new development through supplying the new armory with raw materials. However, much resistance was met from within his own cabinet.

In an effort to sell his plan for developing the armory at Harpers Ferry,
Washington sent several encouraging letters to the Secretary of War to plead his case:

_I will pledge myself that there is not a spot in the United States wch. [sic] combines more, or greater requisites for these, than that does; considered either as a place of immense strength against, and inaccessible by an enemy; although open to inland navigation in all directions, as well crosswise as to the Shipping Port at the Federal City, and water transportation to the Western Country; for its centrality among Furnices [sic]and Forges, for its inexhaustible supply of Water, having the whole River of Shanondoah [sic]as a resourse [sic], and for the populous and plentiful country in which it lies [sic]._  

Washington specifically wanted to include the land of Harpers Old Mill Settlement, Halls Island. He was likely encouraged by the existence of the saw mill that was readily available for sawing lumber to construct buildings. In addition, the inclusion of Halls Islands in the armory grounds would double the amount of water power available to the armory. He included this tract in another letter to the Secretary of War in 1795:

_There is another small tract, with a saw mill upon it, adjoining the two foregoing, which I am told may be also purchased. From my own knowledge, I can speak of the eligibility of this situation for a public Arsenal; but as I have never examined it very attentively, I am not able to speak so decidedly as to the advantages of erecting works there. These, however, I am told, are equal to any on the Potomac or its branches, having the advantage of a considerable fall in both Rivers, which may be brought to operate at this place._

Washington’s opinion conflicted with that of the Secretary of War, Timothy Pickering, who preferred expanding the operations at the Springfield Armory. Pickering believed there was insufficient funding to build a new establishment, and hoped to appease Washington by building only a depot at Harpers Ferry. Pickering then commissioned a consulting engineer, Colonel Stephen Rochfontaine, to assess additional sites along the Potomac that were potentially suitable for the new armory. Rochfontaine’s survey was completed in 1795, with a final report that did not even mention Harpers Ferry. He explained that its absence was not an oversight; rather he felt Harpers Ferry lacked considerable ground to build at a reasonable expense and the susceptibility to floods would be too great for any water work to be built there. Infuriated, Washington was committed to promoting Harpers Ferry as the best site for the new U.S. Armory. However, it took another three years before he could convince the War Department to move
forward with land purchases. The land purchased by Congress in 1796 and 1797 for the U.S. Armory at Harpers Ferry included 125 acres from John Wager, 300 acres from Thomas Rutherford (which included Halls Island) and 640 acres from the Virginia General Assembly. Additionally 1300 acres across the Shenandoah River, known as Loudoun Heights, was leased from Lord Fairfax with rights to harvest and grow timber.

After Washington relinquished the presidency in 1798 to John Adams and tensions of war were pressing with France, the new Secretary of War, James McHenry announced plans to proceed building the full-sized armory at Harpers Ferry. He appointed Joseph Perkin as first superintendent in August 1798 and John Mackey as first armory paymaster. Perkin having substantial experience in the arms business made a suitable choice for the position; however Mackey was a political appointee who inevitably hindered the early developments of the armory.

The town of Harpers Ferry in 1798 was more like a provincial village. It had only one country store and one sawmill but did not have any schools, churches or other public institutions. Rural in character, the town focused on an agrarian lifestyle. The people of the town maintained a daily schedule in sync with the cycles of nature with a local sphere of influence. The society centered on a few core gentry families who dominated the local economy and politics. Outsiders or anyone going against the locally established norms of the community were quickly blacklisted from social life and respectability. This provincial attitude carried over into the early leadership of the armory and would set the stage for future controversy and setbacks.

To initiate design and construction efforts, Perkin was accompanied to Harpers Ferry by noted engineer James Brindley to survey the grounds and waters and prepare a report of their findings for the new development. Brindley had worked with several river development companies for more than a decade and was highly noted for his experience in canal navigation. Their report identified the land along the Potomac as the best option for building the main armory grounds and what later became known as the Musket Factory. They also recommended that an experienced engineer be hired to build the armory canal and milldam. Mackey, feeling the canal construction was only a simple watercourse, disagreed and utilized local
labor for the construction. He did however agree to have Brindley survey the canal and build the framework for the dam. Construction on the canal and workshops began in May of 1799. The first armory workers arrived in Harpers Ferry in 1798, and the production of arms began in the summer of 1801.63

The federal government developed little on Halls Island between 1798 and 1808. As seen in the 1807 plat, there were only a few structures on the island. The plat indicates the location of Robert Harper's house adjacent to the island, which apparently served as a residence for an armory worker; the location of a second dwelling house that was utilized by Leonard Harbaugh during the canal construction; the new sawmill constructed by the canal company, circa 1806; and the location of two proposed “mill seats.”64 The Harper sawmill was utilized for sawing timber for constructing workshops and the arsenal on the Potomac River.65

After much controversy over Paymaster Mackey’s management of the armory’s affairs and lack of completing the canal construction, he was replaced with Samuel Annin, a former arms worker from New Jersey. The relations between Annin and Perkin remained cordial; however, their responsibilities lacked a clear definition from each other similar to that of the Mackey reign. However, Annin proved much more productive in completing the armory canal by 1801.66 From 1801-1808 the armory grounds included eleven riverfront buildings. Production during this period remained low and sporadic. Several factors played into the meager output including low water levels that restricted canal use and water-power, leaks in the new armory canal, and lack of funding. In an attempt to reduce military expenditures and the federal debt, the newly elected president, Thomas Jefferson, drastically reduced the War Department’s budget in 1801.67

In 1806, Superintendent Perkin died and was replaced by James Stubblefield in April of 1807. Stubblefield was a Virginia gun maker and married into one of the most prominent families of Harpers Ferry. He maintained family ties within the armory as well, as his brother-in-law, Armistead Beckham was the master armorer. Stubblefield’s nineteen year management of the U.S. Armory at Harpers Ferry was highly controversial and would later be scrutinized by the War Department. 68
By 1808, pressures were mounting toward war between the United States and the British Empire, the War of 1812. This resulting in an increase in funding directed to the armory at Harpers Ferry. In May of 1808, Secretary of War Henry Dearborn authorized Stubblefield to construct whatever workshops were necessary to double the arms production. Stubblefield and Annin agreed on the size and style of structures. Stubblefield supplied drawings and sketches and Annin implemented the designs. This construction phase increased the total number of armory buildings by nine, with two new shops on Lower Halls Island, and five along the Potomac River at the Musket Factory.69

The two new buildings erected on Lower Halls Island in 1808-1809 were both one story brick structures. The larger of the two was the 80x45 foot Grinding Mill constructed at a cost of approximately $6,000 and the other was the 45x45 foot Tilt Hammer Shop whose construction cost $4,000. Both workshops required water power and utilized a water wheel to power the machinery. They were the first use of water power for arms manufacturing on Halls Island. Together with the new sawmill, they comprised the entire armory plant on Lower Halls Island through 1818. With Halls Island located about a half-mile away from the main production site of the Musket Factory on the Potomac, this increased the cost of manufacturing arms through the added cost of transporting parts by horse and buggy from the workshops on the Potomac up to the shops on Halls Island and back. This most likely prevented additional workshops from being constructed on Halls Island during this period.70

Attracting and keeping armorers at Harpers Ferry was challenging in the early days of the armory’s establishment. This was partially due to the annual epidemics of “bilious fever” which sickened numerous people each year, but also due in part to the lack of adequate housing. Before 1815, the armory workers were required to provide their own lodging. Many of the armorers were forced to build one and two room shacks described as being “damp, poorly lighted and unventilated.” Additionally, the town was lacking proper drainage facilities which led to drinking water being contaminated with sewage. These unsanitary living conditions often led to disease and death. 71
Annin and Stubblefield attempted to make improvements to the housing and public water situation. Between 1810 and 1821, they cleaned up the public water works and built seventy-four dwelling houses. It is unclear as to the location of these initial dwelling houses, however, it is known that eleven houses were located on Upper Halls Island. These houses could have been built between 1807 and 1834 and it is not known if they were some of the initial privately built shacks or more formal government dwelling houses. In addition to dwelling houses, a toll house was erected by the Shenandoah Canal Company at the canal intake from the river on the upper reaches of the Upper Hall Island. The toll house was constructed by 1807.

Production at the armory increased in the days leading up to the War of 1812 and continued through 1814. Competition for skilled labor was high and Stubblefield looked at ways to streamline the manufacturing process in order to increase the number of arms manufactured. Utilizing a division of labor, Stubblefield attempted to create a system of uniformity and began to move away from the skilled artisan approach that was currently in use. Twenty years later he explained:

I determined to adopt a new plan of manufacturing the arms for the United States, and in the spring of 1809 commenced making tools and machinery for the purpose of distributing the component parts of the guns so as to make the work more simple and easy. In June, 1810, we got our tools and machinery ready for making arms; and it is upon this uniform plan that they are now made throughout the United States….By division of labor, a great deal of expense is saved, and the work can be executed with infinitely more ease, more rapidly, as well as more perfectly and uniformly; and moreover, a hand can be taught, in one-tenth part of the time, to be a good workman when he has but one component part to work upon.

Stubblefield likely adopted this system after visiting the Whitney and Springfield Armories in 1808. At the onset of the war there was a push for the armories to collaborate and share information, machinery, labor and raw materials. Harpers Ferry tended to be the primary beneficiary of this collaboration. In terms of division of labor, the system that Stubblefield adopted became the practice of piecework payments, where an armorer’s production was measured based on the output of operations performed on single components instead of complete assemblies. It did not, however, develop uniform parts to any significant degree.
The Ordnance Department was established in 1812 and in 1815 the U.S. Armory was placed under the military jurisdiction of the Ordnance Department.

Figure 10: Detail of 1809 Map of Frederick, Berkeley and Jefferson Counties, Virginia (Map Courtesy of Library of Congress).

3 Stephen R. Potter, Ph.D., Regional Archeologist, Interview (July 9, 2009) & Review Comments (January 6, 2010).
4 Ravenhorst and Harris, 1.5.
5 Ravenhorst and Harris, 3.4.
6 Ibid.
7 Potter.
8 Ravenhorst and Harris, 1.4, 3.47 & 4.1.
9 Sumpweed is a common name for Iva annua (Marsh Elder), an edible grain or seed.
10 Potter.
Halls Island: U.S. Rifle Factory and the Shenandoah Riverfront

12 The word ‘Potomac’ is derived from the Algonquian word for trading place, or where something is bought.
13 Potter
15 Potter.
19 Stuart E. Brown, Jr., Virginia Baron: The Story of Thomas 6th Lord Fairfax (Berryville, Va.: Chesapeake Book Company, 1965), 26-35.
21 Brown, 80-100.
22 Hofstra, Planting, 7.
23 Hofstra, Planting, 94-98.
25 Bushong, 12.
27 Harper's Ferry; Reprinted in Noffsinger, 214.
28 Bushong, 13; & Noffsinger, Physical History, 5.
30 Gilbert, Where Industry Failed, 16 & 59.
32 Noffsinger, 220 & Harper’s Ferry.
33 Bushong, 14.
34 Harper had started constructing the house in Lower Town known as the “Harper House” in 1775. It was originally built as a tavern and was not completed until after Harper’s death in 1782. Robert Harper never lived in this house.
36 Joseph & Wheelock, Virginias, 3-3.
37 Joseph & Wheelock, Virgininas, 3-3.
38 Early Colonial Mills typically served the local surrounding population out of necessity and were often thought of as “public” entities, the merchant mill began to serve a focus on a more regional reach. See Susan Winter Frye, “Evolution of Mill Settlement Patterns in the

39 Noffsinger, 220.


41 Bushong, 14.

42 Copy of Last Will of Robert Harper of Berkeley County, Virginia, 26 September 1782. (Washington, D.C.: National Archives Record Group 153, Military Reservation Division, Box No. 44). Reprinted in Noffsinger, 61-64.


47 National Scenic Byways Program Website: [http://www.byways.org/explore/byways/13753/places/15576/](http://www.byways.org/explore/byways/13753/places/15576/)


51 Ibid, 112.

52 George Washington to Tobias Lear, November 30, 1795, *Writings*, 34: 381.


59 George Washington to The Secretary of War, September 16, 1795, *Writings*, 34: 307


61 Crosbie & Lee, 11.


64 A mill seat is a suitable place for a water mill.


67 Crosbie & Lee, 17.
Halls Island: U.S. Rifle Factory and the Shenandoah Riverfront

68 Crosbie & Lee, 18.
70 Ibid, 10-11.
71 Smith, Challenge of Change, 77 & Stubblefield to Dearborn, April 4, 1808; “Friend” to Eustis, July 26, 1809; Colonel John Whiting to Secretary of War, March 1810; Annin to Eustis, December 2, 1812; to John Armstrong, March 17, November 2, 1813 & July 26, 1814; Letters Received, Records of the Office of The Secretary of War (Record Group 107, National Archives).
72 Smith, Challenge of Change, 77.
74 Stubblefield to Bomford, July 11, 1829, Records of the Office of the Chief of Ordnance (Record Group 156, National Archives), see also Smith, Challenge of Change, 80.
75 Smith, Challenge of Change, 80-82.
Prehistory - 1818 Period Plan

SOURCES
1. 2009 GIS Basemap / T. Stidham
2. W&P Railroad Plan, 1834/35
3. Aerial photograph, 2007
4. Shenandoah Canal Plan, 1803
5. Map of Harpers Ferry, 22 April 1848

DATE
September 20, 2010

DRAWN BY
National Park Service, D. Poss
National Capital Region / Cultural Landscapes Program
Illustrator / Photoshop CS4

LEGEND
Road
Railroad
Toll Trail
Building
Trees
Specimen Tree *

Note:
* Specimen Trees depicted in this drawing are estimated based on tree locations shown on the Shenandoah Canal Plan, 1803.
1819-1843: HALL’S RIFLE WORKS

This section follows closely that of Merritt Roe Smith, Harpers Ferry Armory and the New Technology: The Challenge of Change, 185-218.

Captain John H. Hall

The story of Hall’s efforts to introduce a patented breechloading rifle into military service and to standardize production through the use of precision techniques testifies to more than the virtues of individual genius; it also clearly depicts the trials and tribulations of rendering an effective mechanical synthesis in an age of developing industrialism.1

John H. Hall was born to a prominent family in Portland, Maine on 21 January 1781. He was the eldest of six children of Stephen Hall from Westford, Massachusetts and Mary Cotton Holt Hall. Stephen Hall, a Harvard graduate, was active in local politics through which he played a leading role in the separation of Maine from Massachusetts in the early 1780s. His primary occupation, however, was in managing his father-in-law’s tannery in Portland. In 1794/95, when John Hall was about fourteen, his father passed away. This unexpected event likely diverted any aspirations for attending college to work in the family business or as an apprenticeship in an auxiliary trade.

In 1808, John Hall’s mother passed away, leaving him executor of a moderate family estate. That same year, Hall opened a shop near Richardson’s Wharf in Portland, where he engaged in woodworking primarily as a cabinetmaker and boat builder. During the War of 1812, he joined the Militia Regiment of Portland’s Light Infantry as a Lieutenant and later promoted to captain. In 1813, he married Statira Preble of York, sister of the Honorable William Pitt Preble of Portland and the niece of an American naval hero from the Tripolitan War (1801-1805), Captain Edward Preble.
Born in 1788, Statira Preble Hall’s ancestry traces back to the beginnings of the Massachusetts Bay Colony. A “tall, elegant woman”, Statira added balance to her husband’s brilliant, but somewhat eccentric temperament. She was always Hall’s closest and most trusted confidante. Throughout their 28 years of marriage, he consulted her prior to making any important decision. They had seven children, two of which became prominent politicians. William Augustus was a judge in Missouri and Willard Preble was elected to the United States Congress in 1847, serving three terms; he then went on to serve as Lieutenant Governor and Governor of Missouri from 1864-65.

The Hall Patent Breechloading Rifle

By the time he married Statira, Hall had already moved from woodworking to making firearms and, early in 1811, had designed his first breechloading rifle. At the time, this was an unusual looking rifle and often described as “a long step from the beaten path.” Hall claims to have “invented the improvement in 1811, being at the time but little acquainted with rifles, and being perfectly ignorant of any method whatever of loading guns at the breech.” In the spring of 1811, Hall sought to patent his new invention but was surprised, when the Superintendent of Patents, Dr. William Thornton immediately challenged his claim. Thornton sent a letter to Hall claiming he was the inventor; however, he was “desirous of sharing the invention.” Without producing a gun, drawing or specifications for the gun he had claimed to invent, Thornton seemed content to believe that conceiving the idea of a rifle similar to Hall’s rifle was sufficient evidence for him to claim equal rights to the invention. Hall requested assistance from the Secretary of State James Monroe to have the conflict resolved in court. Instead, the secretary conceded that it would be in Hall’s best interest to take the joint patent with Thornton and receive at least half the credit. The joint Hall-Thornton Patent for a Breechloading Rifle was issued on 21 May 1811.

Most of the major inventor/entrepreneurial arms makers in the early nineteenth century depended heavily on federal government contracts to provide working capital through advance subsidies. Some of the most notable included Eli Whitney, Simeon North and Asa Waters; Hall was eager to do the same. The expenses to manufacture and market his “patent rifle” were becoming a major burden. By 1817, he had spent nearly $20,000 and accumulated personal liabilities in excess of $6,000. His cash flow was barely adequate to cover interest payments, pushing him close to bankruptcy unless he could negotiate a government contract for
manufacturing his rifle. Thornton, however, was more interested in selling his rights and collecting the royalty fees. As a result he became one of Hall’s staunchest opponents in this endeavor.

Despite Thornton’s opposition, Hall pushed on and began to market his new rifle to the government in 1811. He met with President James Madison, who quickly referred him to the Secretary of War, William Eustis. Unfortunately, the War Department had recently entered agreements for 85,200 muskets as part of the Militia Act of 1808. At this time, the military had a long-standing preference for muzzle-loading weapons and little incentive to entertain the unproven breech-loading rifle. Hall did not give up and the patent rifle was finally given a trial in 1813 by Eustis’ successor, General John Armstrong. He ordered Lieutenant Colonel George Bomford to investigate its merits. After conducting a series of lengthy field tests of eight of Hall’s breech-loading weapons, five rifles and three muskets, Bomford reported in favor of their adoption. Receiving the Secretary of War’s authorization, Bomford placed an order for an additional two hundred rifles, in addition to the ones tested, on 23 December 1814 to be delivered by 1 April 1815. Without the labor force or manufacturing facilities in place, Hall regrettably declined the offer due to the quick turn around for delivery. Instead, Hall spent most of 1815 improving the design and training his work force.
The Push for Interchangeability

Lieutenant Colonel George Bomford, a military engineer from West Point, was at this time the chief assistant to Colonel Decius Wadsworth, the first chief of the Ordnance Department. Under his experienced and disciplined leadership, the Ordnance Department followed a motto of “uniformity, simplicity and solidarity.” Bomford was specifically responsible for promoting greater systemization and efficiency at the national armories. During the War of 1812, thousands of arms were damaged and rendered virtually useless. The goal of the Ordnance Department was to lower the production costs of guns and to develop uniform parts so that they could easily be repaired in the field. Together, Bomford and Wadsworth introduced this practice into the Springfield and Harpers Ferry Armories through administrative reform primarily focused on the “Uniformity System.” This was not a new practice. Several French armories successfully advanced the system during the 1780s; Thomas Jefferson and Eli Whitney wrote about it several times and Simeon North, a Connecticut gun maker, partially applied the system to pistol manufacturing by 1813.

In June 1815, the Ordnance Department held a meeting in New Haven, Connecticut to discuss a means for establishing these more rigorous standards to manufacture military muskets. The participants included Wadsworth, Armory Superintendents Roswell Lee of Springfield and James Stubblefield of Harpers Ferry and Eli Whitney, a close friend and confidant of Wadsworth. Once tested at the two armories, the plan was to then extend the new uniformity standards to arms manufactured by private contractors. Although promising on paper, the principle of standardization was far more challenging in practice and after two years, neither armory had much to show for their efforts.

As such, when Bomford received a letter from Hall on 18 January 1816, he was more than intrigued to hear:

I have spared neither pains nor expense...in getting my tools and machinery in the best possible order for executing the work with accuracy. Only one point remains to bring the rifles to the utmost perfection, which I shall attempt if the Government contracts with me for the guns to any considerable amount viz., to make every similar part of every gun so much alike that ... if a thousand guns were taken apart & the limbs thrown promiscuously together in one heap they may be taken promiscuously from the heap & will all come right. This point I conceive practicable, & although in
After much negotiation with the Ordnance Department, Hall finally agreed to a second contract for 100 rifles in December 1816. The contract stipulated the price for each rifle at twenty-five dollars apiece and required delivery in one year. The arms were completed by November 1817 and shipped to Captain George Talcott at the U.S. Arsenal in Charlestown, Massachusetts. Talcott, previously unsupportive of the arms, tested and reported very favorably of them, stating, “I cannot sufficiently praise them. Everything (except the Bayonets) is as perfect as can be wished. I am decidedly of the opinion that they ought & most eventually [will] supercede the common Rifle, -- but their principles are such that they must always be constructed with great care and attention as respects the individual parts.”

Even with such positive reviews, the chief of ordnance was hesitant to adopt larger contracts for the patent rifle due to their great expense. He planned instead to send the rifles to Missouri for more extensive field trials. Hall feared his business could not endure the lengthy waiting period the field trials would create and began petitioning to President James Monroe to introduce the rifle to public service. To further boost his cause, Hall enlisted several influential friends to lobby on his behalf. Hall’s efforts paid off. He was invited by the Secretary of War John C. Calhoun in March 1818 to go to Harpers Ferry National Armory to supervise the construction of several patent rifles to improve and test the model. Hall arrived at Harpers Ferry in August of that year for a brief stay.

Assisted by several armorers, Hall made four sample weapons: two similar in dimensions to the standard musket and two similar in dimensions to the standard rifle. Once completed, the arms went through a rigorous and thorough inspection by Superintendent James Stubblefield and Master Armorer Armistead Beckham. Neither was thrilled by Hall’s presence at the armory, but after noting that the arms took a third less time to load and were as accurate and powerful as standard arms; they begrudgingly provided a favorable report. Though impressed by the performance of the patent
rifle, Stubblefield was unimpressed with the cost to produce; noting in his final report that they cost almost $2 apiece to produce. The cost of production caused great concern for Wadsworth, who continued to hold back their adoption into service leading to a third trial of the arms.

The latest sample rifles were sent to Greenleaf's Point in Washington for a new round of experiments and testing headed by Colonel Nathaniel Towson. This three month trial led to more positive feedback for the patent rifle and they were recommended by the officer board for introduction into regular service. Their report stated “the advantages of these guns over the common ones now in use are, *first*, the celerity and ease with which they may be loaded in all situations. It is of great consequence in the rifle; for the difficulty of loading is the greatest objection to its more general introduction into service; *second*, greater accuracy and less recoil; *third*, less weight.”

As a result of the Towson committee trial, Secretary of War Calhoun decided to offer John H. Hall a larger contract for 1000 rifles. Unfortunately, Hall was expecting an amount closer to 10,000 rifles. Nevertheless, Hall signed a contract on 19 March 1819 for 1,000 rifles to be produced at Harpers Ferry under his supervision. He served as an “Assistant Armorer in instructing and directing the Workmen, to be employed in fabricating the Firearms above Specified.” Hall was to receive a $1 royalty for each weapon produced and a $60 per month salary from the Ordnance Department. This contract was unique in that it was the first government arms contract to subsidize a private manufacturer at a public armory rather than with monetary advances.

**Establishment of Hall's Rifle Works**

John H. Hall arrived in Harpers Ferry in April 1819 to set up what would become the Hall Rifle Works. Funding had yet to be appropriated for the rifle project and little was done to accommodate his arrival. In a letter from Chief of Ordnance Wadsworth, Stubblefield was directed to minimize disturbance to the armory while accommodating Hall.

*It is my wish the regular business of the Armory should be as little interrupted as possible by the arrangements for Mr. Hall's rifles and no more than it must unavoidably be in consequence of taking off some of the [h]ands to [w]ork under him.*
As to the erection of new buildings for machinery and workshops it is out of the question because such an object was not contemplated in the estimates and appropriations, and we have not money to spare for new buildings. If you can arrange at any of the workshops so as to apply additional machinery to some of the water wheels I have no objection to its being done. As it is not expected any more hands will be employed than were before, I do not perceive that more shop room will be needed….

Hall and Stubblefield seem to agree that this arrangement was not sustainable and recommended the erection of buildings dedicated to the manufacture of Hall Rifles to be located along the Shenandoah. Stubblefield submitted an estimate for “fitting up the old saw mill,” a new blacksmith shop, three dwelling houses to be located on the Shenandoah and the construction of a new saw mill on the Potomac. The appropriations for this work were approved 19 August 1819. Work commenced immediately and was complete 31 December 1819. In addition to the two workshops, two bridges were built the following year in December. A stone bridge was built over a tailrace leading to one of the new workshops and an arch stone bridge was constructed over the Shenandoah Canal to Lower Hall Island.

By the end of 1820, Hall’s Rifle Works was an official establishment on Lower Halls Island. It consisted of only two workshops: the one-story wood frame sawmill that was converted into a machine shop and a two-story stone blacksmith shop. Additionally, two workshops belonging to the Musket Factory remained on Lower Halls Island. It is likely that the three dwelling houses built for workers at the Rifle Factory were located adjacent to the factory on Upper Halls Island. However, these two small islands were still connected and identified as one island at this time. Only two bridges have been identified in and around the island and there were most likely few unimproved roads.

Hall finished building his tools and started working on constructing the machinery for the rifles in 1822. The following summer, he sent twenty rifles to the Ordnance Department and completed the remainder of the 1000 rifles by December 1824. Production took much longer than
expected, primarily because of Hall’s obsession with developing a successful rifle made with interchangeable parts. He first announced his success with interchangeability in a December 1822 letter to the Secretary of War:

*I have succeeded in an object which has hitherto completely baffled (not with standing the impressions to the contrary which have long prevailed) all endeavors of those who have heretofore attempted it – I have succeeded in establishing methods for fabricating arms exactly alike, & with economy, by the hands of common workmen, & in such a manner as to ensure a perfect observance of any established model, & to furnish in the arms themselves a complete test of their conformity to it.* (Hall’s emphasis)

One of the many advantages of this perfection will be to render the fabrication of each part of a gun totally independent of all the other parts & thus to prevent a great loss of time which is constantly occurring & at the same time to facilitate such a complete division of labor as will, ultimately, reduce the expence [sic] of manufacturing arms to its lowest possible amount.10

The time and expense for completing the patent rifles received much criticism from Stubblefield and the U.S. Inspector General, but Hall held firm. He argued that the cost of developing these rifles was not excessive as, “the principles upon which my tools & machinery have been constructed are applicable to every species of small arms and have for their object the production of perfect uniformity with the least possible expence [sic].” 11

Fortunately, Hall had two very powerful allies in Bomford, now Chief of Ordnance, and Calhoun, the Secretary of War. Both men had visited Harpers Ferry and reviewed Hall’s work several times between 1821 and 1825 and were well aware of the progress, potential and benefits of Hall’s efforts. When the first 1000 rifles were finally completed in 1824, both Bomford and Calhoun went to Harpers Ferry to inspect “the manner in which the several parts, promiscuously taken, came together, fitted and adapted to each other.” Impressed by the success of Hall, they approved an extension to Hall’s contract for another 1000 rifles in July 1824. Bomford wanted to prove beyond any doubt that these rifles were superior to other arms, and in 1825 he recommended an extensive trial of the Patent Rifles at Fortress Monroe, Virginia. By this time, Secretary of War Calhoun had retired and was replaced by James Barbour and no immediate action was taken.12
**Expansion to Shops**

The success of interchangeability and the contract extension led to additional, but limited funding allocated for the Hall Rifle Works. Between 1822 and 1826, the federal government spent $2,033.92 improving the property and still considered the Rifle Works “experimental” in nature. All improvements completed during this time were done as cheaply as possible. These improvements included: construction of a stone coal house, two workshops, two annealing furnaces, a smoke house, a bar iron store house with second floor dwelling unit, a wall along Shenandoah Street to raise the canal bank, a log house for workmen on Upper Halls Island, a kiln for steaming rifle stocks, a well on Lower Halls Island, and a dam constructed across the Shenandoah River. A majority of the funds were used in 1824-1825 enlarging Hall’s wood frame machine shop and the former armory saw mill. As a result, Hall’s Rifle Works in 1826 included a total of six workshops and at least four dwelling houses for armory workers. Additionally, the two Musket Factory workshops completed the 1826 factory landscape of Halls Islands.13

**The Carrington Report & Fortress Monroe Trials**

In May 1826, the House of Representatives passed a resolution calling for detailed information on the fabrication, cost and use of the Patent Rifles. This resolution was introduced by the chairman of the committee on military affairs, John H. Cocke, after some prodding from one of Hall’s biggest adversaries, Superintendent Stubblefield. Resenting Hall for having to share the annual appropriations for the Harpers Ferry Armory, Stubblefield and the local “Junto”14 were determined “to put a stop to the Manufactory of the patent Rifles altogether.” They pooled together their political resources and worked through Congressman William Armstrong of Romney, Virginia and persuaded Cocke to introduce the resolution. They anticipated that Congress would withhold any further funding to the Patent Rifle project once informed of the extravagant spending of public money for the project. The resolution led to a series of inquiries that vindicated Hall and shed further light on Stubblefield’s unsatisfactory conduct.15
On 26 July 1826, orders were issued to the Fortress Monroe Commandant to supply two companies with the Patent Rifles and to begin a series of trials to compare the new pattern Springfield Muskets and the Model 1814 Harpers Ferry rifles. The trials were completed in December of that year when a report was submitted to the committee on military affairs. The Hall Rifle far surpassed the other muskets and rifles. In terms of utility, the review board expressed “its perfect conviction of the superiority of this arm over every other kind of small arm now in use. This opinion has been formed after having seen two companies armed with them for five months, performing all the duties to which troops are liable in garrison, and contrasting them in a variety of ways with the common rifle and musket – in all which trials their great and general superiority has been manifest.” In addition, the board members were duly impressed by the “uniformity of all its component parts,” which made it unique from the other arms and provided a means to greatly simplify repairs needed in the field. They concluded “the Hall Rifle…..appears in a fit condition for service.” 16

In order to investigate the allegations of extravagant spending on tools and machinery associated with the manufacture of the Hall Rifle, the Ordnance Department identified the need for an examining committee to study the Rifle Works facility. The chosen committee included James Carrington, Luther Sage and Colonel James Bell. Carrington and Sage were highly respected in the arms-making community and had collective knowledge and experience of all the notable arms-making facilities in the United States at that time. Carrington, a well-known and respected armorer and machinist, had served as shop foreman for Eli Whitney as well as arms inspector for the federal government. Commanding the utmost respect of the arms-making community, Carrington was selected to head the committee. Sage had served under Roswell Lee at the Springfield Armory and spent most of his time inspecting contract arms. He had the opportunity to inspect the shops of many noted arms-makers including Simeon North and Nathan Starr. Bell was a last minute replacement who had little knowledge of machinery; however, he was an extremely respectable military man from Frederick County, Virginia and offered a reliable third party witness for the objectivity of the report.17

The examining committee began inspecting the Hall’s Rifle Works on 11 December 1826 and spent more than three weeks studying the facility. The committee “diligently studied the costs of construction and repair, the quantity of work performed by each machine in a given time, the relative portion of manual labor required in each case, and the quality of work
performed,” as well as compared the new machinery to old machinery. Once the investigation was completed, Carrington prepared the committee’s findings in a seventeen-page report titled “On Hall’s Machinery.” Carrington and Sage then accompanied Lee to present the findings to the chief of ordnance in Washington on 6 January 1827. 18

The Carrington committee identified Hall’s machinery as significantly advanced from anything else in the contemporary practice of arms manufacture and declared:

Capt. Hall has formed & adopted a system, in the manufacture of small arms, entirely novel & which no doubt, may be attended with the most beneficial results to the Country, especially, if carried into effect on a large scale……his machines, for this purpose, are of several distinct classes, and are used for cutting iron & steel & for executing wood work; all of which are essentially different from each other & differ materially from any other machines we have ever seen, in any other establishment. [These machines could] be better understood by pointing out the difference of the results produced by them. It is well known that arms have never been made so exactly similar to each other by any other process, as to require no marking of the several parts & so that those parts on being changed would suit equally well when applied to every other arm……the machines we have examined, effect this with certainty & precision, we should not have believed, till we witnessed their operation.

If uniformity, therefore, in the component parts of small arms is an important desideratum,…it is, in our opinion, completely accomplished by the plan which Hall has carried into effect. By no other process known to us (& we have seen most, if not all that are in use in the United States) could arms be made so exactly alike, as to interchange & require no marks on the different parts. And we very much doubt, whether the best workmen that may be selected from any Armory, with the aid of the best machines in use elsewhere, could in a whole life make a hundred rifles or muskets that would, after being promiscuously mixed together, fit each other, with that exact nicety that is to be found in those manufactured by Hall…. We would however further observe, that in point of accuracy, the quality of the work is greatly superior to any thing, we have ever seen or expected to see, in the manufacture of small arms & cannot with any degree of propriety, be compared with work executed by the usual
methods, and it fully demonstrates the practicability of what has been considered almost or totally impossible by those engaged in making arms, viz., of their perfect uniformity....the inventor, who we trust will receive that Patronage from Government his talents, science & mechanical ingenuity deserve. 19

With Carrington and Sage’s experience and familiarity with all other noted early 19th century arms makers, their assessment “paid remarkable tribute to the magnitude of Hall’s achievement.” They validated that Hall was the first to produce a large number of firearms with interchangeable parts. Simeon North had only partially accomplished this by 1827 and Eli Whitney never came close to achieving any means of interchangeability. North and Whitney were Hall’s most distinguished contemporaries. The Springfield Armory was notably the most progressive government arms manufacturing establishment under Superintendent Lee, and had introduced serial machine production of highly similar parts by 1818. However, the Springfield components required individual marking, filing and fitting in a soft state prior to assembly. “Marking components so that they can be distinguished from others in the same batch is unnecessary in the manufacture of truly standardized parts.” The Carrington Report verified that Hall had far surpassed Springfield’s techniques. He succeeded in developing a means to manufacture rifle components with careful gauging and machining which allowed the assembly of parts in a case-hardened state. This was the significance of his work and what convinced Congress that Hall’s work was a worthwhile endeavor, regardless of expense.20

**Expansion of the Hall Rifle Works, 1827-1834**

With newfound faith and proven merit in Hall’s work, the federal government initiated a third contract with Hall on 8 March 1827. The terms of the new contract substantially increased his salary, required an increase in rifles to three thousand per year and continued to provide the one dollar per rifle royalty paid to Hall. Having patented his machinery on 7 March 1827, just before signing the new contract, this royalty was provided for “the use of certain machines for cutting metallic substances.” Additionally, Hall’s agreement included supervision of the rifle production, as well as continuing to develop improvements to the machinery and “methods of conducting the business.” The Carrington Report and Fortress Monroe tests solidified the Rifle Works as a legitimate establishment, no longer experimental in nature. However, the work performed by Hall was experimental by design. “Contrary to what arms collectors and military historians often assume, his primary function after 1826 was not to make
rifles per se, but to refine and further develop mechanized techniques for their manufacture.”

In order to support the additional efforts of the Rifle Works, it was necessary to begin expanding the facilities on Halls Islands. Bomford requested from Acting Superintendent Roswell Lee that a “shop room be set apart for the fabrication of rifles the control of which is to be vested in Mr. Hall. Any extensions or repairs of building is however to be first approved by the Supt. and the work to be executed under his direction.” In addition, it was directed that the grinding mill located on Halls Island should be provided for the use of the Rifle Works and that an additional smith shop should be provided.

Upon this recommendation, the Rifle Works began a period of expansion starting in mid 1827 and lasting through 1829. The first round of improvements included construction of the recommended Smith Shop with four forges, a small storehouse for coal and the conversion of the grinding mill for Hall’s use. Both of the new buildings were constructed of stone with slate roofs. The grinding mill was enlarged by roughly 20 x 20 feet along with a second 10-foot water wheel. In 1828, a new stone tilt-hammer shop with slate roof was built on Lower Halls Island and two additional dwelling houses were constructed on Upper Halls Island, making a total of six dwelling houses. A new residence for John Hall was built in 1827-28. It was a more substantial house than the other armorer dwelling houses and occupied the current location of the Lockwood House on Camp Hill. By 1829, an additional $14,842.89 was spent on repairs and improvements to the Rifle Works and its accompanying dwelling houses located on Upper and Lower Halls Islands. Repairs to the remaining armory workshops located on Lower Halls Island totaled $2,533.00. The total combined expenditures from 1820-1829 were $20,232.28.

Once John Hall relocated his residence to Camp Hill in 1828, if not already there from Robert Harper’s days, he likely developed a trail from his new residence to the Rifle Works. Given the topography of the hillside separating the two locations, it is most likely that Hall would have taken a
path that cut through the hillside diagonally to slowly descend the cliff. There is an existing trail that ties into the Appalachian Trail from John Hall’s residence and forms a switchback to exit the cliff right at the entrance to Hall’s Rifle Works. This trail would have been the easiest route for Hall to travel for his daily commute and is believed to have served as an armorer’s trail from Camp Hill to Halls Island. The only other option would have been to walk into Lower Town, down the carved stone walkway and then walk the approximate mile up Shenandoah Street to get to the Rifle Works.

**Creation of Upper and Lower Halls Islands**

By 1833 Halls Island had been separated into two islands, Upper Halls and Lower Halls. The first armory sluiceway channels were constructed in ca. 1807 from digging a channel off the Shenandoah Canal at the midpoint of the island. This channel traveled south into the island approximately one-third of the way before turning east and travelling parallel to the canal until it discharged into the natural river channel separating Halls and Virginius Island. At some point between 1820 and 1833, the parallel channel traveling east was filled in and the channel portion flowing south from the canal was extended in a southeasterly direction to tie into the Shenandoah River. This extended channel divided the Halls Island into two separate Islands.

**A Reduction in Appropriations: The Battle of Big Government**

In 1829, President Andrew Jackson began his first term. His tenure in office was most noted for his fight against the national bank and federal infrastructure programs. President Jackson supported state programs over federal programs in all financial issues and strived to reduce the size of the federal government. This new thinking, along with a need to reduce the large deficit that the Stubblefield administration accumulated for the armory, likely caused a new shift in appropriations for the Rifle Works. Around the middle of 1829, Bomford informed Hall that some of the appropriations for the Rifle Works would need to be reduced in order to eliminate the Stubblefield deficits. In 1830, the expenditures for permanent improvements at the Rifle Factory were cut in half from the previous year.

Funding for the Rifle Factory continued to be low throughout the early 1830s. This created less than desirable working conditions primarily caused
by the lack of much needed workshop space. Hall and his armorers were required to move one machine out of the way in order to use another. This constant shifting of machinery limited the efficiency of rifle fabrication by making it impossible to manufacture all the parts simultaneously. The overcrowded conditions were evident to an inspector in late 1832. He noted in his inspection report:

Some additional shop room is necessary, for the great quantity of machinery used. The principle shop is now quite too much crowded and additions to the machines are made from time to time, as the ingenious inventor progresses in the fabrication of arms. A few dwelling houses for the workmen at this branch are also much required...

A few improvements to the physical landscape did occur from 1830 to 1834, at a cost of $11,080.11. The majority of this work was completed in 1831 and 1832. After a request by Hall, the last armory building on Halls Island was transferred to the Rifle Factory in July 1831 when renovations converted the 1808-09 armory’s tilt-hammer shop into a shop for grinding barrels, ramrods and bayonets and a rifle stocking shop.

Earlier in 1831, permission was granted to increase the thickness of a flood protection embankment located on the southwest side of Lower Halls Island to a width of 4 feet and a height of 3 feet. The original construction date of the embankment is unknown. Repairs were made to several of the dwelling houses and workshops and five small structures were built in 1831. They included a charcoal house, a new furnace house for annealing barrels, a new square frame filing shop, a new furnace house for hardening rods, and a shed in front of the old annealing furnaces. It is estimated that a section of the old tilt-hammer shop was renovated in 1832 and a new 17 x 17 foot Filing Shop was built on Halls Island. Also in 1832, a new fire engine from the Watervliet Arsenal in New York was sent for use on Halls Island. An engine house was built to house the fire engine. Only minor repairs to roof and workshops were completed in 1833 to 1834.
A store house for iron and a coal bin were constructed at the Musket Factory along the Potomac River in 1834. Considering there were no other facilities utilized by the armory on Halls Island at this time, it is likely that the 1822 Coal House and 1824 Store House for iron located on Halls Island were turned over to the Rifle Works in 1834. This would have completed the transfer of all operations on Halls Island to the Hall Rifle Works.  

The Shenandoah River: Water Rights and Dam

Waterpower was the primary source for energy in the early 19th century, making it a constant source for legal battles. In late 1831, when the federal government began to build a new dam to replace the old one in the Shenandoah River, a legal battle for the water rights of the Shenandoah began. An upstream mill owner, John Strider, claimed that he was the owner of the water rights for this section of the Shenandoah River and charged the United States with infringement upon these rights by the construction of the new dam. The dam construction was stalled until the rights of the waterpower could be clarified. Almost three years later, in June 1833, the United States bought Strider’s rights to the waterpower of the Shenandoah for $2,600.00. The deed granted the rights of the Shenandoah from the upper boundary of the Strider Mill, or Gulph Mill, to the upper boundary of the United States property on the Shenandoah. It also provided the “priviledge” to construct a dam across the Shenandoah.  

Construction of the dam finally commenced in the fall of 1834 at a cost of $1,999.50. The exact location is unclear, but the dam was likely constructed above the Rifle Works property adjacent the Gulph Mill tail race or at head gates on the upper end of Upper Halls Island.

Transportation Expands: The Push for Internal Improvements

Early in the 1830’s Harpers Ferry saw a number of long anticipated transportation improvements. Congress began discussions concerning the need for roads and canals and “internal improvements” as early as 1808, if not before. In a report to the Senate on 6 April 1808, the Secretary of the Treasury presented a report on Roads and Canals, which stated:

The general utility of artificial roads and canals is at this time so universally admitted, as hardly to require any additional proofs. It is sufficiently evident that, whenever the annual expense of transportation on a certain route, in its natural state,
exceeds the interest on the capital employed in improving the communication, and the annual expense of transportation (exclusively of the tolls) by the improved route, the difference is an annual additional income to the nation. Nor does in that case the general result vary, although the tolls may not have been fixed at a rate sufficient to pay to the undertakers the interest on the capital laid out. They, indeed, when that happens, lose; but the community is nevertheless benefited by the undertaking. The general gain is not confined to the difference between the expense of the transportation of those articles which had been formerly conveyed by that route, but many which were brought to market by other channels will then find a new and more advantageous direction; and those which on account of their distance or weight could not be transported in any manner whatever, will acquire a value, and become a clear addition to the national wealth. Those and many other advantages have become so obvious, that in countries possessed of a large capital, where property is sufficiently secure to induce individuals to lay out that capital on permanent undertakings, and where a compact population creates an extensive commercial intercourse, within short distances, those improvements may often, in ordinary cases, be left to individual exertion, without any direct aid from Government.  

**Turnpikes: Paving the Way**

As the Harpers Ferry Armory developed and the surrounding community began to grow, the need for road improvements was recognized in 1816. Talk of a possible turnpike through Harpers Ferry began. Discussions focused on initiating a regional program for infrastructure improvements that included turnpike construction. In 1830, the Harpers Ferry, Charles Town and Smithfield Turnpike Company was established and construction of the turnpike was completed in 1831 to connect the three towns. The turnpike entered Harpers Ferry from the west through the narrow corridor between the Shenandoah Canal and the steep shale cliffs that tower over the Rifle Works. As the turnpike neared its completion, the local mill owners along its route noted “many of the farmers….will be enabled for several months in the year to carry from 100 to 125 bushels of wheat at a single load-this to many will be a great advantage…” Shortly after, a second turnpike company was created and a turnpike was built connecting Harpers Ferry and Frederick to the east.
The Canal & Railroad Race

In 1828, two other transportation projects serving Harpers Ferry were in development. That year the Chesapeake and Ohio Canal (C&O Canal) and Baltimore and Ohio Railroad (B&O Railroad) began construction, with the canal beginning in the Washington, D.C. and the railroad in Baltimore. The C&O Canal was the first to reach Harpers Ferry in 1833 when its construction reached the Maryland shore of the Potomac across from Harpers Ferry. The canal would eventually traverse 184.5 miles connecting Georgetown with Cumberland, Maryland. From Cumberland it could service the Ohio River Valley through tributary connections of the Ohio River. The B&O Railroad took a little longer to arrive, and crossed into Lower Town Harpers Ferry in 1836 by constructing a bridge over the Potomac River. This was the first commercial railroad in the United States, and connected Baltimore with the Ohio River Valley. Initially it only served Maryland, and first traveled out of the state when it crossed the Potomac into Harpers Ferry, Virginia (now West Virginia).34
The emergence of the B&O Railroad into Harpers Ferry initiated the creation of the Winchester and Potomac Railroad (W&P Railroad). It connected the populous town of Winchester and the Shenandoah Valley with Baltimore via its connection with the B&O Railroad in Harpers Ferry. The W&P Railroad was provided a rights grant to construct the railroad with a 30-foot wide right-of-way that followed the Virginia shoreline of the Shenandoah. It crossed Strider’s, Thorpe’s, Halls and Virginius Islands and connected with the B&O in Lower Town Harpers Ferry in 1835 and 1836. By the late 1830s Harpers Ferry had become a strategic transportation and industrial crossroads that opened economic development opportunities to the west.35
Expansion of Rifle Works: Rebuild and Repair, 1835-1843

After much negotiation and deliberation, Hall entered into an agreement on 20 March 1835 with Secretary of War Lewis Cass. The terms of this agreement transitioned Hall from a contractor to an employee of the War Department. As a new federal employee, Hall became the director of the Rifle Works, which would hold a semi-independent status from the Harpers Ferry Armory. However, the novelty of the patent rifle was beginning to wane. Arms designed by John W. Cochran, Samuel Colt and Baron Hackett were tested against the Hall Patent Rifle in 1836. Hall’s Breechloading Rifle was deemed superior, but the examining officers considered the Breechloader complicated to operate and not necessarily the best for military service.36

Reports were also coming from the field indicating some flaws in the rifle, resulting from the use of steamed walnut gunstocks that did not age well. An easy remedy was to redesign the stock and avoid the use of steamed walnut. In 1840, then Secretary of War, Joel Poinsett felt they had outlived their usefulness. He did not approve the recommended modifications and thus set the stage for their demise.37

Construction at the Rifle Works in 1835 included two brick buildings, an annealing shop and an annealing furnace. These are identified as Buildings No. 20 and 21 respectively on the 1848 Map of the Rifle Factory and replaced two older buildings that were demolished in the same year. Improvements were also made to the Shenandoah Canal along the Hall Islands. Vouchers indicate that earth was removed from the “new” canal at the Rifle Works; however, maps from 1834 to 1848 indicate that the existing canal was only widened. The money spent on physical improvements in 1835 was just over $2200.38

As many of the older makeshift structures began to decline, their replacement became critical. In 1836 construction began on a new brick and stone drill shop to replace an old wooden shop (old sawmill and Hall’s first machine shop). It was completed for a total of $1,021.53. The new drill shop is Building No. 18 on the 1848 Map of the Rifle Factory. In October 1836, Lt. Col. George Talcott inspected the Rifle Works, he recommended the addition of four new workshops and supported a proposal by Hall to build a stone river wall. A few months earlier, Hall had written Bomford
requesting $1,874 to build a 6 foot wide by 12 foot high, 250-foot long river wall for protection from the threat of future floods.\(^{39}\)

In the late freshet here the embankment above the rifle works, by which that portion of the property is protected from inundations and probable destruction, presented indications of great danger – The water penetrated through its sides, in several places, near the base – threatening to undermine and destroy it – although of more than twenty feet thickness.

This freshet, it is said, was not so high as one that occurred in 1810, by more than four feet – A height that would, apparently, have caused the destruction of the embankment and a great amount of valuable public property. It is believed that the water penetrated the bank thro’ holes made by muskrats, which are very destructive to walls of earth near water courses.

The best protection, in this case is to be obtained from a strong wall of stone parallel to the present embankment – a few feet from it, and extending down to solid rock below, which is within about two feet of the surface – The wall to be of such thickness and strength as to resist the force of the highest freshets – such a wall would require to be about six feet in thickness, twelve feet in height and two hundred and fifty feet in length – containing 720 perches,…. It is believed that it would be proper and necessary to fill in between it and the present embankment, with earth,…. 

Although it is now twenty-six years since the highest freshet remembered occurred here, yet such an one may again occur soon, and it would be inexcusable in me to neglect to apprise the Government of its great danger- and that a preventative ought be applied without delay.\(^{40}\)

Congress approved the requested $8,569.00 in March of 1837 for the new river wall and four additional workshops at the Rifle Works. By the end of June 1837 the new river wall, a brick browning shop and a brick jobbers workshop were completed. In addition a new stone tilt-hammer shop was just getting started and the foundation had been laid for a brick
springmakers workshop. The springmakers shop was completed by the end of 1837 and the tilt-hammer shop was completed in 1838.\textsuperscript{41}

Minor repairs were made to the bell shop (the grinding mill from 1808-09) in 1840-41. These included adding a skylight to the roof and repairing some of the slate roofing. This work was likely completed under the remaining balance of the 1836 appropriations. No additional appropriations were approved by Congress for improvements to the Rifle Works until 1840. Unfortunately, the $14,600 approved in 1840 for the Rifle Works was redirected to cover cost overruns at the armory. At the close of 1841, the Rifle Works included a total of 26 buildings. Other minor repairs to the site of the Rifle Works included a fence that was erected along the W&P Railroad right-of-way in 1841 and a few minor repairs to the Shenandoah Canal in 1842-43.\textsuperscript{42}

**The End of the Hall Patent Rifle**

John H. Hall became ill in 1837 and relinquished his position as the director of the Rifle Works to his second eldest son, William. Despite his illness, he continued to retool the machinery for the manufacture of carbines and experimented with drilling methods for cast steel gun barrels. As Hall’s condition worsened, he took an extended leave of absence from the Rifle Works in 1840 and left Harpers Ferry with his wife to visit his son in Missouri. Captain John H. Hall died on 26 February 1841 in Hunstville, Missouri.\textsuperscript{43}

On 12 October 1843, the U.S. Ordnance Department decided to discontinue production of the Hall Patent Rifle following the completion of those already in the process of being manufactured. The final lot of 2,700 Breech-loading Rifles was completed in 1844.\textsuperscript{44}

\textsuperscript{1} Smith, *Challenge of Change*, 184.
\textsuperscript{2} A breechloading rifle is one that is loaded at the breech or near the rear of the gun.
\textsuperscript{3} William Thornton to John Hall, 20 April 1811, Hall-Marmion Letters (transcribed), Harpers Ferry NHP Archives.
\textsuperscript{4} Hall to Bomford, 18 January 1816, as seen in Smith, *Challenge of Change*, 191.
\textsuperscript{5} Talcott to Mortoe, 9 December 1817, as seen in Smith, *Challenge of Change*, 192-193.

7 Hall to Calhoun, 16 March 1819; as quoted in Smith, Challenge of Change, 196.


10 Hall to Calhoun, December 30, 1822; Records of the Office of the Chief of Ordnance, Record Group 156; National Archives, Washington, D.C.; Also in Smith, Challenge of Change, 199.

11 Hall to Calhoun, 15 May 1822; Records of the Office of the Chief of Ordnance, Record Group 156; National Archives, Washington, D.C.; Also in Smith, Challenge of Change, 198-199.

12 Smith, Challenge of Change, 200.


14 The “Junto” was a local group of influential families in Harpers Ferry that attempted to control the management of the armory and were in favor of maintaining “local” habits and traits. They were extremely suspicious of “outsiders” that may try to change their established social order.

15 Smith, Challenge of Change, 200-201.

16 Ibid, 201-202; and Major J.B. Crane (report), December 11, 1826, Reports and Correspondence of Ordnance Boards, & Reports of a Board of Officers at Old Point Comfort on Hall's Patent Rifle, December 11, 1826, Reports of Tests and Experiments, Records of the Office of the Chief of Ordnance, Record Group 156; National Archives, Washington, D.C.

17 Ibid, 202-205.

18 Ibid, 202-205.

19 Ibid, 206-207 & James Carrington, Luther Sage and James Bell to Bomford, 6 January 1827, Reports and Correspondence of Ordnance Boards, Records of the Office of the Chief of Ordnance, Record Group 156; National Archives, Washington, D.C.

20 Smith, Challenge of Change, 207-208.

21 Ibid, 209.


24 Smith, Challenge of Change, 212.


26 Smith, Challenge of Change, 213.


29 Ibid, 57.
30 Ibid, 48-49.
33 Virginia Free Press, 8/18/1831, & 9/1/1831.
37 Smith, *Challenge of Change*, 217.
39 Ibid, 66-68.
42 Ibid, 81-83.
Note:
Buildings and workshops shown on this map were identified based on information found from primary research by NPS historians Smith & Snell, the 1833-35 W&P Railroad Maps, and the 1848 Map of Harpers Ferry. There are many gaps in the available information pertaining to the workshops from this period, and many are identified with multiple names throughout the records. Additional research on this period is recommended.

The building numbers provided on this map correspond to the Building Chronology Spreadsheet in Appendix A of the CLR. The chronology spreadsheet provides additional source data and building information. All the workshops discussed in the current research is included on the chronology spreadsheet. However, information on the locations for all the workshops was not identified based on current research. As a result, some of the buildings from this period are not represented on this map.
1844-1860: MODERNIZATION PERIOD

The First Military Superintendent / Preparing for Modernization

During the first half of the 19th century, the U.S. Armory lacked any clear direction or comprehensive plan for the development of the buildings and grounds. Instead, the armory’s lack of consistent funding, poor leadership and inefficient labor practices resulted in a landscape of structures randomly arranged and in a dilapidated state. As a result, Colonel Bomford petitioned Congress in November 1838 for additional appropriations for the following year. In 1841, Congress approved $38,000 in special funds earmarked for repairs and improvements to the Harpers Ferry Armory.\(^1\)

The strongest necessity exists for the improvement of the public buildings at Harpers Ferry Armory – they are at present exceedingly unsightly and unworthy of a National Establishment, and many of them, being mere wooden sheds, are besides liable to accident from fire.\(^2\)

At the same time, the U.S. Armory experienced a sudden shift toward full military leadership. The physical conditions at the armory, a desire to improve the efficiency of the plant and a need to eliminate abuses by the past civilian superintendents, are likely causes for this shift. In 1841, Major Henry K. Craig became the first military superintendent of the Harpers Ferry Armory and modified the working dynamics at the armory from a relaxed come-as-you-please environment into a disciplined factory setting.\(^3\)

Although his tenure as superintendent was short, he helped to turn the tide for the future physical development of the U.S. Armory Grounds including Halls Island. Unfortunately, the lingering economic depression restricted the War Department’s finances and as a result, Harpers Ferry remained in the dilapidated condition that it was in when Craig arrived. Under Craig’s supervision, he insisted that all new buildings would be built of the best materials and constructed in the best manner. This was a significant contribution to the armory’s modernization efforts. Only one important new structure was built on Lower Halls Island during Craig’s
administration; but a new standard of quality was set for all future construction.⁴

Craig Era Improvements, 1842-1844

On 2 February 1842, the Secretary of War requested a detailed examination of the Harpers Ferry Armory. The new Chief of Ordnance George Talcott, appointed a board to review the facility and provide an inspection report of its condition.⁵ The inspection board, made up of Inspector General Colonel S. Churchill and Superintendent Craig, was “fully impressed by the necessity of very extensive improvements, repairs and additions to the buildings, machinery, &c [sic] attached to this armory” and recommended rebuilding the U.S. Musket Factory and the Rifle Factory. They further indicated that needed improvements were required not only “for the increase and quality of its production, but for the security of those productions and …..of the health of the officers and workmen of the armory”⁶

After submitting the report, and with no clear plans in place, Superintendent Craig requested an additional $40,000 in 1842 for undefined repairs and improvements to the armory. His lack of a detailed budget likely encouraged Congress to withhold the full requested amount as they only appropriated $30,000 at that time. The Musket Factory received a majority of this funding, while only $1,595.25 funded general repairs and improvements at the Rifle Factory from 1842 to 1844. Primarily funding the construction of a new brick filers shop (building #4, 1848 Map of Harpers Ferry), construction started in late 1843 and was completed in 1844. The new filers shop was a one-story building over a high stone masonry basement, 73 x 24 feet with a slate roof. It was a “finishing shop for filers, and is fitted up with work benches and vices round the sides and end.” In addition to the new workshop, a few water wheels were renovated but more importantly, the machinery of Hall’s Rifle Works was completely reconfigured for the transfer from manufacturing the Hall’s Patent Rifle to the new Model 1841 percussion rifle.⁷

Repairs to Shenandoah Canal

Between 1842 and 1844, the Shenandoah Canal underwent only minor improvements. A stone wall for a guard lock of the Shenandoah Canal to the W&P Railroad was constructed along with a lock in 1843. The length of this wall, built with 106.72 perches (2,641.32 cubic feet) of stone, is
impossible to determine without any indication of the wall height, which is unknown. In the same year, the wooden bridge over the Shenandoah Canal had a few unidentified repairs completed.\(^8\)

**Survey of Public Lands**

Likely, in preparation for redeveloping the Armory Grounds in 1843, cut stone boundary markers would have been placed at all the corners of the U.S. government property and the land was surveyed in October.\(^9\) At that time, the U.S. government owned a majority of Harpers Ferry including Lower Town and Camp Hill, (Fig. 15). Halls Island was located at the southwestern corner of these federal lands, indicating a boundary stone should have been placed at the southwestern tip of Upper Halls Island. To date this marker has not been located.

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*Figure 15: 1851 Survey of Public Lands, (Map courtesy of National Archives)*
Superintendent as Architect:  
Major John Symington, 1844-1851

A talented and eccentric West Point trained engineer, Major John Symington, replaced Major Craig as Superintendent of the Harpers Ferry Armory on 9 November 1844. During his seven-year regime, Symington would prove to be one of the most influential figures affecting the physical landscape of the U.S. Armory grounds including Halls Island, the Rifle Factory, the Musket Factory, the Arsenal and the entire town of Harpers Ferry. Although trained as an engineer, he was equally skilled in architecture, construction and town planning. Pulling together old unexecuted plans, Symington successfully obtained congressional approval to redevelop the armory grounds with a unifying plan and architectural style. He also developed a strategy to solve the lack of adequate housing for armory workmen, and developed a grid based town plan in 1850 that still prevails in Harpers Ferry today.10

Just one month after arriving in Harpers Ferry, Symington presented Chief of Ordnance Talcott with detailed plans and estimates for rebuilding the entire Musket Factory, renovating a few shops at the Rifle Factory, and purchasing new machinery for both locations. In addition, he proposed two alternative land purchasing programs that focused on the six acre Wager Ferry Lot and Lower Town Reservation as well as Byrnes Island in the Potomac River. His total estimate for the proposal was $92,556 for which he strongly encouraged approval. The plans duly impressed Talcott and the Secretary of War, who then presented the plans for congressional approval. However, Congress appropriated only $18,000 for the 1845-46 fiscal year with $5,000 directed to the Rifle Factory. These appropriations were to fund the previous years requested projects by Major Craig. 11

Modernization Period, 1845-1860

Initially Symington planned to renovate most of the shops at the Rifle Factory. With more time to evaluate the dilapidated conditions there, he quickly modified his plans. In July 1845, Symington suggested that due to the poor condition of the Hall workshops, it would be best to either abandon the site entirely or else a complete reconstruction was warranted. Due to this shift in strategy, only $750 of the $5000 appropriated for the Rifle Factory was used in 1845. The remainder of the funds were either held in reserve or utilized at the Musket Factory.12
Symington supported his decision to suspend the planned repairs in a letter to Talcott on July 24, 1845:

From the dilapidated condition of these buildings, and their singularly inconvenient arrangement for the operations for which they were designed, I should look upon any expenditure repairs or additions to them badly applied. The principle buildings cannot be repaired without going to the foundations, in which case it would unquestionably be better to rebuild them upon a proper and systematic plan. The forebays, which an estimate was made to reconstruct of masonry and for which funds were appropriated, I am having repaired temporarily with wood to serve until some definite determination become relative to the buildings generally of the Rifle Factory.

Though I am strongly inclined to believe that the best arrangement would be to construct new buildings, at the Musket Factory, to carry on the fabrication of arms other than muskets, and abandon the site of the Rifle Works altogether there is room enough at the Musket Works for such buildings as it would be necessary to construct to carry out such a plan, and with all expense the water power could be made sufficient for all operations.

Leaving out the unfit condition of the Rifle Shops, their locality, so distant from the Musket factory and the storehouses, is liable to great objection as you will know upon the source of expense in transporting materials and work back and forth, and from greater expense of maintaining two establishments instead of one. 13

As the United States found itself at war with Mexico in May 1846, there was renewed interest by Congress to fund improvements at the armories. A decision was made to rebuild and maintain a separate establishment on Lower Halls Island for continued use as the U.S. Rifle Factory. Congress appropriated funding for the finishing and machine shop (building #1, 1848 Map of Harpers Ferry) in August 1846. At the same time, Congress approved the full sum requested in Symington’s 1844 Armory grounds proposal. The approval of these funds officially launched the modernization period at the Harpers Ferry Armory, including the Rifle Factory.14

The modernization period lasted from August 1846 until June 1860. During this time, Congress appropriated a total of $127,943 for improvements to the U.S. Rifle Factory. A majority of those appropriations went to construct new buildings. The remaining balance went to construct the perimeter
walls, to grade the factory yard, to construct a new main tailrace, to make improvements to the Shenandoah Canal and to construct the Shenandoah Dam. All of the new improvements were completed with the best materials and finest workmanship available. They included carefully constructed mortared stone foundations, solid brick upper walls and cut stone water tables, windows, door sills and copings. The door and window frames were generally of cast-iron and the gabled roofs covered in slate or sheet metal for fire protection. All of the shops were finished with lightning rods, copper gutters and down spouts, and two coats of oil-based paint. 15

Major Symington designed the new armory structures in a unifying architectural style, which has often been referred to as Factory Gothic. However, the rounded band of windows more closely resembles that of the Lombard Romanesque instead of the pointed arches typically indicative of the Gothic Style. The similarities of Symington’s buildings to the Romanesque are very evident when compared with the Romanesque Church of Saint Ambrose in Milan (Fig. 16). Thick walls, a lack of sculpture and rounded or semi-circular arches typically found in bands, called “Lombard Bands”, characterize this style.

Symington’s buildings were also based on a similar floor plan concept and related to each other in aligned rows. The typical floor plan was rectilinear in shape and subdivided into three sections to create a center and two flanking wings. Each section had a gable roof; however, the center section gable was set at right angles to the gable roofs of the two flanking wings. The center section would also project well beyond the rear of the wings.
with a slight two-to-four foot front projection. The aligned row of buildings would then appear to create a straight line of front facades for the entire length of all the buildings. The length, width and height of each structure could vary as needed for each workshop. The lengths of all his buildings varied from 60 to 280 feet, the wing widths were typically 35 to 36 feet and the height was either one or two stories. A few of his new buildings maintained a simpler and smaller rectangular floor plan while maintaining the same architectural style and materials as the larger buildings.  

The gabled roof ends of all Symington’s buildings were adorned with crenellated brick parapets, capped with stone copings. The first stories were subdivided into arcaded bays; each bay comprised of a round arch that was supported by capped brick pilasters. A brick panel was then recessed within each bay and contained either a round-arched window or door. The second stories of the major buildings were subdivided into rectangular bays with flat arches set between brick pilasters. Recessed within each of these bays were brick panels that contained a window topped with a flat arch.

Symington designed four major shops and one minor shop at the Rifle Factory; building all but one of them between 1845 and 1851. All of the additional workshops constructed at the Rifle Factory through 1860 were designed to match Symington’s architectural style and construction standards.

**The Proof House, 1845**

The proof house, building #23 on the 1848 base map, was constructed in 1845. It was a minor structure and only required $750 of the $5000 appropriated for that year. This was most likely the first structure that Symington built in Harpers Ferry and was 19½ x 15 feet, constructed mostly of wood with a 2½-foot thick stone masonry back wall.

**The Finishing and Machine Shop, 1846-1848**

The finishing and machine shop constructed in late 1846 to June 1848 is identified as building #1 on the 1848 Map of Harpers Ferry and building #3 on the 1859 Historical Base Map, was. It included new forebays and water wheels and was a 128 x 35½ feet two-story brick shop with two
wings. The wings were both 24 x 25 feet and one-story each. A main tailrace was constructed of large stone walls, 2½ feet thick; it was a covered ten-foot wide race more than 223 feet in length and ran parallel with and behind the new finishing and machine shop. By 1849, there were two, six-foot turbine water wheels in operation with cement forebays. A lightning rod was added in 1851.19

Demolition of Hall’s Old Workshops

Little information has been uncovered to date on the details of construction and demolition of Hall’s workshops. There were approximately twenty-six structures reportedly standing on Hall’s Island by 1842, only a year after John Hall’s death. In 1843, the Ordnance Department decided to end production of the Hall Patent Rifle and began restructuring the Rifle Factory workshops and machinery to produce the Model 1841 Percussion Rifle. As a result, several of Hall’s workshops could have changed names based on new functions performed in them. This makes deciphering the differences between the 1848 Map of Harpers Ferry and the list of workshops (developed from historical documentation) constructed and demolished during this transition somewhat challenging. In addition, the size of footprints provided in historical documentation may not fully correspond with the footprint sizes on the historical maps as they may have been enlarged or reduced during actual construction from their planned size. Of the twenty-six workshops from 1842, only two remained standing at the start of the Civil War in 1861. The remaining twenty-four structures were all demolished at some point between 1843 and 1859. The following chart identifies possible demolition dates for Hall’s old workshops as based on our research to date. Additional research, including archeological investigations are recommended.

Tilt-Hammer and Smiths (Forging) Shop, 1849-1851

The new tilt-hammer & smiths shop (building #4 on the 1859 Historical Base Map (Fig. 18)), had one cast-iron turbine wheel. Construction of the shop began in the fall of 1849 and was completed in 1851. It was 110 feet long by 35 ½ feet wide with a 14½ foot rear center projection. The shop was a one-story brick structure with a stone basement foundation. Lightning rods were placed on the building roof in 1851.20
The annealing furnace & proof house with chimney stack was constructed between 1851 and June 1852. The one-story brick building was 60 x 36 feet and divided into three compartments. The location of this structure is unknown. NPS historians Charles Snell and Philip Smith identify it as building #5 on the 1859 Historical Base Map assuming it was located in the same rough area as the old annealing furnaces. However, when Symington requested appropriations for the construction of this building, he explained that “the old annealing furnaces are defective, not answering the purposes, and are put up in small buildings inconveniently located.” This indicates there is a possibility that the new structure was relocated. Another possible location is behind the tilt-hammer and smith shop in the location of the one-story structure visible in this location on the Lithograph of Virginius (Fig. 22 & 23). The period plans in this report identify the annealing furnace and proof house in this proposed location; however, further study and archeological research may provide some clarity.
<table>
<thead>
<tr>
<th>Building/ Name</th>
<th>1848 Map #</th>
<th>CLR Map #</th>
<th>Date Built</th>
<th>Demo</th>
<th>Additions/ Repairs</th>
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<td>1828</td>
<td></td>
<td>1843 ca.</td>
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<tr>
<td>Kiln/ House for Steaming Stocks</td>
<td>15</td>
<td>15</td>
<td>1825</td>
<td>1849 ca.</td>
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<tr>
<td>Drill Shop</td>
<td>18</td>
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<td>1836</td>
<td>1849 ca.</td>
<td>1851: repaired slate roof</td>
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<tr>
<td>Grinding Mill (later called: Bell Shop)</td>
<td>13</td>
<td>7</td>
<td>1808-09</td>
<td>1849</td>
<td>Belfry added 1828: Roof Repaired (1841)</td>
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<tr>
<td>Vitriol Shop/ Browning Shop</td>
<td>8</td>
<td>33</td>
<td>1837</td>
<td>1850</td>
<td></td>
</tr>
<tr>
<td>Smiths Shop / Forging Shop</td>
<td>19</td>
<td>18</td>
<td>1827</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Tilt hammer or Barrel Welding Shop</td>
<td>6</td>
<td>36</td>
<td>1838</td>
<td>1851</td>
<td></td>
</tr>
<tr>
<td>Annealing Shop</td>
<td>20</td>
<td>30</td>
<td>1835</td>
<td>1852 ca.</td>
<td></td>
</tr>
<tr>
<td>Annealing Furnace</td>
<td>21</td>
<td>31</td>
<td>1835</td>
<td>1852 ca.</td>
<td></td>
</tr>
<tr>
<td>Jobbing Shop for Filers</td>
<td>5</td>
<td>34</td>
<td>1837</td>
<td>1851 ca.</td>
<td></td>
</tr>
<tr>
<td>Jobbing Shop for Smiths &amp; Spring makers</td>
<td>2</td>
<td>35</td>
<td>1838</td>
<td>1856 ca.?</td>
<td>1849: Repaired Furnace 34</td>
</tr>
<tr>
<td>Rod Furnace / Rod Tilting Shop</td>
<td>9</td>
<td>26</td>
<td>1831</td>
<td>1858 ca.</td>
<td></td>
</tr>
<tr>
<td>Iron Store House w/ lodging room</td>
<td>12</td>
<td>1824</td>
<td>1854 ca.</td>
<td>1831: interior repairs</td>
<td></td>
</tr>
<tr>
<td>Brick Workshop</td>
<td>14</td>
<td>1825</td>
<td>1854 ca.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoke House</td>
<td>17</td>
<td>1826</td>
<td>1854 ca.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possible workshops built in 1st &amp; 2nd qtr</td>
<td>22</td>
<td>1828</td>
<td>1854 ca.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charcoal House</td>
<td>23</td>
<td>1831</td>
<td>1854 ca.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filing Shop</td>
<td>25</td>
<td>1831</td>
<td>1854 ca.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filing Shop</td>
<td>28</td>
<td>1832</td>
<td>1854 ca.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Engine House</td>
<td>16</td>
<td>29</td>
<td>1832</td>
<td>1854 ca.</td>
<td></td>
</tr>
<tr>
<td>Drilling &amp; Boring Shop (Barrel Turning &amp; Finishing Shop)</td>
<td>12</td>
<td>21</td>
<td>1828</td>
<td>1861 ca.</td>
<td></td>
</tr>
<tr>
<td>Storehouse, Coal</td>
<td>14</td>
<td>19</td>
<td>1853</td>
<td>1853-65</td>
<td>1853 - repaired</td>
</tr>
<tr>
<td>Blacksmith Shop/ 1854-Remodeled Stock House</td>
<td>22</td>
<td>8</td>
<td>1819</td>
<td>1861-65</td>
<td>1853-54: Remodeled Stock House</td>
</tr>
</tbody>
</table>

Table 1: Demolition schedule of Captain Hall’s old workshops, 1843-1861.
FIGURE 18: 1859 HISTORICAL BASE MAP, RIFLE FACTORY, LOWER HALL ISLAND 1859-1860. Delineated by NPS Historians, 1960 (Map Courtesy of Harpers Ferry NHP Archives)
The Rifle Works Grounds

Part of Symington’s modernization plan for the Rifle Factory included leveling off the grounds and raising the finished grade elevation around the new buildings. Symington stated in his annual report on 30 June 1850: “There has been a considerable amount of grading done on the grounds around the shops at the rifle factory, rendered necessary by the unevenness of the surface, the old race-ways having to be filled up.” Additional grading and filling of the low-lying land on Halls Islands was also completed in 1851. Symington is likely referring to the old raceways running east and west on Lower Halls Island.

There is mention of a board fence being contemplated for the Rifle Factory grounds to protect the facility from the wandering cattle in the area. It is not known whether or not the fence was ever erected, if so, it was likely swept away during the 1852 flood.
Access to Upper and Lower Halls Islands was provided by three bridges crossing the Shenandoah Canal, the 1820 stone arch bridge, a bridge over the Shenandoah Canal locks, and a wooden bridge to Upper Halls Island that had been repaired in 1843. In 1851, Symington rebuilt the wooden bridge to better position it away from the new workshops. His original proposal indicated that the new bridge was to be constructed atop the existing stone piers of the old bridge; however, it was also necessary to construct two new masonry abutments with wing walls and adjust the new bridge location. Symington’s report on the need for the bridge replacement indicated: “…the old bridge, which is out of position, abutting immediately upon the workshops, and over which all domestic supplies, for those living upon the island, have to pass. The new position for the bridge is above the workshops, so as to admit of the armory yard being properly enclosed.” This statement indicates that the bridge was solely used to access the dwelling houses on Upper Halls Island and was west of the proposed fence line as well as the 1848 finishing and machine shop.

The Shenandoah Canal & U.S. Shenandoah Dam

In 1846, the Shenandoah Dam was repaired in order to improve the “head of water.” A new waste dam was then rebuilt in a new location in 1847 to 1848. This new waste dam was likely built in connection to the new tailrace construction. The location of the dam is unknown.

In 1848, work was done to improve the Shenandoah Canal at the Rifle Factory. In connection with the construction of the new tail race, the canal was cleaned and substantial new walls were constructed along with new guard locks and gates. These improvements were needed because “the old works at this place have given out, the gates and sills being entirely decayed.” In 1851, a new revetment wall and drain culvert were built at the Rifle Factory. It is possible that this culvert was part of the filling in of the old raceways and piping a new covered race-way behind the new workshops as discussed above.
Sale of Public Lands, 1851

In an effort to provide housing in Harpers Ferry, Symington developed a plan to sell off all the public land that was not needed for the armory’s use. This would enable the armorer’s to purchase lots on which to construct their own dwellings without the assistance of the federal government. By 1851, Symington had convinced the secretary of war to move forward in developing this plan. A board was created to identify land required for the armory use, land available for sale and to develop a town plan for Harpers Ferry. This board consisted of Major John Symington, Brevet Colonel Benjamin Huger, Symington’s newly assigned replacement, and Lieutenant Colonel James W. Ripley, the superintendent at the Springfield Armory. The board developed a report along with a town plan for Harpers Ferry to facilitate the sale of public lands. The town plan was drawn by S. Howell Brown and was submitted to the secretary of war after the report in 1852. The report dated 24 September 1851 included:

To be preserved for armory use:
The Rifle Factory and the upper part of the island on which it is situated, which is now occupied by dwelling houses. These dwellings should be removed, and this part of the island reserved for future use, and to protect the bank of the canal by which it is bounded.

This description of Upper and Lower Halls Islands supports the understanding that the two islands had become one by the end of 1851.
FIGURE 20: MAP OF HARPERS FERRY, VIRGINIA. PREPARED IN COMPLIANCE WITH LETTER TO MAJOR SYMINGTON, 22 APRIL 1848 BY HOWELL S. BROWN (MAP COURTESY OF HARPERS FERRY NHP MAP COLLECTION)
Upper Halls Island, 1845-1851

In the eighteenth and nineteenth centuries, livestock in Virginia was permitted to roam freely. As a result, it became necessary to protect gardens and yards from the roaming cattle with fencing. Since the U.S. Armory owned the land for the dwelling houses on Upper Halls Island and elsewhere in Harpers Ferry, the government took responsibility for erecting fences at the houses they leased. The fencing was made of yellow pine and chestnut that was mostly recycled from gondolas traversing the Shenandoah and C&O Canals. The earliest found record indicates that in 1845 “one gondola, 1,200 feet yellow pine plank…” was used for the repair of fencing on the Rifle Factory grounds. This reference indicates that the dwelling houses had fencing prior to 1845.51

By 1845, Symington began to order the demolition of some of the older dwelling houses; many of which dated to 1810. The first to be demolished on Upper Halls Island was house number 155 in 1847. It was a one-story wood house with a value of $200. Two additional houses were demolished in 1850; numbers 162 and 167, both are located on the 1848 Map of Harpers Ferry. House 162 was a one-story wood house worth $500 and house 167 was a one-story stone house worth $450. Construction materials from the demolished houses were sold at public auctions.52

Superintendents: The Final Days of Military Leadership, 1852-1854

In September 1851, Colonel Benjamin Huger replaced Symington as superintendent of the U.S. Armory at Harpers Ferry. He served until March 1854 when Major William H. Bell, who served only until August of the same year, replaced him. Major William Bell would be the last of the military superintendents at Harpers Ferry. Both Bell and Huger continued to push forward the execution of the plans developed by Symington for the Musket Factory and the Rifle Factory grounds. For the Rifle Factory, this primarily included the construction of the machine shop, remodeling two of Hall’s old workshops to be used as store houses and constructing a minor building, the coal house.

The 1852 Flood

On 20 April 1852 Harpers Ferry experienced one of its greatest floods to date. According to the annual report by Superintendent Huger, “the principal workshops at the rifle works were not injured by the flood of April 20. The lower buildings and grounds were covered. These works were suspended a day only.” By the time he submitted his report on 30 June
1852, he indicated that the damage had been fully cleaned up with partial grading completed. Later that year, Huger requested funding for a coal house and bins indicating that the older coal house and bins had been constructed in a temporary fashion and were washed away by the 1852 flood. Unfortunately, the damages to other areas of the town were more severe and were described in the Virginia Free Press as follows:

Harpers Ferry experienced the highest flood in memory. It was much worse than the 1847 flood. Boats, gondolas and rafts were used to remove families from homes. Two families heard crying for help but carried away by current. Every house on Shenandoah Street and Potomac Street submerged. Every bridge with the exception of one on W&O Railroad between Shenandoah City and Harpers Ferry destroyed together with trestle work. Loss of property belonging to Harpers Ferry Armory and to private citizens cannot be estimated. Virginia Free Press requests Congress to appropriate money for relief of Harpers Ferry.

**Machine Shop, 1852-1853**

The machine shop, building #6 on the 1859 Historical Base Map, was the last building designed by Symington at the Rifle Factory. Money for erecting the machine shop was appropriated in 1850; however, construction was delayed until 1852 and would have been supervised by Symington’s replacement, Superintendent Brevet Colonel Benjamin Huger. The building was constructed of brick with a stone foundation and basement. It was approximately 87 feet-9 inches long by 35 feet with a center projection of 14 x 35 feet utilized as an office. Included in the machine shop was a turbine wheel placed in a cut stone wheel pit with a new stone and cast-iron forebay. A culvert was also built to channel water away from the turbine wheel, while other culverts were repaired. Based on the location identified for the machine shop in the archeological excavations in 1961, the cut stone turbine pit inside the machine shop is the same as the extant turbine pit that has been uncovered on Lower Halls Island.

**Remodeled Stock House, 1853-1854**

In 1853 and 1854, the old forging shop or 1819 blacksmith shop of Hall’s Rifle Works was remodeled for use as a stock house. This building is located adjacent to the Lower Shenandoah Canal Locks and identified as building #22 on the 1848 Map of Harpers Ferry. This was a two-story structure, and is visible in the lithograph of Virginius Island (Fig. 22 & 23).
It is the smaller structure seen just in front of, and in line with, the row of new Symington Rifle Factory buildings.\[58\]

**Repair of Old Storehouse, 1853**

One of the existing storehouse structures was repaired for continued use as a storehouse in 1853. During the repair, Superintendent Huger noted that a flight of exterior stairs had been removed and a new set of stairs was built inside the storehouse. This evidence indicates the storehouse was a two-story structure. This structure is identified as building #14 on the 1848 Map of Harpers Ferry as the “Storehouse and Office”. This same building is identified on the 1834 W&P Railroad Map as Captain Hall’s office. It was approximately 30 x 35 feet and most likely constructed of stone between 1827 and 1834. This building can also be seen in the Virginius Island lithograph. The roofline is barely visible through the treetops between the remodeled stock house and the W&P Railroad.\[59\]

**Coal House, 1853-54**

After the temporary coal house and bins were washed away during the flood in April 1852, Superintendent Huger was appropriated funding to construct new, permanent structures for storing charcoal, anthracite and bituminous coal. The new coal house was constructed in 1853-1854. It was a 15-foot tall one-story brick structure with a sheet iron roof, 21 x 25 feet.\[60\] The location of this structure is unknown. Historians Snell and Smith identify it as building #7 on the 1859 Historical Base Map. However, no indication was found to explain this determination and when looking at the Lithograph of Virginius, the building in that location is two-stories, versus a one-story structure as identified for the coal house. The period plans identify the location as shown on the 1859 Historical Base Map; however, further study and archeological research may provide some clarity.
Figure 22: View of the Island Virginius, in the Shenandoah, at Harpers Ferry, taken near Jefferson’s Rock. Taken from nature by Thomas Sachse, lithography by E. Sachse & Co., Sun Iron Bldg., Baltimore, MD. ca. 1854-1859. (Image courtesy of Harpers Ferry NHP Historic Photo Collection)

Figure 23: Detail view of Halls Island from the Sachse Lithograph ca. 1854-1859. (Image courtesy of Harpers Ferry NHP Historic Photo Collection)
Fencing and Grading of the Rifle Works Grounds

With the bulk of the new buildings completed by 1853, Superintendent Huger requested funding to remove old buildings, for additional grading of the grounds and to erect a perimeter fence around the Rifle Factory. In his request to Congress, Huger noted that the grounds were currently in bad order and the shops and property were “exposed for want of proper enclosure.” The funding for these improvements was appropriated in March 1853. In the annual reports for both 1853 and 1854, there is no mention of the building demolition, fence construction or site grading at the Rifle Factory. Superintendents Huger and Bell instead describe the grounds improvements for these years:

30 June 1853

About 300 feet of 8-inch cast-iron pipe, with three hydrants attached, have been laid in front of the shops for conveying water (in case of fire) from the large force pump designed to be attached to water-wheel of machine shop. This improvement will be completed during the present season. 

30 June 1854

One large force pump, for throwing water in case of fire, has been put in position, with the required gearing, connected with the water-wheel at the machine shop.

Shenandoah Canal & Shenandoah Dam

Superintendent Huger requested $5000 in 1853 to repair the Shenandoah Canal at the Rifle Factory. His support of the needed appropriations indicated the need for a revetment wall as one did not exist for approximately half of the canal. Additionally, Huger included the need for “opening a new waste-way and closing the old, and repairing the canal bridge. The waste-way is now at the upper end of the canal and leaves no current in the lower part. By moving the waste-way to the lower end of the canal, and building the revetment wall, the deposite [sic] will be lessened, and the necessity of stopping the works to clear out the canal will be avoided.”
The new revetment wall was completed by June 1853, and described in Huger’s annual report on 30 June 1853:

_A dry stone wall has been built all along the basin on the opposite side of the canal, to the works, two sections on each side of the bridge to raise the edge of the canal, and so grade the road as to draw off the water from the road and hill-side, which has heretofore washed large deposits of earth into the basin; for this purpose 409 feet of dry wall nearly 6 feet high by 3 feet wide, have been built; 700 cubic yards filling put in._

_A dry wall, 224 feet long, 6 ½ feet high, and 3 feet thick, has been built along the southeast side of the canal, adjoining the finishing shop and across the opening of the old sluiceway, which has been filled up. This completes the walling-in of the whole basin._

Based on this account, it is clear that grading work was performed on Shenandoah Street as it was the only road adjacent to the Shenandoah Canal and more importantly, the old sluice-way had been filled in and walled off on the canal edge. This sluice-way had been constructed during Hall’s tenure and divided the once single island into two separate islands, known as Upper and Lower Halls Islands. Once this sluice-way was filled, the two islands merged back to one. At the same time, a portion of the newly filled divisive channel was likely piped to connect with the 1848 tailrace recently constructed behind the factory buildings.

*Figure 25: Ruins of U.S. Rifle Factory, circa 1862/1866 (Image Courtesy of Harpers Ferry NHP Historic Photo Collection)*
Interestingly, the maps developed for the Town of Harpers Ferry by S. Howell Brown after 1853, still indicate Halls Islands as two separate islands. These maps are the only ones to include Halls Island and were all prepared based on the initial survey by Brown in 1852. The 1852 and later maps were developed at a scale to include the entire town of Harpers Ferry, focusing on the development of a town plan and identifying public versus private lots for sale. It is likely that Halls Island was not resurveyed as part of the town planning efforts, which would explain the discrepancy in representing the island as two.

**The Return of Civilian Leadership**

During the first half of 1854, criticism began to surface of the effectiveness of military leadership at the U.S. armories. Most would agree that the modernization efforts of the military superintendents were a huge improvement to the physical state of the U.S. Armory at Harpers Ferry. However, many of the local workmen at Harpers Ferry were quick to find fault with the new facilities.67 Colonel Benjamin Moore, Master Armorer at Harpers Ferry for 19 years stated in testimony to a congressional committee in 1854:

> Workshops were built, under the military system, beautiful in external appearance, but uncomfortable inside. They were constructed with too many windows, which made it uncomfortable to be working in them in summer-time. They were more like green-houses than workshops.68

The military superintendents were typically criticized by the workmen for having a lack of practical knowledge of arms manufacturing, for focusing more on the improvements of grounds than arms manufacture, and for maintaining a high disciplinary standard of managing the workers. This developed into a contentious atmosphere between the workmen and the military superintendents. These complaints, among other factors, led to an investigation, beginning in February 1854, by a Select House Committee that was organized to investigate the appointment of military officers to superintend the manufacture of firearms at the national armories. The committee was charged with reporting whether the military leadership of these civilian entities “is compatible with the public interest and consistent with the nature and character of our civil government.”69

Colonel Moore further stated on the impacts to invention that was felt under the military leadership:
The inventive genius was more displayed under the civil than under the military superintendency [sic], because there was more certainty in the tenure of their employment, and of their being benefited by the exercise of their genius under the civil than under the military superintendency [sic]. Men, in some instances, were compensated for their inventions under the civil; under the military superintendency [sic] they were not.70

This view was not shared by all, especially members of the Ordnance Department. However, the numerous armory workers and master armormen that provided testimony during the congressional investigation convinced Congress to re-enlist the civil leadership at all federal armories. As a result, Major William H. Bell's tenure as superintendent over the Harpers Ferry Armory was cut short. He was replaced in August of 1854 by Henry W. Clowe as the first new civilian superintendent. Clowe remained in that office until the end of 1858 when he was replaced by Alfred M. Barbour who served from 1859 until 1861. Barbour would be the last superintendent to oversee the armory at Harpers Ferry.

A majority of the Symington modernization effort was completed by the time Clowe took office. However, the new civilian leadership completed significant improvements to the land with its grading efforts and fencing initiated under the military leadership of Bell and Huger. Other improvements included the construction of one major building, the barrel drilling and finishing shop, several repairs to existing structures, the removal of a few old structures, the construction of a new lumber yard on Upper Halls Island and substantial improvements to the Shenandoah Canal.

**Fencing and Grading of the Rifle Works Grounds**

Confirming that the much needed fencing and grading work was not completed in 1854, Superintendent Clowe requested an additional $8,180 for this purpose during the 1855-56 fiscal year. His request also included the construction of a sunken road beneath the W&P Railroad to access the Shenandoah River. The purpose of this road was to access the river for to obtain sand for building purposes. Supporting his request for these appropriations, Clowe provided the estimate and documentation from the previous Superintendent Major William Bell. Bell claimed:
The grounds are exceedingly irregular having wide and deep cavities to be filled in, and great irregularities of surface requiring to be graded and leveled. Without protection from enclosures or walls, whilst they are much exposed by the meeting of canal boatmen, immediately in front of the factory. They are exposed on four sides, two of them by the canal, railroad and county road. They exceedingly need attention to protect the public property at the works. The sunken road is … to obtain sand from the Shenandoah for building purposes, this being the only point where it can be obtained [sic]…

The perimeter fence was 2,665 linear feet with a three-foot wide stone foundation, rough stone coping walls, brick piers and iron railing that included a gateway entrance. It was typical in this modernization period, for the construction of items at the Rifle Factory to match those completed for the Musket Factory. Because of this, the fence detail shown in the image at the Musket Factory, (Fig. 26) is likely the same detail constructed at the Rifle Factory. The fence construction began in late 1855 and was completed in the first half of 1858. 72
Additionally, Clowe mentioned that approximately 4,300 cubic yards of fill had been hauled in and graded into the Lower Halls Island in 1856; raising the finished grade elevation for the island. In 1857, the site grading and fill work seemed to be focused on the yard areas immediately around the workshops within the enclosure. During the 1959 exploratory archeological excavations of the site, Archeologist Edward McMillian Larrabee uncovered the front wall and interior stone floor of the machine shop. As they continued to dig north of the exterior wall, the archeologist found a wood plank flooring two feet below the finish floor elevation of the 1853 machine shop’s stone floor. The wood plank flooring is estimated to belong to one of John Hall’s earlier workshops, preceding the Symington modernization era. Based on this discovery, the grading at Halls Island in the mid 1850s added approximately two feet of fill to the overall elevation of the island for flood protection.
During Superintendent Barbour’s term, the site underwent only minor renovations. These included the construction of a “tail-race for the new shops [barrel drilling and finishing shop], hydrants for force-pumps, pipe for conveying water to the annealing house; iron lamp posts for yard lamps, and an iron gate at the west of the inclosure [sic]…”

**Barrel Drilling and Finishing Shop, 1859-1860**

Congress appropriated funds for an additional workshop at the Rifle Factory on 3 March 1859. The barrel drilling and finishing shop was constructed between and connected the 1853 machine shop and the 1851 Hammer and smith shop. It was a two-story brick with stone masonry foundation building, 57½ feet wide by 49½ feet deep, constructed in the same architectural style as the buildings built by Symington. Joining the other two workshops, there now was a single continuous wall 254 feet long, which created an imposing presence along Shenandoah Street. The new shop completed in 1860, included a bell tower with one bell and four clocks protruding above the center front of the building. The procurement of the bell and clocks was postponed, and due to the onset of the Civil War, they were likely never added to the tower.

**Shenandoah Canal & Shenandoah Dam**

In 1855-1856, repairs were completed on the Shenandoah Canal necessitated by damages from the 1852 flood and heavy rains in 1853 and 1854. Superintendent Clowe described these repairs in his June 1856 annual report as “5,823 feet of dry wall, varying from one to six feet in height and from two to four feet in thickness, and 4,895 feet of coping, have been built and set on the armory canal.” The improvements also included excavation and filling of 3,000 feet of soil on the north and south banks of the canal and weatherboarding of the wood bridge that crossed the canal.

These repairs were apparently not sufficient, as an additional $2,000 was approved for repairs to the north wall of the Shenandoah Canal in 1858. Repairs were also needed to stabilize the north wall of the canal as it relates to Shenandoah Street. Clowe mentioned in his report that “The county road, running immediately along the margin of the canal, is constantly wearing away its banks and forming a slope from the road to the canal, facilitating the washing into the immediate channel of the canal of all kinds of rubbish and filth that accumulate on the surface of the road.” Completed in 1859, the canal work included a minimum of 1,407 perches.
of heavy stone masonry, 1,459 feet of stone coping, 405 yards of excavation and 507 yards of fill. The quantities provided were for the canal sections completed in 1859 only; the work performed in 1858 was not itemized.\(^79\) However, the actual length of the new wall was described in a letter from George Mauzy, a resident of Upper Halls Island, as running opposite the Rifle Factory along the roadside of the canal and up river to a point opposite his residence on Upper Halls Island.\(^80\) Mauzy lived in a small dwelling house located at the upper end of Upper Halls Island that was leased to the River Company for the Shenandoah Canal Toll House.\(^81\) He was the toll agent for the River Company. This indicates that by 1859 the northern canal wall ran the entire length of Halls Island, from the Shenandoah Canal locks to the Canal Toll House.

**Upper Halls Island, 1852-1861**

A lumber yard was originally built near the arsenal in Lower Town. After being destroyed during the 1852 flood, Superintendent William Bell was determined to locate the replacement shed on higher ground for flood protection. He identified Upper Halls Island for the site of the new shed and proposed removing the existing “shanty” dwellings that were still on the island. The location of Upper Halls was identified for similar reasons that Robert Harper chose to locate his second dwelling adjacent to the island; for it was “accessible and not liable to be overflowed.”\(^82\)

In 1852, when the Town Plan for Harpers Ferry was developed, Upper Halls was identified as being preserved for government use and the dwelling houses located on the island were slated for removal. However, Superintendent Bell, noted houses numbered 156, 168 and 158 were desirable as residences for the master foreman and workmen of the Rifle Factory. He indicated that the presence of the workmen in these dwelling houses would provide protection of the factory against fire. Bell’s request was approved and these three houses remained on the island.\(^83\)
Congress appropriated $6,000 on 5 August 1854 for the demolition of old dwelling houses and the erection of the new armory lumber yard located on Upper Halls Island. The remaining dwelling houses on Upper Halls still slated for removal were houses 157, 159, 160, 161, 163, 165, 166 and 169. By 30 June 1854, all were removed to allow space for the lumber yard construction.

Additional improvements to Upper Halls Island during this period included the erection of a post, rail and picket fence with approximately 100 panels constructed to enclose the grounds of Upper Halls Island.

**Repairs to Existing Workshops, 1852-1861**

The annealing furnaces were enlarged and extensively repaired in 1855; however, no additional data is known on the new size of these structures. Other additions at the Rifle Factory included a 35 x 25 foot addition to the finishing and machine shop in 1856. This was also a brick two-story addition with stone foundation constructed in the same style and manner as the structures designed by Symington. It is not clear where this addition was built at the machine shop, but speculation by past historians place it as the unidentified structure found behind the machine shop during the archeological excavations on the island in 1959. Other than these few additions, some minor repairs were also performed on the machinery and water wheels during the 1856 fiscal year for the finishing and machine shop as well as the tilt-hammer and smiths shop.

**John Brown Raid, 1859**

On the night of the 16th of October last, a party of abolitionists came to Harper's Ferry, and while the citizens peacefully slept, they took possession of the United States Armory, Rifle Works, and Arsenal.

During the summer of 1859, famed abolitionist John Brown and twenty-one of his followers moved into a farm on the outskirts of Harpers Ferry called the Kennedy Farm. They maintained a low profile while plotting a raid on the U.S. Armory and the town of Harpers Ferry. Brown and his men planned to take possession of the armory, steal the supply of arms, free the town’s slaves, arm them with weapons and enlist them in his “Provisional Army of the United States” in the fight to end slavery.
Brown and his army marched into Harpers Ferry on the evening of 16 October 1859. They approached the town by crossing the B&O Railroad Bridge from Maryland, taking the bridge guard as prisoner. They continued on to the gates of the armory grounds including the Rifle Factory and imprisoned all of the night watchmen. Three of Brown’s men, John Copeland, Captain John Kagi and Captain A.D. Stevens, marched down Shenandoah Street to the Rifle Factory and easily captured the night watchman. Stevens escorted the watchman down to join the other prisoners at the arsenal while Kagi and Copeland guarded the Rifle Factory. Kagi and Copeland were later joined by Lewis S. Leary. Copeland and Leary were 25 year-old black men from Ohio. Of the twenty-one men Brown had gathered for the raid, only five were black.

Brown’s raid on Harpers Ferry quickly turned into a bloody skirmish with the townspeople taking up arms against the invaders. The focus of the fighting was around the arsenal in Lower Town, but by 2:30 pm on the 17th, a party of “citizens and neighbors” launched an attack on Kagi and his two men at the Rifle Factory. The citizen group began shooting toward the Rifle Factory from Shenandoah Street forcing Kagi, Copeland and Lewis out the back of the buildings. The three men crossed over the W&P Railroad and tried to escape by wading in the Shenandoah River. Another group of townspeople positioned themselves on the bank across the river; they spotted the three men and opened fire. Now with shots coming at them from both sides of the river, Kagi and his men sought refuge on a large flat rock in the middle of the Shenandoah. Kagi and Leary were both killed in the crossfire while Copeland was captured and jailed.

Shortly after the raiders were pushed out of the Rifle Factory, several local militia groups made their way into town. “None of them made any attempts to dislodge Brown and his men from the engine house, but all added to the general confusion and hysteria gripping the town.” The local militia troops were replaced by a detachment of U.S. Marines led by Army Colonel Robert E. Lee. Brown refused to surrender without a fight and early in the morning hours on October 18, the Marines stormed the engine house where Brown and his remaining raiders were held up with hostages. Brown was severely injured, captured and jailed in Charles Town along with the other surviving raiders. Brown was found guilty for treason, murder and insurrection; he was executed by public hanging on 2 December 1859 in
Charles Town, Virginia (now West Virginia). Although the raiders held the Rifle Factory, it did not sustain any damages during the fight.

Proposed Improvements Never Initiated

Congress approved several improvements for the Rifle Factory in 1860 and early 1861, but due to the onset of the Civil War, they were never initiated. These improvements included the removal of two of Hall’s old workshops, plans for a new workshop and plans to renovate and enlarge the Shenandoah Canal. The two older Hall buildings were described as “rough cast buildings [also described as old houses] in the lower end of that enclosure which are used only for rubbish etc. They are in an exceedingly dilapidated condition and not now needed and mar the appearance of the grounds….There are also a few old trees in the same enclosure, which it would be advisable to take down.” Permission was never granted for the removal of the buildings and the trees.91 However, when the armory was inspected by Lt. Col. James W. Ripley on 12 May 1860, he noted:

*The addition to the Rifle Factory connecting the forging with the Machine Shop now in process of erection and nearly completed, and as soon as it is finished, the present drilling and browning shop which is entirely out of position, may be removed and the material applied to the erection of a small stock house of sufficient capacity to accommodate about 10,000 stocks, such building being very much needed at the Rifle Works….*92

A request was made for $12,128 for the 1861 to 1862 fiscal year for appropriations to construct a new brick building to serve as an annealing shop, Stock-House and grinding mill. At that time all component grinding was completed at the Musket Factory. The approximate mile distance between the Musket Factory and Rifle Factory created a great deal of hassle and lost time due to travel. It was noted that the erection of this structure would remove the remaining objections to working at the Rifle Factory by enabling the removal of old dilapidated houses and allowing the finished grade to be elevated for flood protection. The new structure would also reduce the overall cost of manufacturing the new Model 1855 Rifle.93

An additional request for the 1861 to 1862 fiscal year was for $11,129 to fund a project to enlarge and protect the Shenandoah Canal.94 Superintendent Alfred M. Barbour provided an explanation of need stating:
...Originally this canal was made by a joint stock company, to facilitate the navigation from the upper country bordering on the Shenandoah River, and was not designed for the purposes to which the water power derived from it is now devoted. In effecting the improvements here proposed, a stone wall will be necessary to render the waterpower of the rifle factory sufficient; and also to protect from inundation the land and tenements of the government between this canal and the Shenandoah River. These are occupied by operatives of the armory and are very valuable.

Congress appropriated the desired funds for the canal improvements and the new building on 2 March 1861. Confederate troops seized control of Harpers Ferry on 19 April 1861 and these improvements were never initiated.

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1 Crosbie and Lee, 41-42.
3 Ibid, 11.
4 Ibid, 12.
5 Ibid, 1.
8 Ibid, 10.
10 Ibid, 72-73.
11 Ibid, 73-75.
18 Ibid, 16.
20 Ibid, 27-34.
21 Ibid, 37-40.
22 In viewing the photograph taken during the Civil War, (Fig. 24 & 29), there is no indication of ground disturbance in the area of building #5 on the 1859 Historical Base Map.
There is a remnant wall standing near the proposed location of the annealing furnace & proof house, but this wall more likely belongs to the 1853-54 stockhouse. The stockhouse location is clearly located and identified on the 1848 Map of Harpers Ferry (Fig. 17) and was aligned with the gates and bridge over the canal locks as is the wall in the photograph. Smith also identified the new annealing furnace as the second building in the row of workshops portrayed in the lithograph of Virginius Island (Fig. 22). It is more likely that the building referenced in the lithograph is actually the 1849-51 tilt-hammer and smiths shop. The 1851-52 Annealing Furnace would have been built at the time of this lithograph was created, in ca. 1854-59.

23 Snell, *Rifle Factory History, Vol. II*, 24 The L-shaped building with bridge extension, as shown on the 1833/35 railroad maps show a handwritten identifier of this building as “T. Hammer,” if the building in this rough location was in fact the 1828 tilt-hammer shop, it would have been demolished by 1843 to make room for the 1843-44 filers shop.

25 The kiln was possibly removed before construction of the 1849 tilt-hammer & smith shop, based on its proximity to new building. No hard evidence has been found to date.

26 Based on the location of the drill shop on the 1848 Map of Harpers Ferry, it would have been necessary to demolish the 1836 drill shop to make room for the 1849 tilt-hammer shop. However, expenditures for repairs of old structures indicate the “old drill shop” had the roof repaired in 1851 and the foundation repaired in 1850. (See Snell, *Rifle Factory History, Vol. II*, 45.) Further research needed to clarify.

27 The bell shop was in the same location as the 1849 tilt-hammer & smith shop; it must have been removed prior to construction of the new building. See Snell, *Rifle Factory History, Vol. II*, 45.


29 barrel welding shop needed to be removed to make room for the 1852 machine shop.

30 Removed once the 1852 annealing shop & proof house was completed. Snell states that this shop was removed to make room for the 1852 annealing shop but it may be more likely that they were removed after the new shop was up and running.

31 Ibid.

32 This building may have been removed with other structures in preparation for the construction of the 1852-53 machine shop (See Snell, *Rifle Factory History, Vol. II*, 43). The jobbing shop for filers was not in the way of the new machine shop and may have been removed at a later date, but it is not depicted in the ca. 1853 Sketch of Rifle Works at Harpers Ferry, Virginia, by Lieutenant James Benton.

33 Likely removed prior to 1856 addition to the 1846 finishing & machine shop, See Snell, *Rifle Factory History, Vol. II*, 76.


35 rod tilting shop must have been removed sometime before 1858 to make room for the 1859 barrel drilling and finishing shop. Smith indicates this building was removed in 1849, before construction of the 1849 tilt-hammer & finishing shop or in 1851 before construction of the 1852 machine shop. However, the rod tilting shop would not have immediately been in the way of either new structure. See Snell, *Rifle Factory History, Vol. II*, 28 & 43.


37 Ibid.

38 Ibid.

39 Ibid.

40 Ibid.

41 Ibid.

42 Ibid.

43 Ibid.
This building had some plaster repairs completed in 1850 (See Snell, *Rifle Factory History, Vol. II*, 45.) and was requested for removal in 1860 (See Snell, *Rifle Factory History, Vol. II*, 86.). No evidence was provided for this removal of the structure, but the first Civil War raid of Harpers Ferry likely demolished it.

Ibid, 47.

Ibid, 48.

Ibid, 49-51.

Ibid, 52-53.


Ibid, 63.

Virginia Free Press, 22 April 1852.

Ibid, 42-43.


Ibid, 61.

Ibid, 62.

Ibid, 63.


In studying the photograph of the Rifle Factory taken in ca.1862, HF-37, there is no visible sign of the channel separating the two islands. Overlaying the historic 1835 W&P Railroad Map with the 1859 Historical Base Map and the 1962 Archeological Survey provides additional data to support this theory. Based on this overlay study, a majority of the channel would have been inside the factory wall with the channel crossing underneath the perimeter wall near the finishing and machine shop. The 1865 photograph confirms the wall location was several feet west of the finishing and machine shop as shown on the 1859 drawing. The 1865 photograph also confirms that the wall line was straight and perpendicular to the Shenandoah Canal. The 1833-35 drawing and the 1962 archeological survey indicate that the finishing and machine shop was constructed relatively close to the eastern edge of the channel, roughly where the wall would be located, however, the channel is drawn at approximately a 70-degree angle from the Canal.

Smith, *Challenge of Change*, 35.


77 Snell, *Rifle Factory History, Vol. II*, 70-73; Larrabee clarifies several dimensions initially understood for this workshop in his archeological investigation, such as the overall length of the continuous building façade from 300 to 254 feet, see Larrabee, *Second Season*, 31.

78 Ibid, 87-88.

79 Ibid, 87-88.


83 Ibid, 41.

84 Ibid, 41.


87 Ibid, 74-78.

88 Letter from Father M. A. Costello to Father Harrington, All Hallows College, 11 February 1860 (Harpers Ferry NHP Archives, HFD-345), 1.


90 Ibid, 39.


95 Ibid, 92.

Note:
1. All of the Rifle Factory workshops were burned in 1861. At least one of the workshops was re-roofed during the Civil War, and used as quartermaster warehouses and possibly as a temporary prison.

2. Several wood frame structures were constructed to support the railroad, however, their actual location on the site is unknown at this time. These structures have been included on this map in diagramatic form to indicate the size and extent of these structures.

3. The 1851-52 Annealing Furnace and Proof House is shown in the location identified by Historian Charles Snell in 1959. Based on a study of the photograph of the site taken during the Civil War, ca. 1862 (Harpers Ferry/NHP Archives, HF-37), the location is currently undetermined. Further archeological study could possibly locate this workshop.
Site History: 1861-1869

1861-1869: CIVIL WAR AND POST WAR OCCUPANCY

Civil War

After years of heated debates and growing antagonism between the northern and southern states, South Carolina voted to secede from the Union on 20 December 1860. This was just weeks after Abraham Lincoln won the presidential election running on a northern aligned Republican ballot. By February 1861, Mississippi, Georgia, Alabama, Florida, Louisiana and Texas joined South Carolina to form the new union of the Confederate States of America. They voted Jefferson Davis of Mississippi as their president and Alexander Stephens of Georgia as vice-president and proceeded to adopt a draft constitution. President Lincoln took office on 8 March 1861 and addressed a divided nation. Lincoln held firm his resolve to “preserve, protect and defend” the nation.¹

In your hands, my dissatisfied fellow-countrymen, and not in mine, is the momentous issue of civil war. The Government will not assail you. You can have no conflict without being yourselves the aggressors. You have no oath registered in heaven to destroy the Government, while I shall have the most solemn one to “preserve, protect, and defend it.”

I am loath to close. We are not enemies, but friends. We must not be enemies. Though passion may have strained it must not break our bonds of affection. The mystic chords of memory, stretching from every battlefield and patriot grave to every living heart and hearthstone all over this broad land, will yet swell the chorus of the Union, when again touched, as surely they will be, by the better angels of our nature.²

With the road seemingly paved for battle and no compromise in sight, Confederate troops opened fire on Fort Sumter in Charleston, South Carolina. After a thirty-four hour bombardment, Union troops surrendered to the Confederates on 12 April 1861 initiating the start of the Civil War. On 17 April 1861, Virginia voted to join the other southern states and seceded from the Union. Less than 24 hours later, the Confederates planned an attack on Harpers Ferry.
Troops commanded by Lieutenant Roger Jones guarded the armory at Harpers Ferry. Warned of the ensuing attack, Lieutenant Jones burned the U.S. Arsenal and several shops at the Musket Factory destroying approximately 15,000 stands of arms. Shortly after, the lieutenant and his men abandoned the town. They walked across the Potomac River Bridge and headed up the C&O Canal towards Hagerstown. Following close behind were other Union supporters from Harpers Ferry who assisted in the armory’s destruction. They fled north as Confederates marched into Harpers Ferry only a few short hours later at 1:00 am on 19 April 1861. The remaining citizens managed to extinguish the fires and salvaged the buildings and machinery before the Confederates arrived.3

The Confederates managed to completely destroy the armory and left the town in turmoil during their two month occupation of Harpers Ferry. They removed all of the machinery from the Musket Factory and the Rifle Factory and shipped it on wagons to Richmond, Virginia and Fayetteville, North Carolina. The machinery was used in the newly established Confederate armories to manufacture arms for the Confederacy. They forced armory workers to vacate their government housing which, along with the churches in town, were used as barracks. All suspected Union sympathizers where immediately jailed without trial. As the Confederate
army began to evacuate the town on 14 June 1861, they burned all of the buildings at the Musket Factory and the B&O Railroad Bridges crossing the Potomac River. They began their march south toward Winchester, Virginia the next morning.  

After realizing they neglected to burn the Rifle Factory buildings, the commanding General Johnston sent a Confederate regiment back to Harpers Ferry on June 20th or 28th. This regiment set fire and destroyed all of the ten workshops and storehouses located on Halls Island. In addition, they burned the wooden toll bridge crossing the Shenandoah River and ran several B &O Railroad cars and a locomotive into the Potomac River. The wooden interiors, floors and roofs of all the burned shops and storehouses were completely destroyed, but the strong brick walls remained standing.

From this point forward, the town of Harpers Ferry would flip between Union and Confederate occupation several times before the war would end. Union troops re-occupied Harpers Ferry from 18 July to 17 August 1861. However, there is no evidence that these troops occupied any portion of Halls Island or the Rifle Factory shops during this short occupation. The

*Figure 30: John H. Hall’s Rifle Works, U.S. Rifle Factory on the Shenandoah River, near Harpers Ferry, Destroyed by the Virginians in June 1861, Drawn by A. Thompson for The New York Illustrated News, 1862. (Image Courtesy of Harpers Ferry NHP Historic Photo Collection)*
town remained unoccupied and desolate until 25 February 1862 when Union troops took command of the town due to its strategic importance. With the B&O Railroad, the C&O Canal, the road between Frederick and the Shenandoah Valley, the Potomac and Shenandoah Rivers all connecting through Harpers Ferry, the town remained a strategic communication connecting point between Washington, D.C. and the west. The Union troops remained in occupation of the town until September 1862. 6

Union troops repaired the W&P Railroad in its entirety from Harpers Ferry to Winchester by March 1862. The W&P Railroad was then used to carry supplies to Union troops located in the Shenandoah Valley. This made the Rifle Factory a convenient location for the Ordnance Department to house an arsenal. One of the Rifle Factory shops was repaired and utilized for this purpose from February to September 1862. It is unknown which workshop or storehouse might have been used.7

The town of Harpers Ferry changed hands again on 15 September 1862 when Union forces surrendered after a Confederate siege on the town. The siege lasted for three days and primarily impacted areas in lower town and at the Musket Factory. This battle or the short Confederate occupation did not affect Halls Island. After the siege, a small troop of Confederate soldiers remained in town to arrange parole of the Union prisoners, and then quickly abandoned the town to assist in the Battle of Antietam. Union troops returned on 20 September 1862 primarily occupying Maryland Heights, Bolivar Heights and Camp Hill. Union forces abandoned the town again on 29 June 1863 as the Confederates were heading for another northern siege that led to the Battle at Gettysburg, but they returned quickly on 14 July 1863. Halls Island remained unoccupied through 1863 except for one structure that the Ordnance Department utilized as an arsenal along the W&P Railroad. 8 It is possible that the Union troops reconfigured one or more of the Rifle Factory workshops for use as a Civil War prison; however, the prison in question may have been a factory on Virginius Island or at the Musket Factory. Additional research is needed to verify this information.9

The Confederates had one last, albeit short, occupation of Harpers Ferry from 4-8 July 1864 when Union troops abandoned the town again as the Confederates headed through the town on their way to Washington. The Union troops burned the railroad and pontoon bridges and held strong on Maryland Heights. These tactics forced Confederate troops to detour their
route for a Potomac crossing further north near Sharpsburg. The
Confederate troops torched the town as they left on the night of July 6.
Although it is likely that the Ordnance Department Arsenal on Halls Island
burned in the 1864 attack on Harpers Ferry, further research is required to
 confirm.

**Sheridan's Army**

Between August 1864 and February 1865, Harpers Ferry transformed into a
major base of operations for General Phillip H. Sheridan's Shenandoah
Valley campaign. In late 1864, the roofs of both the Musket Factory and the
Rifle Factory were repaired and the large shops used for quartermaster
supply warehouses. The U.S. Military Railroad Corps completely rebuilt the
W&P Railroad in November 1864; it had been destroyed earlier during one
of the Confederate raids on Harpers Ferry. The W&P Railroad line was
rebuilt from Harpers Ferry to Stephenson’s Depot approximately five miles
west of Winchester, Virginia. This railroad line played a critical role in
Sheridan’s Shenandoah Valley Campaign and carried almost 200,000 people
and thousands of tons of supplies on 2,236 trains from December 1864 to
June 1865.

Halls Island was critically positioned to function as a depot for the heavily
used W&P Railroad. The U.S. Military Railroad Corps built six new wood
frame structures on Lower Halls Island and two wood frame structures on
Upper Halls Island to support the railroad. To make room for the military
railroad and supporting structures, the last three remaining dwelling houses
were demolished in late 1864. Our research did not uncover any plans
depicting the location of these wood frame structures, but the following is a
list of the structure types and sizes (they are also indicated on the 1861-1869
Period Map, for size reference only):

<table>
<thead>
<tr>
<th>Lower Halls Island</th>
<th>Upper Halls Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Locomotive Engine House, 164 x 26 feet.</td>
<td></td>
</tr>
<tr>
<td>2. Machine and Blacksmith Shop, 82 x 26 feet.</td>
<td>Tool House, 37 x 22 feet.</td>
</tr>
<tr>
<td>5. Railroad Loading Platform, 112 x 16 feet.</td>
<td></td>
</tr>
<tr>
<td>6. Railroad Loading Platform, 446 x 25 feet.</td>
<td></td>
</tr>
</tbody>
</table>
Figure 32: Alfred Waud Sketches of Sheridan's Army Quartermaster Supply Stores, 1862-1865
(Images Courtesy of Library of Congress)
Town in Ruins

The war ended in April 1865 leaving Harpers Ferry and the Rifle Factory in complete ruins. All ten of the shops at the Rifle Factory were completely destroyed and abandoned, and remaining supplies seemed to have been consolidated in the shops at the Musket Factory until they could be shipped to the appropriate U.S. Arsenals. The temporary railroad structures were ordered to be demolished by the Secretary of War on 1 March 1866 with the materials sold at auction.10

This ruinous state inspired a local resident to express her sadness of the town’s demise with these words:

*Nowhere can be seen more painful evidences of the effect of our years rebellion than at this far famed place. Nothing is left there that the fury of the war could destroy. The work of God, a part of his six day’s labor, - the bold, wild grand scenery; the roar of the Cobongaroota (not the Potomac); the Bolivar, Maryland and Shenandoah Heights; the break through the mountains at the time of the Deluge; the ‘rising sun’ scene throwing a golden hue on Jefferson’s Rock, and the surrounding mountains, still remain as they came from the Divine Hand, to feast the eye of the traveler, the antiquarian, the artist and scholar.*

*The sieges, the cavalry and infantry combats, the cannonading, the bomb, the sword and torch have left it a mass of ruins, and were it not for the arrival and departure of the cars, everything would be as silent as one of the lost cities of antiquity.*

*The armory’s bells no longer call the stalwart artisans to their daily toil; the hammering, the boring, grinding, welding and polishing are no more seen...the great driving machinery lies powerless; and the armorers are not longer to be seen ‘with clink of hammers closing rivets up.’* 11

On 14 May 1866, the chief of ordnance advised the secretary of war that “Harpers Ferry can not, in my opinion, be ever again used to advantage for the manufacture of arms, the retention of the property of the United States at that place is not necessary or advantageous to the public interest....and I recommend that as soon as that depot can be broken up, all the public land, buildings, and other property there be sold.”12 The federal government held public auctions on 30 November through 2 December 1869 for the sale of their land holdings in Harpers Ferry. This sale included the 13 acres of Upper and Lower Halls Islands, the ruins of the ten U.S Rifle Factory
Buildings, and the water power rights on the Shenandoah River. Francis C. Adams and a group of speculators purchased Halls Island for $30,000 in signature bonds, allowing them to take immediate possession of the property based on an agreed upon payment schedule. Adams and his partners never made a payment for the land and it eventually reverted back to the Government.13

A Hopeful Future

The federal government may have given up on Harpers Ferry, but the town’s people still held high hopes for its future in the hands of private enterprises....

This determination must force the people of Harper’s Ferry and those in the neighborhood to look in the future to private enterprise; and there is no location in this whole region of country where manufactories of every description could be carried on more successfully.14

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5 Ibid, 206.
6 Ibid, 206-208.
8 Ibid, 93.
9 Additional research should be done for this subject. See: Lee C. Drickamer and Karen D. Drickamer, Editors, Fort Lyon to Harper’s Ferry, On the Border of North and South with “Rambling Jour”: The Civil War Letters and Newspaper Dispatches of Charles H. Moulton (Shippensburg, PA, White Maine Publishing Co., 1997), 148, 206, & 216. Moulton references a prison in an old 4-story factory building, but does not specify its location. None of the Rifle Factory buildings were 4-story structures. See Also: Provost Marshal’s Office Records at the National Archives including RG 393, Records of the United States Army Continental Commands, 1821-1990 and RG 393 Pt 2 entry 1167.
10 Ibid, 94-95.
11 Harper’s Ferry (Bolivar, WV: Collection of Miss Cassandra Dittmeyer, undated); Reprinted in Noffsinger, Physical History, 203.
14 Harper’s Ferry, 203.
Note:

1. All of the Rifle Factory workshops were burned in 1861. At least one of the workshops was re-roofed during the Civil War, and it is unknown whether or not it was used as a temporary prison.

2. The 1851-52 Annealing Furnace and Proof House is shown in the location identified by Historian Charles Snell in 1959. Based on a study of the photograph of the site taken during the Civil War, ca. 1862, the location is currently undetermined. Further archeological study could possibly locate this workshop.

3. The 1851-52 Annealing Furnace and Proof House is shown in the location identified by Historian Charles Snell in 1959. Based on a study of the photograph of the site taken during the Civil War, ca. 1862, the location is currently undetermined. Further archeological study could possibly locate this workshop.
1870-1944: THE SHENANDOAH PULP COMPANY

The Rebirth of Industry on Halls Island

The destruction and abandonment of the Rifle Factory and the 1866 decision of the chief of ordnance to cease manufacturing arms in Harpers Ferry led to significant changes in land use on Halls Island during the Reconstruction era.

Despite local optimism about revitalizing the armory, in 1867, General Grant stated that the armory grounds at Harpers Ferry were no longer needed and advised the secretary of war against rebuilding. “In 1868 Congress passed an act to sell public lands, buildings, machinery and waterpower privileges to the Shenandoah and Potomac Rivers. With no economic base, the town was described as ‘Next to Dead’ and a ‘Village of Paupers.’”¹

Between 30 September and 1 October 1870, a massive flood caused the water level in the Shenandoah River to rise thirty feet. The flood leveled buildings, trapped people in their homes and caused the death of forty-seven residents of Harpers Ferry. Many of the dead were residents of Virginius Island who were marooned when the bridges leading to the mainland were washed away by the swift waters of the Shenandoah.²

Virginius Island is located on the Shenandoah River immediately downstream from Halls Island. Before the flood of 1870, it was a diversified and bustling industrial hub of Harpers Ferry. After the devastating flood, it became a single-industry community centered around the Child and McCrieght Flour Mill, established in 1860. The mill was located in a former cotton mill owned by Abraham Herr. The old cotton mill failed several years before the war and was utilized as a grain storage facility before the war then was used for the care of sick soldiers during the Civil War.³
By 1876, the U.S. government owned Halls Island and its water rights. Industry was halted after the Civil War leaving the area relatively dormant in comparison to its robust industrial past. After a failed attempt to sell the property to Capt. Francis C. Adams and partners in 1869, property and water battles with U.S. District Courts continued into the mid 1870s.4

The setting of the area, including Halls Island, was described in 1872 by acclaimed author and poet William Cullen Bryant in *Picturesque America*, one of the earliest and most quintessential books describing and illustrating the American landscape post-Civil War.

*The road around Bolivar is the segment of a circle, the first part of which lies along the Shenandoah and the unused Slackwater Canal, bordered by majestic cottonwoods, their wide gaunt, flicked branches spreading weirdly over the dismantled Government Rifle-Works, the empty, crumbling canal, and the havoc that war and flood have made on every side.*

**Thomas Savery and the Shenandoah Pulp Company**

Thomas Savery was born on May 1837 in Philadelphia, Pennsylvania to a Quaker family. Savery attended Quaker schools and later became an apprentice machinist at William Sellers & Company of Philadelphia, where his outstanding mechanical skills became evident. He then worked as a foreman in the shops of the Columbus, Piqua & Indiana Railroad, later becoming superintendent in the Pennsylvania Railroad’s Altoona shops. “In 1864 Savery became shop foreman for Pusey, Jones & Company, in Wilmington, Delaware, shipbuilders and manufacturers of papermaking machinery. The company was on the verge of bankruptcy in 1874 when he was named general manager, chief operating officer, and vice president. He later became president. During the 1880s and 1890s Savery became more interested in the production of paper and wood pulp. He patented several papermaking machines which were widely used, and Pusey & Jones became a leader in the industry.”5 Savery, a leader in the manufacture of late nineteenth century pulp and paper machinery, obtained thirty-two patents for improvements to paper manufacturing machinery.6

Savery recognized the potential in the raw materials, railroad access and water power of the Harpers Ferry area. On 22 October 1884, Savery, along with investors, purchased land for the future Harpers Ferry Paper Mill on the Musket Factory grounds along the Potomac River. He paid $25,000,
outbidding the Baltimore & Ohio Railroad. Included in this purchase was the engine house John Brown used as a fort during the raid in October 1859. The entrepreneurial Savery packaged bricks from the fort in lined black leather boxes and sent them to friends, family and others who appreciated their historical significance. Later, he took the entire fort to be exhibited at the 1893 Chicago World's Fair.

In addition to the Potomac River site, Savery purchased 13 acres, 1 rood and 10 perches (a little over 13 ¼ acres) of the old Rifle Factory site on Halls Island. The $810 purchase on 2 March 1885 from the U. S. government included land, riparian and waterpower rights. Savery would construct ground wood pulp mills on both the Potomac River and Shenandoah River sites. This type of mill was a budding industry in late nineteenth century America when cotton and linen rags previously served as the raw materials for paper. Ground wood pulp mills typically produced a paper, which was weaker, softer and less durable than bond, textbook, and cover paper. It tended to become brittle and yellow over time and was typically used for newsprint.

In 1888, Savery commenced construction of the ground wood pulp mill known as the Harpers Ferry Paper Company on the Potomac River. It was approximately the same size and worked at the same capacity as the Shenandoah Pulp Mill on Halls Island. The pulp mill on the Potomac was considered to be the more valuable of the two. Operations began in March 1889, a little over a year after the Shenandoah Pulp Company opened. The Baltimore Sun reported that experts in the field considered Savery’s mills to be the most valuable and finest in the country with the exception of the mill at Holyoke, Massachusetts.
The Rifle Factory demolition occurred between 1884 and 1887. Construction of the Shenandoah Pulp Company began in 1887 on the lower locks of the Shenandoah Canal at the northeast corner of Lower Halls Island. Savery’s workers used bricks, cut stones and other scrap materials from the U.S. Rifle Factory to build the Shenandoah Pulp Company foundation. These materials were also used to construct a large retaining wall following roughly along the railroad line on the south side of the island. The wall contained the impoundment known as Lake Quigley, which was necessary to store and soak logs and power the mill. The lake was named for John F. Quigley, one of Savery’s partners and the owner of a Niagara Falls paper mill. Quigley designed and constructed the Shenandoah Pulp Mill and served as vice-president and general manager of the mill.

Lake Quigley was bounded on the north side by the Shenandoah Canal wall. It extended approximately one mile to the west where an 18 foot wide and 1,300 foot long crib dam turned the water into the canal from the river and narrowed into a head race on its eastern edge at the west side of the mill. The creation of the mill and its accompanying lake radically changed the landscape and ecology of Halls Island. As Savery’s mill was nearing

Figure 33: Savery’s Harpers Ferry Paper Mill on the Potomac River ca. 1890s (Image courtesy of Harpers Ferry NHP Historic Photo Collection).
completion, The Baltimore Sun reported that “...the mill, forms a lovely lake, in some places over 300 feet wide, which has very little current.”\(^{15}\) The dam extended across the river and when the gates were fully opened the entire flow of the Shenandoah River could be diverted through them. Water would channel through “ten head gates into a canal which widened to form the lake.” The community used the lake for boating and ice skating in the winter and in the early 1890s, the Spirit of Jefferson newspaper reported that ice from the frozen lake had been shipped west to Cumberland, Maryland.\(^{16}\) At this stage of research, the purpose of shipping ice to Cumberland is not known.

Archeological findings from the 1960s revealed that the foundations of old buildings on Halls Island diverted water currents and directed sedimentation in the lake. During the pulp mill era depth measurements were taken at 300 foot intervals across the lake revealing that there were two channels on either side of a ridge in the middle of the lake. Rumors of one resident attempting to garden on the ridge are also prevalent in local lore.\(^ {17}\)
The Sanborn Maps seen above, and photographs of the site reveal that there was a railroad spur leading from the W&P main line to the pulp mill as early as 1890. More research is necessary to determine the exact date of the construction and demolition and the evolution of the “siding” or short rail line that led from the main line to the mill.
FIGURE 37: IN A PHOTOGRAPH DATED CA. 1885-1936: VIRGINIUS ISLAND (BOTTOM LEFT), THE SHENANDOAH PULP COMPANY (MIDDLE RIGHT) AND LAKE QUIGLEY ARE SEPARATED FROM THE SHENANDOAH RIVER BY THE RAILROAD EMBANKMENT (IMAGE COURTESY OF HARPERS FERRY NHP HISTORIC PHOTO COLLECTION).

FIGURE 38: LAKE QUIGLEY, WALL, SHENANDOAH STREET AND DWELLINGS CA.1885 (IMAGE COURTESY OF HARPERS FERRY NHP HISTORIC PHOTO COLLECTION).
Much work needed to be done on the canal to accommodate the new pulp mill at Halls Island. It had suffered from several years of flooding and neglect. A November 1877 flood closed the canal for good. Under Savery’s ownership: “It was widened in some places, and for a distance of 300 feet before the mill the bottom of solid rock was blasted to a depth of 18 feet. The tailrace, one-third of a mile long to where it enters the Shenandoah at its junction with the Potomac, was excavated to a depth of 7 ½ feet and made 50 feet wide. The distance between the head and tail water is 30 feet, of which 12 feet are gained by the natural rapids of the river. Of the 30 feet 25 feet will be used. Eighteen hundred forsepower [sic] will be developed.”

Spurred by the location of the stone head gates at Shenandoah City, a lawsuit was filed by E. W. Miller, who purchased the assets of the failed Shenandoah City Company. Miller was convinced that within his holdings were the rights to waterpower at Shenandoah City. This led to a lawsuit (Miller v. Shenandoah Pulp Company) in which Savery prevailed. The Harpers Ferry Flouring Mill Company also filed suit against Savery, (Harpers Ferry Mill Company v. Thos. H. Savery and others) claiming that his water-harvesting activities prevented operation of the flour mills. After filing an injunction, work was halted for two months until Judge John G. Jackson of the United States Circuit Court for West Virginia disbanded the injunction.

The Shenandoah Pulp Company was in operation by February 1888. Logs, delivered by railroad along the river floated to the mill where they were put through a series of processes that reduced them to pulp. Hundred pound bundles of pulp were then loaded onto rail cars on the side of the mill where they were shipped to paper mills. Fifty-one men worked ten to twelve hour shifts to produce forty tons in a twenty-four hour period.

On 1 June 1889 a flood washed away two parts of the embankment of Lake Quigley, carrying off $2000 worth of lumber. After this flood, and up and through the 1930s, dredging of the lake performed on a regular basis kept water levels at a functional depth. The 1889 flood also destroyed the headgates at Shenandoah City. Overall losses to the Shenandoah Pulp Company were $12,000. Damages were repaired and millwork resumed less than six-weeks later.
During the late 1880s and early 1890s the growing number of pulp and paper mills in the country was steadily and quickly reducing the price of printed paper, making profitable pulp manufacturing difficult. In 1865, print paper cost just over twenty-four cents per pound. By the early 1890s, print paper cost less than three cents per pound. In addition, local streamflow on the Shenandoah was reduced by as much as twenty-five percent for several months out of the year, leading to a considerable loss of horsepower.

In 1889, Savery and others, in order to supplement the decrease in pulp manufacture, formed the Harpers Ferry Electric Light & Power Co. In 1904, the Shenandoah Pulp Company leased one water wheel for an average of twelve hours a day to the Power Company. By 1905, one of the ten wood grinders in the Harpers Ferry Paper Mill was converted to an electrical generator to supply electricity, and by 1907 both mills used only four of their ten wood grinders for milling. The rest were converted to generate electricity. With improvements to milling technology, production of ground wood pulp remained high despite the reduced numbers of wood grinders being used.22
Pulp production in the mills decreased over time due to depleted timber resources, heavy competition, inconsistent water supply, flooding and the rise of steam power. In 1896, flooding caused $7,000 in damages to the Shenandoah mill and to the mill on the Potomac (damage figures not available at this time). By 1897, both mills were running full time again until September 1902 when a cyclone took the roof off of the Shenandoah Pulp Company.

Author and long-time resident Joseph Barry made an observation on the environment in his 1901 book entitled *The Strange Story of Harpers Ferry*. He wrote;

Indeed there is a belief that at least once in every twenty years the town is partially submerged. Since the war these inundations are more frequent and far more injurious than they were before, because of the wholesale destruction of the forests for the use of the armies during the civil war and the increased demand for timber for mercantile purposes. The day will come when legislation must step in to prevent this evil and when the American people must take a lesson from certain European governments in which the state takes charge of the forests and regulates the cutting down and planting of trees. The suggestion is, perhaps, an unpopular one, but it may be right nevertheless.
Virginius Island and the Harpers Ferry Mill

On Virginius Island, the Child and McCreight flour company “was only a marginally successful enterprise…(which)…never realized its full potential.” Following the devastating flood of 1870, the mill ran only sporadically. After a series of lawsuits and damages caused by the 1889 flood, flour manufacturing ended on Virginius Island. In 1893 the Shenandoah Pulp Company purchased the property. Previously, the dwellings on the island had only been available to factory workers and their families. Under Savery’s ownership, existing residences were adapted to house anyone who wanted to live there. The pulp mill became the center of industry on the Shenandoah shore of Harpers Ferry.26

Post-war visitors first traveled to Harpers Ferry on the Baltimore & Ohio Railroad. Day-travelers and longer term guests were drawn to the site of the 1859 John Brown Raid and the U. S. Armory ruins, as well as the natural beauty of the area. Visitors would walk along Shenandoah Street to see the “Rifle Factory ruins” which were, in fact, the ruins of Herr’s old flour mill. The true Rifle Factory ruins were submerged under Lake Quigley at the time.27 Between 1880 and 1920, many visitors enjoyed Island Park, a twenty-acre amusement park on an island in the Potomac River built by the B & O Railroad.

While a few residents remained on Virginius Island, nature began to reclaim the landscape and the site drew visitors who were attracted to its “park-like landscape” surrounded by the high cliffs on both sides of the rivers. The area was a popular destination for drivers as the popularity and accessibility of automobiles grew. It was also a fashionable spot for fishing, camping and swimming. By the mid 1920s, the old flour mill walls had fallen down and the bricks were reused by residents. The pulp mill also removed seemingly hazardous building remains “to keep them from falling on fishermen.” The town of Harpers Ferry leased Virginius Island several times during the mid 1920s for Sunday schools and other religious services, including Christmas programs.28
Decline of Industry on Halls and Virginius Island

A fire in 1925 collapsed the roof of the Harpers Ferry Paper Mill, and burned the first floor, causing an estimated $300,000 in damage. Savery abandoned his pulp business here and designed a small plant known as the Potomac Power Plant on the site using the original brick walls on the mill’s east and south sides. New walls were built with salvaged bricks from the old Child & McClellan Flour Mill on Virginius Island. The newly configured plant operated solely as a power plant from 1925-1991.29

On 13 May, 1924 a flood severely damaged Shenandoah Street and the Shenandoah Pulp Company water power systems thus shutting the mill down. Additionally, the mill struggled to compete with other primarily steam powered mills. The company reported a loss of $20,945 for the year. Harpers Ferry Paper Company purchased the Shenandoah Pulp Company for $138,400 and the enterprise continued to lose over $72,000 between 1924 and 1927; in 1928 operations ceased altogether. In August 1928, The National Electric Power Company, who also owned the Potomac Power Plant, purchased the Shenandoah Pulp Company, the Harpers Ferry Paper Company and the Harpers Ferry Electric Light & Power Company for $1.1 million dollars. The pulp mill on Halls Island kept just a handful of employees working and finally ceased operations in 1935 after forty-five years of operations. The few remaining residents of Virginius Island moved away after a 1936 flood destroyed two automobile bridges that connected Shenandoah Street to the island.30
The Shenandoah Pulp Company was dissolved by the state in June 1936 and was mostly demolished by 1938. Another large flood event in 1942 deposited debris over the entire Halls / Virginius Island landscape. Vegetation slowly began to reestablish itself and the once industrious setting entered an era of desertion and neglect.

1 Teresa S Moyer, Kim E. Wallace and Paul A. Shackel, To Preserve the Evidences of a Noble Past: An Administrative History of Harpers Ferry National Historical Park, (College Park, Maryland: Catoctin Center for Regional Studies, Frederick Community College and Center for Heritage Resource Studies, Department of Anthropology University of Maryland, 2004), 34.
3 Joseph & Wheelock, Virginius Island, 3-49.
7 Gilbert, Waterpower, 140.
8 The term “rood” differs from the more commonly known unit of measure known as a “rod”. In this context rood refers to a measure of land equal to $\frac{1}{4}$ acre, or 40 square rods.
9 “Waking From its Sleep,” Baltimore Sun, 10 January 1961, Compiled deeds from Jefferson County Court House by Charlotte Judd Fairbairn, Historian (viewed in Harpers Ferry NHP Archives, HFD 557d), 1.
11 Gilbert, Waterpower, 151. Further information on the detailed workings and processes of these pulp mills is described in the books Waterpower and Where Industry Failed by David Gilbert.
12 “Waking From its Sleep,” 3. With the swift water on the Connecticut River provided by Hadley Falls, Holyoke, Mass was an industrial giant during the middle of the 19th century. Immigrant workers provided labor and some of the finest writing papers were produced there. At one point during the 1800s there were over 25 paper mills operating in and near Holyoke. The specific pulp mill referred to in the Baltimore Sun article is unknown.
13 An impoundment is an artificially dammed, or man made lake. According to the EPA’s “Terms of Environment: Glossary, Abbreviations and Acronyms” web page: Impoundment: A body of water or sludge confined by a dam, dike, floodgate, or other barrier.<http://www.epa.gov/OCEPAterms/terms.html>
15 “Waking From its Sleep,” 2, 3.
17 Larabee, Third Season, 85; & Map of The Harpers Ferry Paper Company (Harpers Ferry, W.Va.: Harpers Ferry NHP Map Collection, Lockwood House, 1925).
18 “Waking From its Sleep,” 2.
19 Gilbert, Waterpower, 140-142; “Waking From its Sleep,” 3.
20 Gilbert, Waterpower, 151.
22 Gilbert, Waterpower, 154; 155-6.
25 Joseph Barry, The Strange Story of Harpers Ferry (Shepherdstown, WV, 1901), 41.
26 Joseph & Wheelock, Virginins Island, 3-49; 3-51; 3-52; 3-67.
27 Joseph & Wheelock, Virginins Island, 3-63.
28 Joseph & Wheelock, Virginins Island, 3-71.
29 Gilbert, Waterpower, 163-3.
30 Gilbert, Waterpower, 158; Data from The Potomac Edison Company in letter dated 26 March 1979 (Harpers Ferry NHP Archives), 98 & Gilbert, Where Industry Failed, 75.
1944-2010: NATIONAL PARK SERVICE ADMINISTRATION

The Making of a National Historical Park

At the turn of the twentieth century, American industrialization evolved towards the use of steam power and away from the water power that influenced a long history of industry in Harpers Ferry. This, and the regular flooding of the surrounding rivers, led to the end of the industrial era of the town. Job opportunities in manufacturing dwindled, town residents relocated, and by the late 1920s, visitation, the leading revenue-generating enterprise in post-industrial Harpers Ferry, sharply declined.

Local interest in the preservation of Harpers Ferry was led in part by Storer College President and amateur historian, Dr. Henry McDonald. McDonald moved to Harpers Ferry and began his term as President in 1899. He became a well known advocate for preservation of the area, and worked for many years to raise awareness of the natural beauty and historical significance of his newly adopted home. In 1946, McDonald recruited Washington Historical Society President, Mary V. Mish. Also, Congressman Jennings Randolph, a New Deal Democrat elected to West Virginia's second District in 1932 who was also driven to join the cause for preservation. Randolph was influenced by McDonald's lobbying efforts and by Roosevelt-era ideals. With the help of McDonald and the support of Congressman Randolph, a federally sponsored historic sites survey authorized by the Historic Sites Act of 1935 identified Harpers Ferry as a potential National Historic Site. It was established as Harpers Ferry National Monument (Harpers Ferry NM) in 1944 under Public Law (P.L.) 78-386, not to exceed 1,500 acres. In May 1953, the “U.S. officially accepted all property titles as clear.”

A 1954 letter described the proposed Harpers Ferry National Historical Site:

*As you intimate, the place is a slum. Its qualifications are chiefly historical rather than architectural. Its appeal is sentimental rather than historical or aesthetic, Still there is an attractive aura of decay and ruin which it would be a pity to mar by a rash of restoration.*
Halls Island was part of the initial land donation to the National Park Service. It kept its title as an island despite the fact that in post-industrial Harpers Ferry, the canals, paths and bridges that separated and defined Virginius and Halls Islands disappeared under layers of debris and vegetation. Halls and Virginius were merged into one riverside landscape and consequently, the ruins of Herr’s Flour Mill at Virginius Island and the ruins of the Shenandoah Pulp Mill were long mistaken by tourists and guide books as the U.S Rifle Factory.

The 1993 Cultural Landscape Report of Virginius Island described the atmosphere in the mid 1940s:

“In 1944, legislation to establish the Harpers Ferry National Monument was enacted by the U.S. Congress…. In the years between the enactment of legislation and the transfer of property for the park, two modern steel highway bridges were constructed across the Potomac (1947) and Shenandoah River (1949) to replace those destroyed by the 1936 flood. The bridges were sited at strategic points below and above Harpers Ferry. The historic crossing to Lower Town at the confluence was circumvented by the improved route of the highway that traversed the bridges. The new Shenandoah bridge spanned the river above Hall’s Island, meeting the northern shore near the site of Robert Harper’s second residence and mills. Here, the large earthen embankment and the footings for the bridge piers buried the long forgotten Harper settlement…. The most significant effect came from the low roar of automobiles and trucks traveling along the highway on the opposite shore and crossing over the river on the bridge. These vehicles created a continual noise that, forty years later, has become an integral part of the landscape. Their sound reverberates off the surface of the water, the cliffs and surrounding hills in a way not at all reminiscent of the factory noise from the Beckham, Wernwag, Gilleece, Herr, Child and McCreight or Savery eras. Indeed for many years, when Virginius was uninhabited and overgrown, the solitary rumble of a freight train passing along the old W&P rail line was the only industrial sound to be heard.”

Planning commenced in the early 1950s in anticipation of the National Monument designation. A team of recruits involved in an NPS “departmental management training program.” Created a 1952 Master Plan Development Outline. It was cited as a guide but was never completed. Another attempt at a Master Plan was made in 1955. It, however, did not get finished in the six-month time period it was budgeted for. Neither of the master planning efforts specified a time frame for interpretation or development of Harpers Ferry.
Since European settlement of Harpers Ferry, the landscape witnessed several eras of historical interest including arms manufacturing, the Civil War, industry, tourism, African American history and education. The establishment of a theme upon which to base interpretation of Harpers Ferry was long debated. For many years John Brown’s raid and the Civil War were favored as the main focus. In the mid 1950s, Chief Supervisory Ranger John T. Willett conducted research using historical maps and documents to establish an informal cut-off year of 1865, the end of the Civil War. This decision, to the dismay of some, was later formalized in 1957. This date would guide maintenance, building, demolition and construction decisions while the National Park Service was establishing the monument.5

**Archeology in the Park**

Archeology in National Parks during the middle of the twentieth century was less systematic than it is in modern times. Investigations were often focused on river basin surveys, salvage and rescue, work in parks such as Mesa Verde National Park where primary interpretation was driven by archeological investigation, collection of resources for museum display and interagency work. In Harpers Ferry archeology was utilized as “a complementary research tool to historian’s work. The Regional Office doubted initially that archeology at the Monument would merit a full-time archeologist, but its reasoning reflected a salvage operations-type mentality.” After years of flooding, administrators doubted that “intact subsurface resources remained”6 In the late 1950s, archeological resources were allocated towards Halls Island, the U.S. Rifle Works in particular.

In 1959, lands on the lower Shenandoah from Upper Halls to Lower Town were described as a “wooded island” by Historian Charles Snell. Snell was excited when building foundation locations and measurements found during archeology investigations correlated with historical research. The foundations had been preserved by layer upon layer of silt deposited by floods. Snell recommended funding a major dig on Lower Hall Island to develop a “major interpretive exhibit on the island.” Investigations into the U.S. Rifle Works and the surrounding landscape, which for many years had been the bed of Lake Quigley, went on in the summer of 1959 through 1961. With the analysis of archeological findings, the shape and limits of the island were revealed to the satisfaction of archeologists. A tour of the whole island (Halls and Virginia) opened to the public in 1960.7
In 1960, Harpers Ferry NM expanded with the inclusion of Storer College. The physical boundaries of the park continued to grow with the addition of surrounding lands in Maryland and Virginia. Administrators persisted in preserving the legacy of the Civil War, John Brown and arms manufacturing, however interpretation grew more dynamic as the stories of transportation, nature, black history and the tale of Harper’s settling of the area were made available to the public. On 29 May 1963, Harpers Ferry NM received formal recognition of its status under Public Law 88-33, and its name was changed to Harpers Ferry National Historical Park (Harpers Ferry NHP).8
As the National Historical Park developed in the 1960s, a Job Corps crew stationed nearby provided labor for an archeology program on Virginius Island. While the Virginius Island project commenced, a proposal for Halls Island Rifle Works and Water Raceways Restoration was squashed by then Superintendent Joseph R. Prentice who was concerned about damaging historical evidence through stabilization and restoration. Over time, and with the establishment of the Interpretive Design Center/Harpers Ferry Center (IDC) in the 1960s, living history programs and dynamic interpretive measures were increasingly being utilized in the rest of Harpers Ferry while Halls Island remained a relatively quiet segment of the park. Locals and administrators continued to argue about many aspects of management including historic architectural styles, access and the “cut-off” date for interpretation. The perceived misuse of cultural resources to provide an enjoyable visitor experience versus historical accuracy was also heavily debated.

The establishment of the Interpretive Design Center/Harpers Ferry Center (IDC) and the Mather Training Center (MTC) under NPS Director George Hartzog in the late 1960s was thought by some to be a burden on maintenance and protection. Park monies and staff were reorganized to accommodate the mission of the IDC, which was to improve the level of interpretative exhibits and methods system-wide. Along with these new challenges, changes at the park continued and resources were allocated towards structures and interpretation. This resulted in uneven support towards archeology, which would become the key element leading to interpretation of Halls Island.

Harpers Ferry National Historical Park continued to grow in size. In October 1974, an amendment to the 1944 act was made (PL 93-466) to allow additions to the park not to exceed 2,000 acres and to provide for a parking and shuttle transportation system. On 5 March 1980, the acreage limit was raised to 2,475 acres to allow for the addition of the Short Hill Mountain tract in Virginia. On 6 October 1989, PL 101-109 raised acreage limit to 2,505 to accommodate the donation of the twenty-seven acre Bradley and Ruth Nash farm. Harpers Ferry NHP acreage was boosted once again to 3,745 acres in 2004 under PL 108-307.
Damage to cultural resources on Virginius Island prompted proposals in the mid 1980s for improving preservation efforts. Another flood, this time of thirty-three feet in 1985, exposed archeological resources under the asphalt of the Lower Town visitor parking lot, long thought to have been destroyed. The discovery helped increase emphasis on resource management. High visitor usage over time led to the deterioration and loss of historic materials, as ruins were used to house hibachis and so on. In response, and in order to preserve cultural and natural resources, the park removed a downtown parking area in the late 1980s. The removal limited access to recreationalists, which subsequently minimized the damages they were causing to resources. It also limited their presence, which was perceived by the park as intrusive on the historic scene. Another way the park sought to discourage recreation was by implementing a “no tubes for floating” rule to ease increasing recreational use of the shoreline.11

There was no regional archeologist between 1967 and 1980. When the position was filled, it brought a reinvigorated priority to documentation of archeological resources. This was reflected in Harpers Ferry between 1984 and 1988 when a team of archeologists inventoried more than seventy-eight features at Cavalier Heights and Virginius Island. A 1994 Resources Management Plan gave further guidance to protect park cultural and natural resources.12

Further efforts in preservation of Harpers Ferry NHP include the Harpers Ferry Historic District National Register Nomination of 1979 and a 1980 Harpers Ferry NHP National Register Nomination written by historians Charles Snell and Barry Mackintosh. A brief development concept plan completed in 1980 served as the guiding management document in the park (Fig. 4). Currently, a General Management Plan / Environmental Impact Statement is in the final review process. Upon its completion, the plan will supplement the 1980 plan to become the basic document for managing Harpers Ferry NHP for the next fifteen to twenty years.

Few major changes took place on Halls Island after the construction of the Highway 340 Bridge in 1949. The State Road Commission straightened and paved Shenandoah Street circa 1951.13 A 1986 construction drawing shows plans for a steel-backed timber guardrail along sections of Shoreline Drive and Shenandoah Street. It also reveals plans for the extant small paved turnout at the Shenandoah Pulp Company ruins. The plan included a small island of shrubs between the turnout and Shenandoah Street, which was
later recommended for removal in 1993 Virginius Island Cultural Landscape Report. The actual date of removal of the small island is unknown.

In 2000, the West Virginia Department of Transportation, Highways Division, constructed a new Highway 340 Bridge over the Shenandoah River immediately downstream from the 1949 bridge. Along with the bridge construction, a parking area in the triangular shaped parcel of land wedged between the Highway 340 Bridge embankment, Shenandoah Street and Shoreline Drive, known previously and informally as the “Fisherman’s Parking Lot,” was graded and paved. Stairs were installed leading from the parking lot to Shoreline Drive. Here, visitors could cross the street and enter Halls Island via the CSX Service Road which was also improved during the 2000 construction.

**Figure 43: Highway 340 Bridge construction during the winter of 2000 (image courtesy of Harpers Ferry NHP Photo Collection/donated photos by Mr Ronald J. Molter).**
Halls Island, 2010

The typical Harpers Ferry NHP experience begins at the visitor center at Cavalier Heights. Guests board tour busses that take them down Shoreline Drive, under the Highway 340 Bridge and on to Shenandoah Street at Halls Island. Tour busses pass by Halls Island and stop at a bus pavilion on Shenandoah Street that is situated in a loop turnaround in Lowertown.

Visitors on foot gain access to Halls Island from the earthen trail on the south side of Shenandoah Street, or they enter near the Highway 340 Bridge via the CSX Service Road. There is also trail from Virginius Island that enters the site at its southeast corner near the boiler house and pulp mill. Finally, visitors can access the site from the north by walking in on the spur trail that leads off of the Appalachian, or “Cliff Trail,” across Shenandoah Street.
Once inside the site, guests can navigate along a series of trails, some of which are demarcated with natural log edging. The heart of the site is punctuated on its east end by the massive ruins of the Shenandoah Pulp Mill. The landscape takes on a slightly sunken bowl character in the heart of the site where the U.S. Rifle Factory once stood. It is bounded by the mill along with the remnants of the Lake Quigley wall to the south, the Shenandoah Canal ruins to the north, and the CSX Service Road, built on fill generated from the Highway 340 Bridge construction on the west side of the site. Inside of the bowl, a landscape of deciduous trees creates a canopy of shade in the summer and in the fall they scatter their leaves over ruins of the rifle factory building and the turbine pit. Much of the heart of Halls Island is characterized by depressions and ridges created as a result of dredging and/or siltation settlement over historic raceways and structures below the surface.

The park has began to reintroduce vegetation to the partially denuded area across CSX Service Road immediately west of the bridge. Beyond the re-vegetated area is riparian woodland. Within this area are a series of paths used primarily for river access by fishermen and the occasional boater. To the south of the Lake Quigley wall is a dense wooded area characterized by uneven topography. Beyond that lies the CSX Service Road, the railroad tracks, the riverside and finally the river itself.

Figure 45: Internal path on Halls Island in late spring (NCR CLP 2009).
FIGURE 46: This photograph illustrates the typical character of the riparian woodland to the west of the Highway 340 Bridge (NCR CLP 2009).

FIGURE 47: Internal path on Halls Island in late spring (NCR CLP 2009).

3 Joseph & Wheelock, *Virginius Island*, 3-83, 3-84.
5 Ibid., 129; 114. 115.
6 Ibid., 138.
7 Ibid., 141; 172.
8 Ibid., 178.
9 Ibid., 195.
10 Ibid., 361.
11 Ibid., 286.
12 Ibid., 290.
Chapter III: Existing Conditions
EXISTING CONDITIONS

Introduction

This chapter provides an overview of Halls Island’s existing physical conditions, landscape characteristics and features as researched and surveyed between spring 2009 and winter 2010. The last topographic survey of Halls Island was prepared in 1981 and included a majority of the area east (down river) from the U.S. Highway 340 Bridge. This survey along with current USGS topographic data and other physical data was provided by the National Capital Region GIS Regional Technical Support Center formed the initial base map. To document all visible above ground features, on-the-ground field observations and site research supplemented the topographical survey and GIS data. Vegetation was documented in a general manner by grouping vegetation types and identifying street trees of specimen quality and the few identified historic trees. The National Capital Region Center for Urban Ecology provided additional plant community data.

Physical Setting

Halls Island and the U.S. Rifle Factory site is approximately one half mile upriver from Lower Town Harpers Ferry and the main U.S. Armory Grounds. The Harpers Ferry area located in a mountain gap created by the confluence of the Potomac and Shenandoah Rivers, falls within the Blue Ridge Geologic Province of the greater Appalachian Mountain Range. The 18-acre Halls Island is a relatively flat site in the Shenandoah River flood plain with an average elevation of 280 feet. The CSX Railroad and the Highway 340 Bridge bisect the site. The Shenandoah River forms the site’s southern boundary while Shenandoah Street and adjacent Bolivar Heights form the northern boundary. Bolivar Heights rises quickly to 668 feet to create an almost vertical wall of Harpers Shale and Upland Forest.
Surrounding Context

Camp Hill

Located north of Halls Island within Bolivar Heights, Camp Hill has predominately served Harpers Ferry as a residential community. A small cemetery deeded by Robert Harper in 1782 can also be found here. The first dwellings, streets and residential gardens were established on Camp Hill during the early 1800s to provide housing for armory workers and officials. John Hall and his family lived on Camp Hill in what is now known as Lockwood House. During the Civil War, the area was utilized as an encampment site for troops. Shortly after the war, Storer College, a historically black college, was established on Camp Hill. The college utilized four former armory buildings and operated from 1867 to 1955. The land and buildings of the college were later deeded to the National Park Service and are now used for interpretive programs, offices and training facilities.

Figure 49: Harpers Ferry Context Map (NCR CLP, 2010)
Existing Conditions

Virginius Island

Virginius Island is located between Halls Island and Lower Town along the Shenandoah River. Established as the Town of Virginius in 1827, it was once a bustling industrial mill community with about three dozen buildings at its prime. By 1851, the 13-acre island was absorbed into the corporate boundary of Harpers Ferry. Plagued by flooding from the Shenandoah River, development of Virginius Island and the historical integrity of its ruins were severely impacted. Today Virginius Island is part of Harpers Ferry NHP and it is maintained as a natural and cultural resource preserve that includes several foundational ruins of historic mills and dwellings. The National Park Service has developed walking trails with interpretive waysides on the island.

Lower Town

Located at the confluence of the Potomac and Shenandoah Rivers, Lower Town is the historic center of Harpers Ferry. Established as a settlement by Robert Harper as early as 1751, the first commercial operation was Robert Harper’s ferry operation that crossed the Potomac River. In 1796, Harper’s heirs sold the majority of Harper’s land holdings to the U.S. government for the site of the U.S. Armory. They maintained a 6-acre reservation of land including the ferry crossing in Lower Town for private and commercial development, which became the prosperous Lower Town commercial core. Two years later, the U.S. Armory began to construct their main armory grounds on the Potomac River adjacent to Lower Town. In the mid-1830s, both the B&O Railroad and the C&O Canal connected Harpers Ferry with Washington, District of Columbia; Baltimore, Maryland and the world beyond. It quickly became a thriving industrial and transportation center housing the large armory complex, the arsenal yard, stores, businesses, churches, taverns, inns and homes. The U.S. Armory, John Brown’s 1859 raid, the Civil War, tourism and floods, all played a role in the development and demise of the historic Lower Town.

As the first rehabilitated area of Harpers Ferry NHP, it has evolved through numerous preservation efforts and viewpoints. The historic Lower Town once boasted over 100 structures of stone, brick and wood. Park staff and the superintendent provided the visionary guidance to develop the park’s policies in the early years. At that time, a restoration plan that developed focused on the interpretation of two significant historical events at Harpers Ferry: John Brown’s raid and the Civil War. The initial restoration efforts
removed several post Civil War structures from Lower Town. As a result, the National Park Service demolished and reconstructed roughly 60% of Lower Town to the pre-Civil War period. Preservation efforts today have a broader view of the cultural significance of the town and include examples of post-war structures. At least thirty-four historic buildings in Lower Town are currently listed on the National Register of Historic Places reflect a range of preservation methodologies including total reconstruction, rehabilitation and preservation maintenance.

Loudoun Heights

In 1813, the U.S. government purchased timber rights on the high land located across the Shenandoah River from Halls Island. This 275-acre area called Loudoun Heights is located in both Virginia and West Virginia. Loudoun Heights reaches an elevation of 1,175 feet. Both Confederate and Union troops constructed fortifications and set up camps in the area. Civil War remnants are still evident in the landscape today. The Appalachian Trail follows the ridgeline and side trails branch off to cliffs with panoramic vistas overlooking the Shenandoah River.

Maryland Heights

Maryland Heights is the large rocky cliff landform to the east of the confluence of the Potomac and Shenandoah Rivers, located in the state of Maryland. Rising to an elevation of 1,448 feet, it is the largest landform immediately surrounding Harpers Ferry. The U.S. Armory cleared the hillside forest for fuel and construction material, but the forest has returned today. During the Civil War, both Confederate and Union troops occupied Maryland Heights; remnants of this occupation are evident in the landscape today. Within the 763 acres of Maryland Heights managed by the National Park Service, hiking trails to Civil War ruins and views of Harpers Ferry have been developed and maintained from the rocky outcrops and cliffs above the Potomac River. The Harpers Ferry NHP maintains 763 acres of Maryland Heights within their boundary.

Bolivar Heights

To the west of Lower Town, the elevation rises gradually from 530 feet at Camp Hill to 668 feet along a ridgeline that stretches from the Potomac River to the Shenandoah River. Bolivar Heights played a significant role in the Civil War; numerous fortifications were located there and it is the site of
the largest surrender of U.S. troops during the war. Primarily re-forested, today this area consists of trails and interpretive waysides.

**Musket Factory/ Lower Armory Grounds**

The main armory grounds and Musket Factory established in 1796, is located along the banks of the Potomac River immediately upstream from the confluence with the Shenandoah River. During its development and operation from 1800 to 1861, the U.S. Armory provided the primary industry to Harpers Ferry. The town grew and flourished because of its existence. Although only a part of the U.S. Armory, the Musket Factory was the largest entity of the operation. The Rifle Factory on Halls Island comprised the other portion. The Musket Factory consisted of several large workshops and a canal. John Brown’s raid focused most of its attention here, when John Brown and his men were held hostage in the armory’s Fire Engine House. Today the lower armory grounds are predominately a large open area with some shade trees, whereas the upper armory grounds are heavily vegetated with woody growth. In 1894, the railroad company constructed a large berm across the southern end of the armory grounds; it remains today and divides the grounds from Lower Town. The site is an archeological preservation zone and only a portion of it is currently within park boundaries.

**Natural Systems and Features**

The underlying geologic formation of the area is primarily Harper Formation, a greenish-gray phyllite, with inter-beds of fine-grained quartzite, commonly referred to as Harpers Shale. It is visible in the rocky cliffs of the area and the rocky rapids in the Shenandoah River commonly referred to as the “staircase.” The soil within the floodplain is a Combs fine sandy loam soil, which is typically a very deep, well-drained alluvial soil.

The Shenandoah River, along the site’s southern boundary, played a critical role in the historical development of Halls Island. As the principal tributary of the Potomac River, the Shenandoah and its tributaries drain the central and lower Shenandoah Valley and the Page Valley in the Appalachians on the west side of the Blue Ridge Mountains, in northwestern Virginia and the Eastern Panhandle of West Virginia. The significant fall and rocky rapids of the Shenandoah “staircase” or Shenandoah Falls spurred the construction
of the Shenandoah Canal and provided substantial waterpower during the early industrial period. Today, these rapids are popular for recreation activities such as rafting, kayaking and fishing.

Because it is located within the hundred-year floodplain of the Shenandoah River, flooding has been a significant factor in the evolution of Halls Island’s cultural landscape. There have been at least fourteen major floods since 1748, the last two occurred in January and September of 1996 with floodwaters cresting just over twenty-nine feet. The flood stage is eighteen feet, with a twenty-foot flood predicted every five to ten years. Typically floods in Harpers Ferry have been caused by extreme weather events such as heavy rain or snow melts in winter that produce rapid run-off. The all time record crest of 36 ½ feet was in 1936 and is predicted to occur every 125 years. Most recently, the Potomac and Shenandoah Rivers crested at 20.78 feet on 15 March 2010.
FIGURE 50: IMAGE OF 1996 FLOOD (IMAGE COURTESY OF TERRY ADAMS, NCR PHOTOGRAPHER)

FIGURE 51: CSX RAILROAD NEAR HALLS ISLAND AFTER 1996 FLOOD (COURTESY OF STEVE LOWE, HARPER'S FERRY NHP LANDSCAPE ARCHITECT)
Spatial Organization

Two major transportation corridors, the Highway 340 Bridge and the CSX Railroad spatially divide Halls Island into three sections. They include the remains of Upper Halls Island, east of the Highway 340 Bridge; remains of Lower Halls Island, west of Highway 340 Bridge; and the riparian riverfront, south of the CSX Railroad.

The construction of the Highway 340 Bridge in 1949 and 2000 separated the area once known as Upper Halls Island from the rest of Halls Island; today it is only accessible from Shoreline Drive. Impacts from the construction of Shoreline Drive and U.S. Highway 340 heavily impacted the landscape of Upper Halls Island. Re-vegetated after the road construction, the area primarily functions as a buffer-planting zone today.

Lower Halls Island was once the location of the U.S. Rifle Factory and later the Shenandoah Pulp Mill. It is located on the east side of the Highway 340 Bridge. Several historic foundation ruins exist on this portion of the site including the Shenandoah Pulp Mill ruins and the Lake Quigley wall ruins. It is heavily vegetated with a mature tree canopy and herbaceous ground plane. An informal interpretive trail is located throughout this portion of the site to provide visitor access to a few of the more notable ruins.

The CSX Railroad has been located near the southern boundary of Halls Island since the 1830s and has historically acted as the southern site boundary. A mature riparian forest primarily covers the riverfront land mass and includes areas near the Highway 340 Bridge that have recently been re-vegetated. The riverfront on Upper Halls is slightly different from that of Lower Halls Island in terms of size and use. Upper Halls Island riverfront is significantly larger and more remote because of the division created by the Highway 340 Bridge. As a result, the Upper Halls Island riverfront is a favored location to access the river for canoes, rafts and kayaks and local fishing.
**Land Use**

As part of Harpers Ferry NHP, Halls Island is a cultural landscape with historic and archeological ruins. The National Park Service predominately maintains the landscape as a nature preserve and archeological preservation zone located between two transportation corridors. The once industrial site has slowly reforested itself naturally, with minimal assistance by park service staff to curb the spread of invasive vegetation. The northern boundary of Shenandoah Street is one of the primary entrance roads leading to Lower Town Harpers Ferry. Near the southern border is the CSX Railroad corridor, a functioning commercial railroad that provides rail access to the Shenandoah Valley. Bisecting the site on the western half of the island is the U.S. 340 Highway corridor, a main arterial route from Virginia into the northern panhandle of West Virginia. Additionally, the site offers several interpretive and recreational opportunities from interpretive walking trails to fishing.

**Circulation**

Halls Island is surrounded by a multitude of transportation corridors; with vehicular circulation primarily on or near the site boundaries. While U.S. Highway 340 does bisect Halls Island, it is primarily located above the island by a bridge until it intersects with Shenandoah Street near the northwest corner of the project area. Shoreline Drive is a limited use road that winds through upper Halls Island and is primarily used for shuttle bus access from the Cavalier Heights Visitor Center to the Lower Town bus depot. Primary vehicular traffic is routed along Shenandoah Street from U.S. 340 to Lower Town. Parking is provided at a river access parking lot off Shenandoah Street near the intersection of U.S. 340 and a car pull-off (limited to fifteen minutes) is available for up to two cars near the Shenandoah Pulp Mill. The entrance to the CSX Railroad service road is located across from the river access parking lot off Shoreline Drive. It parallels the Highway 340 Bridge until it meets the CSX Railroad and it turns to parallel along the northern alignment of the railroad. The service road provides vehicular access for railroad service vehicles as well as NPS maintenance crews if necessary.

Pedestrian circulation is limited to a few unimproved trails in and around Halls Island. Primary access to the site is a narrow foot path located between Shenandoah Street and the Shenandoah Canal. The path provides a pedestrian link from the Cavalier Heights Visitor Center along Shoreline
Drive to Shenandoah Street and on to Halls and Virginius Island, continuing on to Lower Town. Visitors enter Halls Island along this trail either from the river access parking lot, the Shenandoah Street pull-off or from the Lower Town Bus Depot. Two secondary trail access points are from the Virginius Island pedestrian trails that both access Halls Island from the southeast corner of the Shenandoah Pulp Mill. One follows the southern border of the Shenandoah Canal and follows along the south wall of the Boiler House Ruins. The second follows a route along the boundary of the CSX service road and turns north to meet at a breach in the western end of the Lake Quigley Wall. From the pulp mill ruins a dirt trail follows along the Lake Quigley Wall and winds into the site towards the uncovered turbine pit. This trail then turns south and through the breach in the Lake Quigley Wall where it ties back to the CSX service road. Although it does not physically connect to Halls Island, the Appalachian Trail crosses the Shenandoah River above Halls Island on the Highway 340 Bridge.
Existing Conditions

FIGURE 52: SHENANDOAH STREET CORRIDOR, THE NORTHERN BOUNDARY OF HALLS ISLAND (NCR CLP 2009)

FIGURE 53: CSX RAILROAD CORRIDOR, ALONG SOUTHERN BOUNDARY OF HALLS ISLAND (NCR CLP 2009)
**Topography**

Located within the Shenandoah River floodplain, the overall topography of Halls Island is relatively flat and low. The average elevation of the site is 275 feet with a gentle overall slope of approximately 3% from the north side of Shenandoah Street (280 feet) to the Shenandoah River (265 feet). East of the Highway 340 Bridge, there are numerous manmade and natural undulations of the ground plane throughout this portion of the site. Previous archeological explorations, dumping of debris and deposits of silt and sediment from numerous flood events caused numerous ground undulations. They create an uneven and unkempt character of the ground plane and a minor safety hazard.

The other major landform or topographic feature is the embankment created from the construction of the U.S. Highway 340 Bridge by the Federal Highway Administration (FHA). A plateau of fill through the western section of the site assists the U.S. Highway 340 to ramp up to 320 feet meeting the elevation of the bridge abutment. FHA also constructed a solid vertical retaining wall approximately twenty-five feet high separating the river access parking lot and Highway 340. The grade to the west of the highway remains level with the highway for about twenty-five feet before it gently slopes back down to meet the existing grade. The fill soil from the Highway 340 Bridge has covered a significant portion of the original Upper Halls Island and has impaired any potential for finding archeological resources from Robert Harpers homestead or the armory dwelling houses that once occupied this portion of the island.

**Vegetation**

The predominant existing vegetation on Halls Island is a riparian forest classified as Piedmont / Central Appalachian Rich Floodplain Forest. This vegetation type is a closed forest with mixed over-story dominance by American sycamore (*Platanus occidentalis*), black walnut (*Juglans nigra*), bitternut hickory (*Carya cordiformis*), common hackberry (*Celtis occidentalis*), American elm (*Ulmus Americana*), and, locally, green ash (*Fraxinus pennsylvanica*), tulip poplar (*Liriodendron tulipifera*), and shumard oak (*Quercus shumardii*). Box elder (*Acer negundo*) is strongly dominant in the sub-canopy and northern spicebush (*Lindera benzoin*) is dominant in the shrub layer. Vines are common, with Virginia creeper (*Parthenocissus quinquefolia*), frost grape (*Vitis vulpine*), and poison ivy (*Toxicodendron radicans*) most frequent. The herb layer is rich in spring ephemerals and other nutrient-demanding species, including Virginia bluebells (*Mertensia virginica*), Canadian wild ginger...
Existing Conditions

(Asarum canadense), spreading chervil (Chaerophyllum procumbens), bluntleaf waterleaf (Hydrophyllum canadense), striped cream violet (Viola striata), woodland phlox (Phlox divaricata), mayapple (Podophyllum peltatum), yellow trout-lily (Erythronium americanum), squirrel corn (Dicentra Canadensis), clustered black snakeroot (Sanicula odorata also known as Sanicula gregaria), golden ragwort (Packera aurea also known as Senecio aureus), Virginia spring beauty (Claytonia virginica), nodding fescue (Festuca subverticillata), James’ sedge (Carex jamesii), woody gray sedge (Carex grisea), false mermaidweed (Floerkea proserpinacoidea), longstyle sweetroot (Osmorhiza longistylis), and littleleaf buttercup (Ranunculus abortivus). However, the invasive exotics are abundant in the herb layer and far outnumber the native herb species. The predominant invasive species at Halls Island are garlic mustard (Alliaria petiolata), ivy leaf speedwell (Veronica hederifolia), false strawberry (Duchesnea indica), stinging nettle (Urtica dioica ssp. Dioica), Japanese stilt grass (Microstegium vimineum), and ground ivy (Glechoma hederacea).

The area along the Shenandoah Canal and Shenandoah Street corridor is primarily a mown roadway edge with street trees, typically American sycamore, Norway maple (Acer platanoides) and box elder. A majority of the trees are of specimen quality and volunteer growth with only seven planted by the National Park Service in 1997. The planted trees are all American sycamore and are located on both sides of Shoreline Drive between Shenandoah Street and the CSX service road. The canal basin is filled with weedy herbaceous and woody vegetation.

The area surrounding the River Access Parking Lot and the new U.S. Highway 340 Bridge was planted in 2000 with a variety of canopy and ornamental trees as a vegetated buffer for the parking lot and the bridge wall. Additional buffer planting was added in the location of the old Highway 340 Bridge in 2009. The buffer planting in both areas includes eastern redbud (Cercis Canadensis), flowering dogwood (Cornus florida), and red maple (Acer rubrum).
Adjacent to Halls Island and across Shenandoah Street the topography makes a sudden increase in elevation and the plant community quickly changes to an upland forest classified as the Central Appalachian Basic Oak-Hickory Forest. This association is a true oak-hickory forest with variable mixed canopy dominated by several oaks (*Quercus* spp.), hickory species (*Carya* spp.), red hickory (*Carya ovata*), red oak (*Quercus rubra*), and chestnut oak (*Quercus prinus*) are consistent co-dominants. Green ash and tulip poplar are less constant canopy species but may also be found here. Eastern redbud and, to a lesser extent, flowering dogwood dominate the shrub and lowest tree layers, while mapleleaf viburnum (*Viburnum acerifolium*) is a common low shrub.

Currently there is one identified location of a West Virginia state rare plant species, the starry false solomon’s-seal (*Mainthemum stellatum*) on Halls Island. In a rare plant survey for the park, Nature Conservancy botanists surveyed Halls Island as part of Virginius Island and consolidated the finding of two occurrences of this rare plant in the following description:

Both occurrences of Starry false Solomon’s-seal were relocated at this site. However, one occurrence was in a slightly different location and both occurrences were considerably smaller than when surveyed in 1994. Total number of plants seen during the current survey was 81 compared to over 400 in the previous survey. The sharp decline in this population would be of concern if it was not for the concurrent increase of this species at the Staircase site just upriver from this site. Major reconstruction of buildings has been occurring at Virginius Island, so it is likely that many plants and their habitat have been crushed by construction vehicles and workmen. Also, because this site is very close to town of Harpers Ferry and one colony is right on a major path, park visitors may trample the plants.
Figure 56: American Sycamore from Historic Period (NCR CLP 2009)

Figure 57: Buffer Planting Adjacent to U.S. Highway 340 Bridge (NCR CLP 2009)
Buildings and Structures

Halls Island had as many as twenty-five workshops and dwelling houses at any given time during its historic period. Today only remnants and ruins of a few structures remain. These ruins include structures from almost all historic periods within the period of significance.

1820 Arch Stone Bridge Abutment Remnants: Approximately thirty-five linear feet of the original stone bridge abutment and wing walls remain on the south side of the Shenandoah Canal.

W&P Railroad Bridge Abutment Remnants: Located south of the railroad near where the existing trail exits the site at the CSX service road. It is not accessible or visible to the average visitor, but can be seen from a kayak or raft in the Shenandoah River. Constructed by the Winchester and Potomac Railroad Company, the stone used for these abutment walls was different from the natural fieldstone used in the construction of the other stone foundations on Halls Island; they were dimensionally cut and large blocks of stone. The wall ruins are approximately 110 linear feet high and twelve feet tall.

Rifle Factory Ruins: Portions of stone foundation walls and corners of the Symington era Rifle Factory buildings are located between the Lake Quigley Wall and the Shenandoah Canal. Approximately 115 linear feet of walls remain visible for four of the Rifle Factory buildings constructed during the Symington modernization era.

Shenandoah Canal Wall Remnants: Several locations of stone canal wall portions remain visible along the north and south sides of the Shenandoah Canal. They are typically small portions of rounded fieldstone walls with several feet of cut wall caps visible on the north side near the pulp mill. Approximately 200 linear feet of about two foot high wall portions remain.

Turbine Pit Ruins: An existing cut stone turbine pit is all that remains from the turbine wheel and pit once located in the U.S. Rifle Factory Machine Shop (built in 1852). The turbine pit was installed in 1853 and housed a Boyden turbine wheel purchased from the Ames Manufacturing Company. The wheels measured 42 inches in diameter by 4 ½ inches deep. Installation
also included a stone and cast-iron forebay and a culvert to drain tailwater form the wheel pit. Remnants of the cast-iron forebay and the stone culvert are also visible above grade. The stone turbine pit was uncovered during the 1960 archeological explorations and is located in a deep depression near the north center of Upper Halls Island. It is accessed by the existing interpretive trail that leads through the site.

**Shenandoah Pulp Mill Ruins:** Includes six stepped-stone wall foundation ruins, each approximately twenty-eight feet tall overall (each stepped wall segment is thirteen to fourteen feet high). Each of the six wall segments is roughly ninety-four feet long with the first and last wall segments extending slightly further. These are the largest structural ruins in Harpers Ferry NHP.

**Boiler House Ruins:** The Boiler House was an associated outbuilding to the Shenandoah Pulp Mill. Partial foundational stone ruins remain for all four walls. They range from four feet tall to flush with existing grade and outline the shape of the original 35 by 35 foot structure.

**Lake Quigley Wall Ruins:** A 10 to 12 foot tall by 18 inches thick stone wall that once created the southern boundary for Lake Quigley during the Shenandoah Pulp Mill Period. It is approximately 350 feet long before the breach and has 240 feet of breached or dismantled wall remnants.
Existing Conditions

Figure 58: Rifle Factory Ruins (NCR CLP 2009)

Figure 59: Rifle Factory Ruins (NCR CLP 2009)

Figure 60: Shenandoah Canal Wall Remnant (NCR CLP 2009)

Figure 61: Turbine Pit Ruins (NCR CLP 2009)

Figure 62: Shenandoah Pulp Mill Ruins (NCR CLP 2009)

Figure 63: Shenandoah Pulp Mill Ruins (NCR CLP 2009)
Figure 64: Boiler House Ruins (NCR CLP 2009)

Figure 65: Boiler House Ruins (NCR CLP 2009)

Figure 66: Lake Quigley Wall Ruins (NCR CLP 2009)

Figure 67: Lake Quigley Wall Breach (NCR CLP 2009)

Figure 68: W&P Railroad Bridge Abutment Ruin (NCR CLP 2009)
**Views and Vistas**

Views into the site are limited due to the predominant forest cover. However, a few notable views and vistas are visible from Shenandoah Street and the CSX Railroad service road. Identified below are the most notable views, also located on the Existing Conditions Plan.

**View of the Shenandoah Canal:** The large specimen trees along the road and the forest cover on the south side of the canal provides a long vista of the Shenandoah Canal from Shenandoah Street.

**Views of the Shenandoah Pulp Mill Ruins from Shenandoah Street:** Similar to a gateway structure, the Shenandoah Pulp Mill provides one of the first glances of the historic fabric of Harpers Ferry for the visitors arriving from the Cavalier Heights Visitor Center. This massive ruin structure provides dramatic views from Shenandoah Street as one approaches from both east and west directions.

**View of Shenandoah Pulp Mill & Canal from Virginius Island River Trail:** The Virginius Island River Trail winds through the wooded area between Virginius and Halls Islands. Its course hugs close to the railroad service road and turns north towards the pulp mill. The pulp mill is not visible until it meets with the east edge of the Lake Quigley Wall, only twenty-five feet from the pulp mill and the Shenandoah Canal, creating a sense of surprise and awe.

**Views of CSX Service Yard from Shenandoah Street:** Along the western boundary, below the U.S. Highway 340 Bridge, the CSX service yard is visible from Shenandoah Street at the intersection of the CSX service road. This is an undesirable view of construction equipment and stock piles of materials.

**Views of the Shenandoah River from the CSX Service Road:** The proximity of the service road to the river and the wide corridor of cleared vegetation offer some of the best locations to view the Shenandoah River from Halls Island.
View of Kagi Rock: This view shed along the railroad corridor is defined by trees along the Shenandoah River that open to frame the view of the “staircase” rocks where three of John Brown’s men, (John Kagi, John Copeland, and Lewis S. Leary) were forced to seek refuge in the middle of the river during the raid. Two were killed on the large flat rock and one captured.

Views of Shenandoah River from the Riparian Forest: With several locations to walk right up to the river’s edge, the riparian forest south of the CSX Railroad has multiple locations for views of the Shenandoah River.
**Constructed Water Features**

The historic Shenandoah Canal follows along the south side of Shenandoah Street. The construction of the Highway 340 Bridge, which filled in a large portion of the canal on Upper Halls Island, and the construction of the Shenandoah Pulp Mill and Lake Quigley, created significant impacts to the canal. Years of flooding and silt deposits have also impacted the depth and character of the canal prism. However, today there remains a significant earthen channel approximately ten to twelve feet deep and thirty-seven feet wide. The channel is covered with a thick layer of volunteer herbaceous vegetation during the spring and summer months almost obscuring the channel. Water is intermittently present during times of heavy storm run-off, typically in early spring from snowmelt. When water is present in the canal, it tends to stay on the western portion of the canal near Shoreline Drive and is only a few feet deep. Remnants of the original canal wall are present in several locations; see the Buildings and Structures section of this chapter for more information on this subject.

**Small Scale Features**

During the National Park Service administration, park service staff has added several small-scale features to Halls Island for visitor safety, to protect the sites resources and assist with visitor interpretation. These features include the following:

**Post and chain fencing:** Located adjacent to Shenandoah Street and the unimproved footpath. The post and chain fencing begins on Shenandoah Street at the intersection with Shoreline Drive and continues along Shenandoah Street to Lower Town. The posts are approximately two feet high and spaced five feet apart with a metal chain connecting each post.

**Reinforced steel backed timber guardrails:** These are installed along sections of Shoreline Drive between the street and the unimproved footpath. These more rustic guardrails meet the Federal Highways Administration’s safety standards for a low volume and low speed park road.

**Visitor use features:** Several features installed specifically for visitor use are located at the river access parking lot, these include the two metal covered waste receptacles, orientation signage, wheel stops and a fee collection box. In addition, a waste receptacle, wheel stops for vehicular barriers and a sign
identifying the pull-off parking are located at the Shenandoah Pulp Mill pull-off.

**Stone Boulders:** Along the north side of Shenandoah Street near the pulp mill, the NPS has placed several large stone boulders to prevent vehicles from parking on the road’s shoulder.

**Interpretive Wayside:** A wayside sign installed at the pull-off on Shenandoah Street provides visitor interpretation of the Shenandoah Pulp Mill. The sign is several years old and in fair condition.
FIGURE 75: POST & CHAIN FENCING (NCR CLP 2009)

FIGURE 76: REINFORCED STEEL BACKED TIMBER GUARDRAILS (NCR CLP 2009)

FIGURE 77: VISITOR USE FEATURES AT PULP MILL DROP-OFF (NCR CLP 2009)

FIGURE 78: WAYSIDE EXHIBIT FOR SHENANDOAH PULP MILL (NCR CLP 2009)

FIGURE 79: STONE BOULDERS FOR TRAFFIC CONTROL (NCR CLP 2009)
Stairs and Handrails: A set of stone stairs is located at the southeast corner of the river access parking lot to provide visitor access from the parking lot to Lower Halls Island. The stairs are in good condition; however, the handrail needs to be upgraded to meet the current code requirements for the Architectural Barriers Act (ABA).

Metal Vehicular Gates: Two sets of metal gates exist on the site to control vehicular access. One is located at the entrance to the river access parking lot and one is located at the entrance to the CSX service road.

Archeological Sites

Halls Island has a high potential for containing subsurface ruins and historical artifacts of the U.S. Rifle Factory, the Hall’s Rifle Works, the Shenandoah Canal, the Civil War and the Shenandoah Pulp Mill operation. Archeological explorations in the early 1960s uncovered the existing surface ruins of the Rifle Factory and identified the original boundary for Lower Halls Island. The entire portion of the site east of Shoreline Drive is considered an Archeological Preservation Zone.
1 Plant community type and description provided by National Park Service Center for Urban Ecology.

Part I: Site History, Existing Conditions, Analysis and Evaluation

Chapter IV: Analysis & Evaluation
Introduction
The analysis and evaluation section of the CLR is essential for determining appropriate treatment recommendations of existing features and improving visitor access to the Halls Island site. An evaluation of the physical integrity of Halls Island can be determined by comparing landscape characteristics and features present during the period of significance with current conditions. With this, the historical significance of landscape characteristics and recommendations for future site use, with sensitivity to its past, can be determined. The evaluation is based on criteria developed by the National Register of Historic Places, which lists properties significant to our country’s history and prehistory. It is performed with a focus on condition, patterns, relationships and landscape features that are then evaluated within the framework of the site’s periods of significance to determine the state of their integrity within the context of the landscape as a whole.

Landscape Significance
Halls Island is part of the larger landscape of Harpers Ferry National Historical Park. It was included in the 15 October 1966 administrative list on the National Register of Historic Places following passage of the National Historic Preservation Act of 1966.

A brief mention of Halls Island and its association with Robert Harper, John Hall, and the factory where Hall’s theories of interchangeable parts and mass productivity were put into practice is included in the Harpers Ferry Historic District National Register Nomination of 1979. The nomination prescribes a period of significance for 1751, 1795 and 1800-1865. The property is noted for being significant in the areas of archeology, architecture, commerce, industry, invention, military, politics and government, social and humanitarian interests and transportation.

The 1981 Harpers Ferry National Historical Park national register nomination also mentioned Halls Island, and indicated its period of significance as 1800-1899. The 1981 nomination states that the landscape is significant for its association in the areas of archeology, architecture,
commerce, industry, invention, military, politics and government, and social and humanitarian interests. Upper Halls Island and Lower Halls Island are both mentioned in the nomination and brief descriptions of historic buildings and structures, land use, topography and circulation are included. The nomination also includes a section titled “John Hall, Interchangeable Parts, and Mass Production of Arms.” Neither of the existing nominations adequately document or evaluate the landscape of Halls Island.

The results of this study find that Halls Island and its related features are significant for their association with events that have made an important contribution to the broad pattern of history (National Register Criterion A), its association with the lives of persons significant in our past (National Register Criterion B) and for information about our history or prehistory that it may be likely to yield (National Register Criterion D). The CLR proposes 1751-1936 as the period of significance for Halls Island. This period begins when Robert Harper received his first Harpers Ferry land grant in 1751 and ends when the Shenandoah Pulp Mill ceased operations in 1936.

**National Register Criterion A and B**

*(association with events that have made an important contribution to the broad pattern of history and association with the lives of persons significant in our past)*

It is impractical to discuss Halls Island’s association with events that made an important contribution to the broad pattern of history without a discussion of the significance of John H. Hall. Hall arrived in Harpers Ferry in April 1819 to manufacture his patented breechloading rifle with interchangeable parts. Hall’s rifles took less time to load, weighed less, and were as powerful and accurate as standard rifles of the time. Not only did Hall manufacture rifles, but perhaps his most significant feat was in perfecting machinery that could cut iron and steel and perform woodwork. Relatively unskilled laborers could use the machinery whereas before Hall’s system, rifle making was generally done by skilled craftsmen.

Under contract with the War Department, Hall was in a unique position as a private manufacturer at a public armory. A series of workshops on the shore of the Shenandoah River were built over time, and the site became known as the Hall Rifle Works. Over time, a series of races divided the
island in two. Manufacturing took place on Lower Hall’s Island, and the workers lived upstream on Upper Halls Island.

Hall is widely credited with a large role in developing and modifying techniques that led to what was known by the 1850s as the “American System of Manufacturing.” The principle features of the system included mass manufacture by semi-skilled labor using power-driven tools and templates, each designed to serve a particular purpose to produce ordinary goods for the masses.

In 1837, Hall became ill and relinquished the director position of the Rifle Works to his second eldest son, William. The final lot of 2,700 breechloading rifles was completed in 1844 and the conditions of the workshops and factories on Halls Island slowly declined.

**National Register Criterion D**

*(for information about our history or prehistory that it may be likely to yield)*

Halls Island continued to be a center for arms manufacturing until the Civil War. On 19 April 1861, Confederate Troops seized control of Harpers Ferry. Union sympathizers were jailed, and armory workers were forcibly vacated from their homes that were then transformed into Confederate barracks. Fire was set to all ten workshops and storehouses on Halls Island and the town of Harpers Ferry would flip between Union and Confederate occupation several times before the end of the war.

During the 1870s and into the 1880s the landscape of Halls Island lay relatively dormant after a century of industrious activity. The potential of the landscape’s raw materials, railroad access and waterpower was recognized again when Thomas Savery and partners purchased the land from the government and built a ground wood pulp mill known as the Shenandoah Pulp Mill. During the pulp mill era the once-industrious landscape of arms manufacturing became the bottom of Lake Quigley, an impoundment built to support and power the mill. The mill operated under varying states of productivity for forty-five years until 1936 when, due to diminishing timber resources, inconsistent water supply, competition from other mills and, perhaps the largest impact, the shift in manufacturing to steam power, industry on Halls Island ceased altogether.
Today Halls Island is a wooded swath of land on the bank of the Shenandoah River. The most visible remnants of the past are the massive ruins of the Shenandoah Pulp Mill, the wall that once retained water on the south side of Lake Quigley, a sunken turbine pit located near the center of the site and a railroad bridge foundation wall under the existing railroad tracks. Upon closer inspection, one can find ruins of a boiler house to the southeast of the pulp mill, stones that served as canal walls, and ruins of U. S. Rifle Factory buildings that were once buried under layers of sediment deposited by flooding and Lake Quigley. Information from archeological studies on Halls Island has allowed the park to identify and locate ruins of the U.S. Rifle Factory and support structures. Studies have been limited and it is likely that as additional studies commence, further information about the industrious history, and perhaps the pre-history of the island will be revealed.

It is worth recognizing that Civil War activities and events that led up to the Civil War, namely the raid led by John Brown in 1859, are considered contributing factors to the overall significance of Harpers Ferry. However these events are not considered to justify the significance of Halls Island specifically, although events of the raid did occur on the site. During the raid, Brown and his men crossed the railroad bridge from Maryland and imprisoned the night watchmen at the U.S. Armory including the Rifle Factory. Three of his men held guard at the Rifle Factory before citizens began shooting towards them. In response, the three men attempted escape by wading into the river where two of them were shot and one was captured and jailed.

**Cultural Landscape Integrity**

Integrity is the ability of the property to convey its significance. It is defined by the National Register as the authenticity of a property’s identity, evidenced by the survival of physical characteristics that existed during the site’s historic period. In order to be eligible for the National Register of Historic Places, a site must have integrity as well as being representative of an important historical context. Without integrity, a property may still have significance, but it lacks the features that convey that significance to the world at large without additional interpretation. Integrity is comprised of seven features: location, association, setting, design, materials, workmanship and feeling.
**Integrity-Defining Features**

The findings in the following seven “integrity-defining features” are derived from investigations of the site in 2009 by the CLR team. Several or all of these aspects must be present for a cultural landscape to retain historic integrity.

**Location:** The location aspect of integrity involves the place where the landscape was constructed. The primary features that make up the historic fabric of Halls Island are in the same locations as they were during the period of significance. These include the Shenandoah River, Shenandoah Street, the Shenandoah Canal, the Lake Quigley wall ruins, the pulp mill ruins, the turbine pit and the U.S. Rifle Factory foundations. In the category of location, Halls Island retains integrity.

**Design:** Design is the combination of elements that create the form, plan, space, structure and style of a cultural landscape or historic property. Historic photographs illustrate the existence of an element of design on the site during the modernization period, which lasted from August 1846 until 1860. Design characteristics found in the U.S. Rifle Factory workshops built during this period emulate Romanesque architecture. Today on Halls Island there are no existing materials to convey the aspect of design that were present during the historic period.

**Setting:** Setting is the physical environment of a cultural landscape or historic property. During the historic period, Halls Island was a bustling industrious site. For a time it was also a landscape that was submerged under a lake. Currently Halls Island is a relatively quiet wooded swath of land. The current environment does not reflect the site’s historic setting.

**Materials:** Materials are the physical elements of a particular period, including construction materials, paving, plants, and other landscape features. Some materials on Halls Island derive from the historic period. However, there is not enough existing today to convey the overall character of materials from the period of significance.
**Workmanship:** Workmanship includes the physical evidence of the crafts of a particular period. During the period of significance, and particularly during the modernization period of the mid-nineteenth century, there was a considerable amount of workmanship that went into improvements and new construction at the Rifle Factory. Some of the workmanship during the historic period was evident in brick and mortar work, stone cutting and detailed construction. Currently there is little to no evidence on site of the workmanship that characterized the site during the historic period.

**Feeling:** Feeling is a property’s expression of the aesthetic or historic sense of a particular period. In the past, a distinct character of industry and manufacturing could be ascertained through the sights, smells and sounds of the busy atmosphere at Halls Island. Today the wooded environment is comparatively still and quiet with the exception of the traffic sounds from Highway 340. The feeling associated with the site’s busy industrious past is lost.

**Association:** Association is the direct link between an important historic event or person and a historic property. The association between the Halls Island landscape of today and the industrial aspects of the site’s past are diminished due to altered site function, lack of materials that convey the site’s history, the abundance of vegetation and the absence of interpretive devices to give the visitor a sense of past use of the property.

**Conclusion**

After evaluating the extant landscape features and characteristics within the context of the seven aspects of integrity established by the National Register, this study finds that Halls Island does not retain enough historic physical characteristics to convey the cultural landscape’s significance to the public.
**Landscape Characteristics and Features**

This section provides an evaluation of the physical integrity of the Halls Island cultural landscape by comparing landscape characteristics and features present during the period of significance with current conditions.

Landscape characteristics are the tangible and intangible aspects of a landscape that allow visitors to understand its cultural value. Collectively, they express the historic character and integrity of a landscape. Landscape characteristics give a property cultural importance and comprise the property’s uniqueness. Each characteristic or feature is classified as contributing or non-contributing to the site's overall historic significance.

Landscape features are classified as contributing if they were present during the property’s period of significance. Non-contributing features (those that were not present during the historical period) may be considered compatible or incompatible. They are compatible when they fit within the physical context of the historic period and attempt to match the character of contributing elements in a way that is sensitive to the construction techniques, organizational methods, or design strategies of the historic period. Incompatible features are those that are not harmonious with the quality of the cultural landscape and, through their existence, can lessen the historic character of a property. For those features that are listed as undetermined, further primary research is necessary to determine the feature's origination date.

Contributing landscape characteristics and features identified for Halls Island are *natural systems and features; spatial organization; the transportation aspect of land use; circulation* features including Shenandoah Street, the canal, the river and the railroad; some aspects of the *topography* of the landscape; *archeology* and, in the category of *vegetation*, two sycamores that date back to the 1880s.
Natural Systems and Features

Natural Systems and Features refer to the natural aspects that often influence the development and resultant form of a landscape.

Historic condition

The natural systems and features that influenced the development of the landscape during the historic period are the Shenandoah River and the Harper shale cliffs that border the site on its north side.

The steep cliffs bordering the north side of Halls Island are composed of a geologic unit known as the Harpers Formation, commonly referred to as Harpers Shale. At the base of the hill, the Harpers Formation meets the...
alluvial cobbles, sand and silt that define the geology of the floodplain of the river. The area where the two meet drove the development of the path that evolved into Shenandoah Street ca. 1751.

Proximity to the water power generated by the change in elevation or “fall” of the Shenandoah River at Halls Island influenced Robert Harper’s choice to establish his mills on the floodplain landscape. The rocky nature of the river topography and the change in elevation led to the implementation of the Saw Mill Falls portion of the Shenandoah Canal at the beginning of the nineteenth century. With this, the landscape became an island when the canal created a channel between the base of the cliffs and the floodplain.

**Current condition**

The steep shale cliffs of the Harpers Formation and the Shenandoah River still exist in their original form today. Some alterations in the river topography occurred in the historic period during the construction of the Shenandoah Canal. The shoreline, particularly on the southern edge of Halls Island, was altered in response to changing river currents over time. Changes in the river have not been large enough to significantly alter the general character of Halls Island’s floodplain landscape.

Originally the site was not an island. This changed with the addition of the Shenandoah Canal in 1807. With the construction of Lake Quigley in the 1890s, the site became less of an island and more of a submerged landscape. Due to the siltation build up during the Lake Quigley era and the discontinued use of the canal, the site has once again merged with the mainland and is no longer an island.

**Evaluation**

With both the river and the cliffs still intact, there is integrity to natural systems and features on Halls Island.

**Spatial Organization**

Spatial Organization refers to the historic arrangement of elements creating the vertical and horizontal planes that defined and created spaces.
Halls Island is a linear east-to-west landscape situated between the Shenandoah River and the steep shale cliffs of the Harpers Formation that rise approximately 250 feet to the area of Harpers Ferry known as Camp Hill. The relatively flat topography of Halls Island and the access to the water power created by the natural “fall” of the Shenandoah River were driving factors in its initial organization and establishment, in the addition of the railroad to the site in the mid 1830s, and in the sustained history of industry on the site.

**Historic condition**

Early use of Halls Island as an industrial site was established by Robert Harper in the mid eighteenth century. Harper established a grist mill and a sawmill at Halls Island that utilized the waterpower of the Shenandoah River. Later, the linear organization of the site was reinforced with the establishment of the road now known as Shenandoah Street (ca. 1751), the canal built by in 1807 by the Potowmack Company, and the Winchester and Potomac railroad in the mid 1830s. Flooding, and the addition and subtraction of millraces, tailraces, paths, roads, factories and other features altered the configuration of the ground plane several times during the historic period. However, the general alignment of the road, railroad and of the canal never changed drastically. All remained in their east-to-west configurations. When Lake Quigley was established during the Shenandoah Pulp Mill era, it too adopted the linear shape dictated by the river, railroad and the cliffs.

**Current condition**

Although the river and the cliffs are located directly to the north and south of the study area, the geology of the Shenandoah River, the steep shale cliffs on the north side of the site, the alignment of the man-made Shenandoah Street, the extant railroad and the linear alignment of the remains of the Shenandoah Canal prism are the extant landscape features remaining from the historic period that define spatial organization.

**Evaluation**

Spatial Organization, along with the availability of waterpower, were the most influential characteristics dictating the utilization of the landscape as an industrial site during the period of significance. This characteristic and the associated features; the river, Shenandoah Street, the railroad, the canal
alignment and the cliffs retain integrity and contribute to the historic character of spatial organization on the site.

![Figure 83: The cliffs (left), Shenandoah Street, the rive, the railroad and the canal are features that lend integrity to spatial organization on Halls Island (NCR CLP 2009).](image)

**Land Use**

Land use is the historic organization, form and shape of the landscape in response to land use.

**Historic condition**

During the historic period, land at Halls Island was used primarily for industry and transportation.

**Industry on Halls Island**

Robert Harper established grist and sawmills on the land later named Halls Island in the mid eighteenth century. Shortly after the turn of the nineteenth century, the mill was replaced by several structures built to support production of arms on the site. Over the next half-century, industry remained the primary land use on Halls Island. Firearm production on Halls Island persisted until it ceased amidst the onset and chaos of the Civil War in 1861.
Thomas Savery and partners purchased land, riparian and waterpower rights on Halls Island in 1885 and built a ground wood pulp mill called the Shenandoah Pulp Mill on top of the remains of the Shenandoah Canal locks. The mill operated under varying levels of production for forty-five years beginning in 1889. During the later stages of its existence, the mill was retrofitted to produce electricity. Eventually the mill ceased to be a profitable venture. The mill closed in 1935 and was demolished in 1936, marking the end of the long era of industry on Halls Island.

Transportation on Halls Island

In 1806, the U. S. Government granted a right-of-way on Halls Island to the Potowmack Company. The company built a bypass canal to negotiate the 17-foot drop of the so-called “Staircase” or “Saw Mill Falls” of the Shenandoah River. The Saw Mill Falls section of the Shenandoah Canal was completed in 1807. It had two contiguous locks of granite and freestone, one with an eight-foot lift and the other of nine feet.\(^1\)

The road known today as Shenandoah Street was formalized as part of the Harpers Ferry, Charles Town and Smithfield Turnpike in 1831. The road served as a conduit for the transport of goods since the time of Robert Harper’s mills on the Shenandoah shoreline.

The 1830s were a active time for the development of transportation in Harpers Ferry and America. Railroads, with their faster pace and ability to haul a larger quantity of goods, beat canals in the race west to the Ohio River Valley. The Baltimore and Ohio (B&O) Railroad crossed into Lower Town Harpers Ferry in 1836 via a bridge over the Potomac River. A secondary rail line, the Winchester and Potomac Railroad (W&P), connected the populous town of Winchester and the Shenandoah Valley with Baltimore via its connection with the B&O Railroad in Harpers Ferry. Tracks were built along the southern edge of Halls Island where the W&P line passed as it made its way towards its connection with the B&O in Lower Town.

Transportation in Harpers Ferry became an important sustaining factor in the growth of the town. The landscape of Halls Island helped facilitate this with the construction of the canal and the railroad. Civil War havoc destroyed the W&P railroad, but as a testament to its importance to the
region, repairs were made soon after. The canal, after it was no longer used for boats, remained in its form as a channel that supported industry on Halls Island.

**Current condition**

Land use upon the modern landscape of Halls Island revolves primarily around transportation, recreation and education. It is also categorized in the park’s General Management Plan as a Natural Preservation Zone. Transportation persists, as the railroad, and Shenandoah Street remain a constant presence on the landscape. Industry ceased altogether on Halls Island with the closure and destruction of the Shenandoah Pulp Mill in 1936. Since that time, the wooded riverside site has been a destination for people recreating on and near the Shenandoah River, and for those passing through the site. Educating the public on the history of the site, including its role in arms and pulp and paper manufacture, has been facilitated partially by archeological studies conducted during the 1960s. The results of these studies have not been directly interpreted to the public but rather have informed the park on building sizes and locations. Over time, the Park Service has furthered education by providing tours of the island and using limited interpretive signage relating only to the pulp mill.

**Evaluation**

Today the land at Halls Island is used in a drastically different manner than it was during the period of significance with the exception of use of the site for rail and road transportation. The extant features on Halls Island do not have enough integrity to convey the extent of land usage during its industrious past. An ever-increasing number of people are learning to appreciate the history and unique qualities of land use on the site through interpretation and improved access to the area over time.

**Circulation**

Circulation includes the spaces, features and materials that historically constituted systems of movement, particularly roads and paths.

**Historic condition**

A system of waterways, roads and pathways guided the movement of people in and around Halls Island during the historic period. Primary
systems such as Shenandoah Street, the railroad, the remains of the canal prism and the river have remained largely intact over time. Secondary systems such as the internal water features (millraces, tailraces, basins, sluiceways etc…), paths, walkways and roads once associated with factory buildings and related structures of the historic period fluctuated in response to flooding, growth and change on the industrial landscape. These roads, walkways and paths served utilitarian purposes and not much is known about the length, width, or time period in which individual paths, walkways and roads existed as graphic resources from the industrial era are limited. Many of these features disappeared under the waters of Lake Quigley during the pulp mill period.

Modern Shenandoah Street was constructed at the base of the steep shale cliffs and on the north edge of Halls Island ca.1751 to facilitate the distribution of goods to and from Harper’s mills. The road was formalized as part of the Harpers Ferry, Charles Town and Smithfield Turnpike in 1831 and was macadamized in 1833.

The Shenandoah Canal opened in 1807 and served as a means for boats to skirt the rapids and to negotiate the 17-foot change in elevation on the adjacent section of the Shenandoah River.

The earliest rail line was built on the site in 1836 when the Winchester and Potomac Railroad (W&P), tracks were laid along the southern edge of Halls Island, a short distance from the B&O main line in Lower Town.

Current condition

Historic maps show the existence of paths, walkways, roads, millraces, tailraces and other water-related features that were frequently altered as the needs and configuration of industry changed. After frequent flooding and years of submersion under Lake Quigley, the features that facilitated and defined circulation within the industrial heart of the site are no longer evident on the landscape.

All trails and paths found on the site now are related to both visitor and NPS usage and manipulation of the landscape. A reference to “…the present trails running around the Island of Virginia and the Hall Island…” can be found in a 1959 Historic Building Site Survey Report. It is likely
that with its history of recreational use, one or more informal trails led visitors through Halls Island after the historic period. While there are trails that lead visitors through the island, at this time, no evidence of an NPS-designed formalized trail system for the site has been found.

Construction of the Highway 340 Bridge across the Shenandoah River over the upstream end of Hall's Island added another layer of circulation to the site in 1949. The bridge met the northern shore near the site of Robert Harper's second residence and mills. In 2000, a new bridge carrying Highway 340 over the Shenandoah River was constructed by the West Virginia Department of Transportation Division of Highways immediately downstream from the bridge built in 1949.

Circulation patterns on Halls Island built outside of the historic period include the pedestrian path along Shenandoah Street, the Highway 340 Bridge and the north-south oriented CSX Service Road that enters the site across the street from the parking lot on the west end of the site. Trails on site that lead visitors from Shenandoah Street to the pulp mill and into the Rifle Factory area, along the Lake Quigley wall, under the Highway 340 Bridge and beyond are also considered non-contributing because their layout is not based on a known historic pattern of internal paths and roads.

**Evaluation**

Primary circulation patterns from the historic period do exist on site today. These features are Shenandoah Street, the canal, the railroad and the river. The secondary circulation patterns that defined and grew out of the industrious landscape are no longer extant on the landscape.

**Topography**

Topography is defined as the historic three-dimensional human-developed configuration and manipulation of the landscape surface characterized by features and orientation.

**Historic condition**

It is likely that the topography of the landscape of Halls Island has been in a constant state of flux for thousands of years due to its proximity to the Shenandoah River. While official flood records in Harpers Ferry do not
predate 1877, by the number of floods occurring after 1877, it is assumed that floods have been a constant force of change on the site.

Natural topographic features surround the working core of Halls Island. These include the steep shale cliffs of the Harpers Formation to the north of Halls Island and the topography of the riverbed of the Shenandoah. During the historic period, the topography of the man-made working landscape on the floodplain of Halls Island saw an ever-changing series of features being built including channels, basins, raceways, flood berms, the addition of fill and more. With the construction of Lake Quigley in the late nineteenth and early twentieth centuries, another era of topographic changes took place. Proof of this comes from reports of the need for periodic dredging of the lake during the pulp mill’s operational years.

Current condition

Examination of the current elevation of the ruins from the historic period including the canal prism, the turbine pit, and the foundation of the U.S. Rifle Factory, have led to the conclusion that the topography of Halls Island is currently within approximately five feet of levels that existed during the arms manufacturing era.

One feature that supports this theory is the modern existence of two trees dating from around the 1880s. One, which may be seen in a photograph taken during the pulp mill period is on the north end of the site in the grassy area east of the parking lot. Another specimen is located between the pulp mill ruins and the railroad tracks in the southeast section of the site between the Lake Quigley wall and the railroad tracks. Major fluctuations in topographic levels during the life cycle of these trees would have lead to their demise. Both of these trees are identified in the 1870-1944 and 1944-2010 Period Plans included in this document.

The Highway 340 Bridge construction at the end of the 1940s created a significant change in topography as a build-up of excavated soil, or fill, on either side of the bridge created a raised north-south oriented ridge towards the west, or upstream portion of the site. The relocation of the bridge in 2000, just downstream from the 1949 version altered the topography in this area yet again. CSX utilized the fill to improve their access road between the street to the railroad tracks.
Currently, the internal section, or former industrial heart of the site of Halls Island is fairly level. The greatest topographical variation in this area is at the turbine pit, located near the center of this section of the site.

**Evaluation**

In some areas, topography at Halls Island is similar to its historic grade. This is evident in the levels of extant ruins and the existence of two specimen trees on site. Significant changes in topography occurred with the construction of the Highway 340 bridges. Overall, topography in the internal section of the site is generally intact and remains similar to levels of the historic period.

**Vegetation**

The term vegetation represents historic indigenous or introduced trees, shrubs, vines, ground covers and herbaceous materials.

**Historic condition**

Due to its history as an industrial site and then as a lake, vegetation on the site during the historic period was generally sparse. This was the case in many settled areas of the era, as trees were utilized for industrial production, building construction products and fuel. Photographs and drawings of the nineteenth century landscape do reveal evidence of trees and lawns intermingled within the factory and dwelling landscapes. No records of formal planting designs are evident in these representations, and plans have not been found.
One of the earliest photographs of the site is the 1865 photograph of the U.S. Rifle Factory seen below. In it, a grouping of trees is visible to the immediate south and east of the factory.

In several photographs, what appears to be the same tree can be seen near the railroad tracks on the north side of the CSX Service Road just southwest of the pulp mill ruins. This is the large sycamore, extant in the modern landscape.

Lake Quigley displaced almost all vegetation that existed on Halls Island by 1889. Exceptions were the trees on the east side of the site that are visible in photographs taken during the pulp mill period. This vegetation may have been some of the same vegetation seen in the U.S Rifle Factory pictures taken in the 1860s, as it appears to be growing in or near the same area. Throughout the pulp mill period, vegetation is most concentrated on the south side of the site between the railroad tracks and the Shenandoah River. Trees and shrubs can also be seen in photographs over time on the south side of the Rifle Factory and later the south side of the pulp mill.

**Current condition**

With the closing of the mill in the mid 1930s, Halls Island became comparatively deserted. Trees, shrubs and groundcover quickly took hold of the landscape and by 1959; the landscape is described as being overgrown.

Since 1959, there is a record of at least four floods reaching a minimum of 25 feet (flood stage is 18 feet). These events have not hindered the growth of two forest types in the area. The primary forest type in the area is as a Piedmont / Central Appalachian Rich Floodplain Forest, characterized by American sycamore (*Platanus occidentalis*), boxelder (*Acer negundo*), black walnut (*Juglans nigra*), pawpaw (*Asimina triloba*) and Virginia bluebells (*Mertensia virginica*). This association occupies the higher elevations of floodplains, floodplain berms, and low terraces of major Mid-Atlantic rivers. Near Halls Island, as the elevation increases, the rich floodplain forest graduates into what is called the Central Appalachian Basic Oak - Hickory Forest. This community type is currently known from a narrow range in the northern Blue Ridge and adjacent inner Piedmont of Virginia, Maryland and West Virginia and is characterized by northern red oak (*Quercus rubra*), chestnut oak (*Quercus prinus*), red hickory (*Carya ovalis*), redbud (*Cercis canadensis*) and wreath goldenrod (*Solidago caesia*).
Two sycamores (and possibly more) on the site, probably date back to the 1880s. One is located on the north side of the CSX Service Road just southwest of the pulp mill ruins and one is located to the east of the parking lot on the north side of the site.

**Evaluation**

With the exception of the two Sycamores (*Platanus occidentalis*), which date back to the late nineteenth century, the vegetation on Halls Island does not contribute to the historic character of the site. During the period of significance Halls Island had little vegetation with the exception of the informal trees and lawns that are seen in drawings and photographs from the U.S. Rifle Factory era. During the pulp mill era there was almost no vegetation on the site. The fact that the modern vegetation is not considered to be a contributing feature does not detract from the ecological value of vegetation, it is simply an evaluation of the difference between the historic and modern landscape.
Buildings and Structures

The landscape characteristic Buildings and Structures includes those that were present during the historic period.

This section briefly describes the historic and existing conditions of the buildings and structures that contribute to the integrity of the landscape. Detailed descriptions of all known buildings on Halls Island over time can be found in the text and maps of Chapter II: Site History and in Appendix A.

Historic condition (by era)

Robert Harper Era

There are no remnants of the mills or dwellings built by Robert Harper during the eighteenth century. Structures found during this era were likely made of wood and had a simple design. There are reports of the existence of a sawmill (built 1748-51), a grist mill (built 1748-51) and a dwelling (built 1775) where Harper lived after flooding forced him out of his home at the Potomac and Shenandoah River confluence. It is likely that support structures near the mills also existed.

Shenandoah Canal Construction Era

Structures on Halls Island built in association with the Shenandoah Canal include a sawmill (built ca. 1807), the Leonard Harbaugh House (built ca. 1806) and the Shenandoah Canal (built 1807). A tilt hammer shop and grinding mill were also constructed during this time period (both structures built 1808-1809). These two shops were the first to utilize water power for the manufacture of arms on Halls Island.

Hall’s Rifle Works Era

In 1819, during the early years of the armory development, John Hall came to Harpers Ferry and was put in the unique position as a private manufacturer at a public armory. By 1820 Hall’s Rifle Works were established on the shore of the Shenandoah, away from the bulk of armory operations on the Potomac. During this era, buildings were placed in a haphazard manner on the landscape. There are no reports of the use of
expensive materials or extravagant or ornamental designs. Instead, stone, brick and wood framing characterized the buildings of Hall’s Rifle Works.

Two workshops, a stone bridge, a machine shop created from a converted sawmill, a blacksmith shop and three dwelling houses were the first Hall-related buildings on Halls Island. Two musket factory workshops to support the armory were also built.

As Hall succeeded in impressing the Secretary of War and the Chief of Ordnance, he was allocated monies for improvements at Hall’s Rifle Works. By 1826 a stone coal house, two workshops, two annealing furnaces, a smoke house, a bar iron store house with second floor dwelling unit, a wall along Shenandoah Street to raise the canal bank, a log house for workmen on Upper Halls Island, a kiln for steaming rifle stocks, a well on Lower Halls Island, and a dam constructed across the Shenandoah River were all added to the landscape.

Continued approval of Halls efforts from the government led to funding of expansion of Hall’s Rifle Works. Between 1827 and 1829. During that time a smith shop with four forges and a small storehouse for coal were built. There was also a conversion of the grinding mill for Hall’s use. It was enlarged by roughly 20 x 20 feet along with a second 10-foot water wheel. In 1828 a new stone tilt-hammer shop with slate roof was built on Lower Halls Island and two additional dwelling houses were constructed on Upper Halls Island for a total of six dwelling houses. A wooden bridge across the canal and a new residence for John Hall on Camp Hill was also built during this time.

In July 1831, the 1808-09 armory tilt-hammer shop was converted into a shop for grinding barrels, ramrods and bayonets and a rifle stocking shop. That year, permission was granted to increase the thickness of a flood protection embankment located on the southwest side of Lower Halls Island to a width of 4 feet and a height of 3 feet. The original construction date of the embankment is unknown. Five small structures were constructed in 1831. They included a charcoal house, a new furnace house for annealing barrels, a new square frame filing shop, a new furnace house with furnace for hardening rods, and a shed in front of the old annealing furnaces. It is estimated that a section of the old tilt-hammer shop was renovated in 1832 and a new 17 x 17 foot filing shop was built on Halls
Island. In 1832, a new engine house was built. It is likely that the 1822 coal house and 1824 store house for iron located on Halls Island were turned over to the Rifle Factory in 1834. This would have completed the transfer of all operations on Halls Island to the Hall’s Rifle Works.

By 1833, sluiceway channels divided the island in two. After legal battles over water rights, new dam across the Shenandoah River was built in the fall of 1834.

The following year, two brick buildings, an annealing shop and an annealing furnace replaced two older buildings that were demolished in 1836.

The mid-1830s also saw the construction of the W&P Railroad. A stone rail bridge and accompanying abutments bridged a small gap in the landscape on the south edge of Lower Halls Island.

In 1836, construction began on a new brick and stone drill shop to replace an old wooden shop (Hall’s old sawmill and Hall’s first machine shop).

In 1837 and 1838, a new 6 foot wide by 12 foot high, 250-foot long river wall was built along with brick browning shop, a brick jobbers workshop a new stone tilt-hammer shop and a springmakers shop. No new construction occurred after this time and at the close of 1841, the Rifle Works included twenty-six buildings.

**U.S. Rifle Factory Era**

In 1843 the U.S Ordnance Department discontinued production of the Hall Patent Rifle. Under the supervision of military leadership of the armory, a new brick filers shop, a one-story building over a high stone masonry basement, 73 x 24 feet with a slate roof, was built in 1843-1844.

A stone wall for guard lock of the Shenandoah Canal to the W&P Railroad was constructed along with a lock down in 1843. This wall was built with 2641.32 cubic feet of stone.
A Modernization Period on Halls Island lasted from August 1846 until June 1860. During this time, Congress appropriated a total of $127,943 for improvements to the U.S. Rifle Factory. A majority of those appropriations went to construct new buildings. The remaining balance was used to construct the perimeter walls, to grade the factory yard, to construct a new main tail race, to make improvements to the Shenandoah Canal and to construct the U.S. Shenandoah Dam.

Armory Superintendent Major John Symington designed four major shops and one minor shop at the Rifle Factory; building all but one of them between 1845 and 1851. All of the additional workshops constructed at the Rifle Factory through 1860 were designed to match Symington’s architectural style and construction standards.

All of the new improvements were completed with the best materials and finest workmanship available. They included carefully constructed mortared stone foundations, solid brick upper walls and cut stone water tables, windows, door sills and copings. The door and window frames were generally of cast-iron and the gabled roofs were covered in slate or sheet metal for fire protection. All of the shops were protected with lightning rods, and had copper gutters and down spouts. The exteriors were finished with two coats of oil-based paint.

Symington’s buildings were also based on a similar floor plan concept and related to each other in aligned rows. The typical floor plan was rectilinear in shape and subdivided into three sections to create a center and two flanking wings. Each section had a gable roof with the center section gable set at right angles to the gable roofs of the two flanking wings. The center section would typically project towards the rear of the building with a slight two-to-four-foot front projection creating a long straight front façade for the entire length of a set of buildings. The length, width and height of each structure could vary as needed for each workshop. The lengths of all his typical buildings varied from 60 to 280 feet, the wing widths were typically 35 to 36 feet and the height was either one or two story. A few of his new buildings maintained a simpler and smaller rectangular floor plan while maintaining the same architectural style and materials as the larger buildings.

The proof house, built in 1845, was 19½ x 15 feet. It was constructed mostly of wood with a 2½ foot thick stone masonry back wall.
The finishing and machine shop was built 1846-1848. It was a 128 x 35½ feet two-story brick shop with two one-story wings, both 24 x 25 feet. It also housed forebays and water wheels. A main tail race was constructed of large stone walls, 2½ feet thick; it was a covered ten foot wide race more than 223 feet in length and ran parallel with and behind the new finishing and machine shop. By 1849 there were two, 6 foot turbine water wheels up and in operation with cement forebays. A lightning rod was added in 1851.

The tilt-hammer and smiths (forging) shop was built between 1849 and 1851. It was a one-story brick structure on a stone basement foundation 110 feet long by 35 ½ feet wide with a 14½ foot rear center projection. It housed a cast-iron turbine wheel and lightning rods were placed on the building roof in 1851.

An annealing furnace and proof house was built between 1851 and 1852. It was a 60 x 36 foot one-story brick building divided into three compartments.

The 1828 wooden bridge was repaired in 1841. In 1851 masonry abutments with wing walls were added to it when it was repositioned away from the new workshops.

A decision during the development of town planning for Harpers Ferry in 1852 designated Upper Halls Island for government use. The number of dwelling houses dwindled from eleven to three shortly after the decision. This created space for a lumber yard built on Upper Halls Island after 1854.

In 1852-1853, a machine shop on Halls Island was built on a brick with a stone foundation. It measured approximately 87 x 35 feet with a center projection of 14 x 35 feet. A turbine wheel in a cut stone pit with a culvert was included in the shop. The wheels measured 42 inches in diameter by 4 ½ inches deep. Installation also included a stone and cast-iron forebay, and a culvert to drain tailwater from the wheel pit. Accompanying the turbines were water-wheel governors that worked to provide a uniform motion to the machinery by regulating water flow to the wheel. Based on the location identified for the machine shop in the archeological excavations in 1961,
the cut stone turbine pit inside the machine shop is the same as the extant turbine pit that has been uncovered on Lower Halls Island.

A 1852 flood washed away a temporary coal house. Its replacement, built in 1853-1854, was a 15 foot tall, one-story brick structure measuring 21 x 25 feet. Its location is unknown.

The barrel drilling and finishing shop was constructed in 1859-1860 between and connected to the 1853 machine shop and the 1851 hammer and smith shop. It was a two-story brick building with a stone masonry foundation, 57½ feet wide by 49½ feet deep. With this addition, the Rifle Factory was a single continuous wall 254 feet long which created an imposing presence along Shenandoah Street. The new shop included a bell tower with one bell and four clocks protruding above the center front of the building. The procurement of the bell and clocks was postponed and most likely never added to the clock tower as the Civil War would begin shortly thereafter resulting in the demise of the factory.

Shenandoah Pulp Mill Era

Thomas Savery and partners funded and managed a ground wood pulp mill on the Shenandoah Canal locks on the west end of what was once Lower Halls Island.

One hundred and ninety-seven men built the Shenandoah Pulp Mill during 1887 and 1888. Made up of two connected buildings, the massive structure spanned the old canal and stood on four foot thick stone foundation walls laid in Portland cement. Here there were six flumes, each 15 feet wide. In each of the flumes, massive sheet iron bulkheads measuring 15 feet high and a ¼ inch thick held water back. Five of the six flumes were outfitted with paired sets of turbine water wheels. The sixth flume was reserved for overflow. The main building was 118 feet wide and 60 feet long. The smaller building extended 30 feet downstream from the larger and was 99 feet wide. The highest point of the larger building was approximately 25 feet high.4

The Lake Quigley wall was built during the same time as the Shenandoah Pulp Mill. Many of the materials used to compose the wall were bricks, cut stones and scrap materials recovered from the U.S. Rifle Factory buildings.
The wall extended approximately 350 feet from the southern edge of the pulp mill in a southeasterly direction.

A boiler house was built to support the Shenandoah Pulp Mill around 1890. Limited information is available on this structure and further research is necessary to reveal more information on this structure.

**Current condition**

Ruins and remnants of the U.S. Rifle Factory, the Lake Quigley wall, the turbine pit, the Shenandoah Pulp Mill, the boiler house, the 1820 arch stone bridge abutment, the railroad bridge abutment and the Shenandoah Canal wall are extant on Halls Island.

**Shenandoah Canal Construction Era**

Approximately 35 linear feet of the original stone bridge abutment (1820) and wing walls remain on the south side of the Shenandoah Canal.

Several stone canal wall portions remain visible along the sides of the Shenandoah Canal. They are typically small portions of rounded fieldstone walls with several feet of cut wall caps visible on the north side near the pulp mill.

**Hall’s Rifle Works Era**

**Railroad Bridge Abutment**

The extant railroad bridge abutment ruins are approximately 110 linear feet high and twelve feet tall. They are made of dimensionally cut and large blocks of stone that are most easily viewed from the Shenandoah River.
U.S. Rifle Factory Era

U. S. Rifle Factory

Portions of stone foundation walls and corners of the Symington-era Rifle Factory buildings are located between the Lake Quigley wall and the Shenandoah Canal. Approximately 115 linear feet of wall from four of the Rifle Factory buildings constructed during the Symington modernization era remain visible.

Turbine Pit

The stone turbine pit, uncovered during the 1960 archeological explorations, is located in a deep depression near the north center of Upper Halls Island. Remnants of the cast-iron forebay and the stone culvert are visible above-grade.
Shenandoah Pulp Mill Era

Shenandoah Pulp Mill

The pulp mill ruins are some of the largest ruins of any historic structure in Harpers Ferry NHP and are the largest ruin on the Shenandoah River shoreline section of the park. The ruins are six stepped stone wall foundations, each approximately 28 feet tall (each stepped wall segment is 13.5 to 14 feet high). Each of the six wall segments is roughly 94 feet long with the first and last wall segments extending slightly further. While the ruins themselves may not inform a visitor of the specifics of the industry undertaken on the site during the period of significance, as a whole, they do hint to a history of commercial enterprise on Halls Island.
Lake Quigley Wall

The wall that once contained the southern edge of Lake Quigley is approximately 350 feet long of solid wall before the breach. Beyond that, 240 additional feet of breached or dismantled wall remain. The stone wall is roughly 10-12 feet tall by approximately 18 inches thick.

Boiler House

The Boiler House was associated with the Shenandoah Pulp Mill. Partial foundational stone ruins remain for all four walls. They range in height and outline the shape of the original 35 by 35 foot structure.
There are no buildings on Halls Island at present. Extant structures on site that derive from outside of the historic period include the Highway 340 Bridge, supports, walls and other bridge-related features.

Evaluation

During the historic period, a number of buildings and structures associated with the industrial history of the site were added and removed from the landscape. The few extant ruins of buildings and structures are in their original locations, maintain the integrity of their original construction and contribute to the overall integrity of the Halls Island cultural landscape.

Constructed Water Features

Constructed Water Features are built features and elements that utilize water for aesthetic or utilitarian functions.

Historic Condition

The Shenandoah Canal remains include the canal prism and some of the stones that composed the walls, coping and bridge abutments related to the
canal. Originally built as an earthen canal, stone walls were added to reinforce the walls in 1853. The canal derives from the early 1800s, a period of time when the site was associated with George Washington and the Patowmack Company, whose mission it was to deepen river channels and to construct canals to aid in river navigation to boost commerce in America. The canal originally offered a route through the rocky portion of the Shenandoah River adjacent to Halls Island known as “Saw Mill Falls.” Two 100 foot long locks on the east side of the site assisted boats in navigating the seventeen foot change in elevation on this section of the river. Throughout the historic period, the canal was repaired and altered frequently and its primary use shifted from transportation to waterpower.

**Current Condition**

The canal is no longer watered and has silted in. It is no longer the same depth or width as it was at the time of construction, or as it was after any of the major alterations undertaken during the period of significance. The addition of the Highway 340 Bridge in 1949 changed a significant portion of the canal topography, essentially creating a blockage on the west side of the site. Scattered stones, stone wall remnants, wall copings and the general topography of the prism, do exist. Through these remnants, some of the character of the canal is revealed.

**Evaluation**

While portions of the canal do hold water after floods or heavy rains, currently the canal on the Halls Island site is not watered and no longer functions as it did historically.

**Small-Scale Features**

Small-scale features are defined as elements that historically provided detail and diversity combined with function and aesthetics.

**Historic Condition**

Between the factory buildings, paths, roads, bridges and dwelling houses, it is certain that many small-scale features existed during the period of significance. Photographs and written reports of the landscape from the historic period give an indication of some of the small-scale features that once existed on Halls Island.
Those features include the following:

- A fence erected along the W&P Railroad right-of-way in 1841
- A yellow pine fence at dwelling houses that was reported to have been repaired in 1845
- Two cast iron lamp posts with lanterns ca. 1853
- An 8” cast iron water pipe with 3 hydrants ca. 1853
- A picket fence ca. 1854
- A perimeter fence measuring 2,665 linear feet with a 3 foot wide stone foundation, rough stone coping walls, brick piers, iron railing; and a gateway entrance ca. 1856-59
- A cast iron gate ca. 1859
- Yard lights, hydrants and pipes made of cast iron ca. 1859-90

**Current Condition**

No small-scale features from the historic period are extant on Halls Island today. Existing small-scale features on the site have been added after the period of significance. These include; post and chain fencing, reinforced timber guardrails, curbs, signage, a fee collection box, trash receptacles, a pulp mill interpretive wayside, stairs and handrails and the gate on the CSX Service Road.

**Evaluation**

There is no integrity to small-scale features from the historic period on Halls Island. All small-scale features on site date from after the period of significance.

**Archeological Sites**

Archeological sites are those containing surface and subsurface remnants related to historic or prehistoric land use.

In the 1950s, archeological resources were allocated to Halls Island. Investigations into the U.S. Rifle Works and the surrounding landscape took place during the summers of 1959, 1960 and 1961. Analysis of
archeological findings found the shape and limits of the island, as well as some details about building locations and measurements. This information changed the minds of park managers who assumed that foundations of dwellings and factories were non-existent.

Identification of contributing and non-contributing archeological resources is beyond the scope of this report. However, the findings relating to the U.S. Rifle Works suggest that contributing resources do exist. Further archeological research using technology that is more modern is likely to reveal more information about the history, and possibly the pre-history of the site.

**Evaluation**

There is integrity to archeology on the Halls Island site. Investigations have informed researchers on several aspects on the historical landscape of the site.
**LIST OF EXISTING FEATURES**

*Natural Systems and Features*

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Status</th>
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<tbody>
<tr>
<td>Shale cliffs of the Harpers Formation</td>
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<td>Shenandoah River</td>
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*Spatial Organization*

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<td>Linear alignment of the Shenandoah River</td>
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<tr>
<td>Linear alignment of Shenandoah Street</td>
<td>Contributing</td>
</tr>
<tr>
<td>Alignment of the railroad</td>
<td>Contributing</td>
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<tr>
<td>Linear alignment of the Canal</td>
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*Land Use*

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Status</th>
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<tr>
<td>Transportation (railroad, Shenandoah Street)</td>
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<td>Education</td>
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<td>Natural Preservation Zone</td>
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<td>Recreation</td>
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*Circulation*

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<td>Contributing</td>
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<tr>
<td>Shenandoah Street</td>
<td>Contributing</td>
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<td>Shenandoah Canal ruins</td>
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### Analysis and Evaluation

<table>
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<th>Feature Name</th>
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<tr>
<td>CSX Railroad</td>
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<tr>
<td>Path along Shenandoah Street</td>
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<tr>
<td>Internal trails</td>
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<tr>
<td>Highway 340 Bridge</td>
<td>Non-Contributing</td>
</tr>
<tr>
<td>Shoreline Drive</td>
<td>Non-Contributing</td>
</tr>
<tr>
<td>CSX Service Road</td>
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**Topography**

<table>
<thead>
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<th>Feature Name</th>
<th>Status</th>
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<tr>
<td>Shenandoah Street and Canal</td>
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</tr>
<tr>
<td>CSX Railroad</td>
<td>Contributing</td>
</tr>
<tr>
<td>CSX Service Road</td>
<td>Non-Contributing</td>
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<tr>
<td>Topographic grade of internal area of site near the Rifle Factory ruins</td>
<td>Non-Contributing / Compatible*</td>
</tr>
<tr>
<td>that are within approximately five feet of historic grades.</td>
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</table>

*Due to the absence of historic paths, roads, waterways, basins and other water-related features in the modern landscape, the topographic grade of the internal area cannot be considered a contributing feature because the ground is fairly flat. The current grade of existing features suggests that current levels do not differ drastically from historic levels. Therefore this feature is considered compatible with the historic landscape.*

### Vegetation

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<td>Two sycamore trees</td>
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<td>Central Appalachian Basic Oak - Hickory Forest</td>
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<tr>
<td>Piedmont / Central Appalachian Rich Floodplain Forest</td>
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### Buildings and Structures

<table>
<thead>
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<tr>
<td>Ruins of Shenandoah Pulp Mill</td>
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</tr>
<tr>
<td>Ruins of Lake Quigley wall</td>
<td>Contributing</td>
</tr>
<tr>
<td>Cut stone turbine pit</td>
<td>Contributing</td>
</tr>
<tr>
<td>Railroad bridge abutment remnants</td>
<td>Contributing</td>
</tr>
<tr>
<td>Shenandoah Canal wall remnants</td>
<td>Contributing</td>
</tr>
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<td>1820 arch stone bridge abutment remnants</td>
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</tr>
<tr>
<td>Ruins of boiler house</td>
<td>Contributing</td>
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<tr>
<td>U.S Highway 340 Bridge supports/walls</td>
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### Constructed Water Features

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<thead>
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<td>Shenandoah Canal prism remnants</td>
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<tr>
<td>Ruins of Shenandoah Canal walls</td>
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### Small-Scale Features

<table>
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<th>Feature Name</th>
<th>Status</th>
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<tbody>
<tr>
<td>Post and chain fencing</td>
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<td>Reinforced timber guardrails</td>
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<td>Curbs</td>
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<td>Signage</td>
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<td>Fee collection box</td>
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<tr>
<td>Trash receptacles</td>
<td>Non-Contributing</td>
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<tr>
<td>Stairs and handrails</td>
<td>Non-Contributing</td>
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<tr>
<td>CSX gate and river access parking gate</td>
<td>Non-Contributing</td>
</tr>
<tr>
<td>Pulp mill interpretive wayside</td>
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</table>
4 Ibid., 143.
Part II: Halls Island Treatment Plan

Chapter I: Landscape Treatment
LANDSCAPE TREATMENT

Introduction

This section provides the preservation strategy for long-term management for Halls Island based on the findings of the research, and analysis sections of this report as well as through collaboration with park management and staff. Guidance is provided in accordance with the overall management objectives for the site as documented in the General Management Plan and Environmental Impact Statement, 2006 (GMP/ EIS). The cultural landscape treatment recommendations and design guidelines presented in this chapter provide for a phased implementation approach by incorporating short-term and long-term projects that can build upon each other as resources allow. The preservation treatment recommendations address the challenges associated with balancing cultural and natural resource protection, site access, pedestrian circulation, universal accessibility, and interpretation of a complex history with multiple historical themes.

The GMP/ EIS identifies five interpretive themes for Harpers Ferry NHP. The history of Halls Island supports four of the five themes. These include:

- How landscapes shape human history and how human endeavors profoundly affect natural landscapes.
- The invention of interchangeable parts in arms manufacturing and how it provided unprecedented momentum to the Industrial Revolution.
- The story of John Brown’s raid and the Civil War.
- Weaving together common threads of the 18th, 19th and 20th Century to understand the great American experiment.¹

Most of these historical themes can be explored in most areas of Harpers Ferry NHP, however, the invention of interchangeable parts in arms manufacturing is unique to Halls Island and John Hall’s Rifle Works. While the treatment plan for Halls Island will cover a period of significance from 1751 to 1936 that crosses a multitude of interpretive themes, the Hall’s Rifle Works period should be given priority.
Among the four possible historic preservation treatments outlined in the Secretary of the Interior’s Standards for the Treatment of Historic Properties, this report recommends rehabilitation as the primary treatment for the Halls Island. As a majority of the cultural resources and features from the historic periods are no longer extant, Halls Island is primarily an archeological preservation zone with minimal features above ground to assist in interpreting the site. Rehabilitation as a treatment approach allows the park to make alterations or additions to help interpret to the public and convey the rich history of Halls Island, while preserving the portions and features of historical and cultural value. The following recommendations, which define the proposed rehabilitation, are not intended to serve as construction documents or specifications, but rather to establish the goals and overall direction so that future management choices are informed by historic preservation values. The following approach and the accompanying treatment tasks have been developed collaboratively between the regional cultural landscapes team and Harpers Ferry NHP staff members.

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

**Landscape Character Areas**

During the landscape evaluation, the CLR team identified seven cultural landscape character areas on Halls Island. They were defined by the historic and contemporary use of the area, concentration of cultural resources present, historical significance of the area and the landscape integrity of the features. The character areas were then sub-categorized into three zones of significance, the first zone having the highest degree of historical significance with the last zone having the least. These character areas help to define and organize the landscape of Halls Island.
Zone I: Areas with a high degree of historical significance relating to all historic periods.

Shenandoah Canal & Shenandoah Street

This linear corridor creates the northern boundary for Halls Island. It includes the historic skirting canal; Shenandoah Canal and canal locks, constructed in 1806 and 1807; and Shenandoah Street, one of the first streets in Harpers Ferry. The canal provided a means for commercial boat traffic from the Shenandoah Valley to bypass the treacherous rocky waters of the Shenandoah River adjacent to Halls Island. The original earthen canal channel was modified several times from 1820 to 1855 with dredging and the addition of stone walls on both sides of the canal. It was modified again during the construction of the Shenandoah Pulp Mill and Lake Quigley. The south wall of the canal was lowered to construct the lake and a portion of the canal lock was extended east and utilized for part of the pulp mill foundation. Today the remains of the canal bed are covered with mostly tall herbaceous vegetation and trees such as American sycamore and boxelder continue to grow along the canal edges. Shenandoah Street was originally called the Road to Harpers Ferry or the Ferry Road as early as 1751, during Robert Harpers time. It was first macadamized in 1831 when the Harpers Ferry, Charles Town & Smithfield Turnpike Company upgraded it to a turnpike. It was repaved with asphalt in 1951 and again in
2000, but maintains its historic alignment from Shoreline Drive into Lower Town. The construction of the Highway 340 Bridge abutments required a modification in the alignment for Shenandoah Street east of Shoreline Drive.

Rifle Factory Area A

A majority of the U.S. Rifle Factory and Hall’s Rifle Works workshops were located in the area identified as Rifle Factory Area A. This area was first developed as early as 1751 with Robert Harper’s sawmill and gristmill. The canal company destroyed Harper’s sawmill in 1806 with the construction of the Shenandoah Canal locks, but quickly built a replacement that was used by the federal government in the construction of the first workshops at the U.S. Armory. The first armory workshops built on Halls Island were constructed in 1808 and 1809. In 1819, John Hall arrived in Harpers Ferry and began working in a new workshop built that year. From then on, the island evolved into the Hall’s Rifle Works and it went through several eras of building and rebuilding of workshops. The last Hall Rifle was manufactured there in 1844 and at that time, the workshops in this area were converted into the new U.S. Rifle Factory. The area underwent a major renovation between 1844 and 1861 with eight new buildings constructed, two converted and approximately twenty demolished. The new structures were constructed in a more permanent manner and in a uniform architectural style. All but two of these structures were located in Rifle Factory Area A. These buildings were burned during the Civil War, but several were re-roofed and used as quartermaster supply warehouses. The site also became a shipping and receiving port for General Sheridan’s Shenandoah Campaign and possibly a temporary prison. After the war, the Shenandoah Pulp Company dredged portions of this area to construct Lake Quigley in 1887. A wall to retain the lake was built through the middle of Halls Island and is known as the Lake Quigley Wall. A majority of this wall is still standing and it creates a dividing line between Rifle Factory Area A and Area B.

Rifle Factory Area A is the most historically significant area on Halls Island. There are foundational ruins from the modernization period and known archeological resources from the John Hall period. The Lake Quigley wall has created a barrier to the remaining portion of the Rifle Factory site and is used to separate the two Rifle Factory character areas.
Shenandoah Pulp Mill

The Shenandoah Pulp Company constructed The Shenandoah Pulp Mill in 1887 to manufacture ground wood pulp for making paper. The pulp mill was built on a portion of the Shenandoah Canal locks and extended further east. To power the pulp mill, a lake was created by dredging channels around the main Rifle Factory workshops and widening the Shenandoah Canal. A wall constructed along the railroad served as the southern boundary of what became known as Lake Quigley. The stone and bricks used in constructing the Pulp mill and the Lake Quigley wall came from what was left of Rifle Factory workshops following the destruction during the Civil War. The Shenandoah Pulp Company ceased operations after the devastating flood in 1935 and dissolved the company a year later. The Shenandoah Pulp Mill ruins are one of the few extant features of the post war industrial period for Halls Island, and largest structural ruins in Harpers Ferry NHP. Both the pulp mill and Lake Quigley wall are listed in the List of Classified Structures (LCS) inventory.

Zone II: Areas with historical significance, but without extant features. These sites are primarily archeological sites with potential cultural landscape value.

Rifle Factory Area B

As described above in Rifle Factory Area A, this is the second half of the Hall’s Rifle Works site and a large portion of this area once functioned as a natural water channel separating Virginius and Halls Islands. During John Hall’s period, approximately six workshops occupied this section of the island. All but two of those workshops were demolished during the modernization period of 1844 to 1861. One of the structures was removed during the Hall period while the last structure was demolished during the Civil War. Portions of this area were heavily used during the Civil War once the railroad was up and running again. The old water channel was filled in 1887 during the dredging performed for the construction of Lake Quigley by the Shenandoah Pulp Company. Other portions of this area were small undeveloped islands. One of the oldest surviving trees on Halls Island is an American sycamore thought to be on a low ridge of one of these islands. While Rifle Factory Area B is historically significant, the extant resources in this area are archeological and not visible on the surface. Vegetation has continued to grow and develop into a healthy riparian forest.
CSX Railroad

The federal government approved a railroad easement for the construction of the W&P Railroad in 1835. The railroad corridor and alignment of the CSX Railroad is roughly the same alignment and corridor from the original railroad construction. Although the railroad has changed ownership over the years, it has remained a fixed southern boundary of the Rifle Factory ever since its completion in 1836. In 1987, CSX constructed a service road along the railroad. There is potential that some archeological resources may be found within this corridor. Other extant resources include portions of the 1836 railroad bridge wall located where the original water channel separated Virginius and Halls Islands, only the south sidewalls are visible today.

Zone III: Areas with historical significance, but without extant features and that has been extensively redeveloped. There are no extant features and no integrity to archeological remains.

Riparian Forest

This area is located between the CSX Railroad and the Shenandoah River. It was not utilized for development during any of the historic periods. Through years of natural re-vegetation, it has now become a healthy riparian forest.

River Access Parking Lot and Highway 340 Bridge

The River Access Parking Lot and Highway 340 Bridge occupy a portion of Halls Island once called Upper Halls Island. Several U.S. Armory dwelling houses were located here from 1835 to the Civil War. Part of the original Shenandoah Canal crossed through this area. The original canal head gates were located roughly at the intersection of Shoreline Drive and the Halls Island study boundary. Most of this land was later part of Lake Quigley and was mostly underwater from 1887 to 1936. Due to significant fill and grading, from the construction of the Highway 340 Bridge in 1949 and the new Highway 340 Bridge in 2000, this area has been significantly
modified and any archeological resources remaining are either deeply buried and inaccessible or destroyed by the construction activity.

**Treatment Recommendations**

**General Concept**

Under the preferred alternative in the *GMP/ EIS*, Halls Island (along with Virginius Island) falls into a category known as the *Archeological Preservation Zone*. “This zone would preserve archeological resources in place.” The *GMP/ EIS* outlines this zone to include the following treatment objectives:

- An active program to stabilize and preserve remnant structures would be conducted.

- Some structural foundations would be located and exposed through archeological testing.

- Excavation on Halls Island would be limited to exposing building foundations or other ruins providing interpretive and educational opportunities at this important historic site.

- NPS staff could mark foundations of buildings where sufficient information existed to determine the extent and configuration of the structure.

- Visitors would access the site from the Lower Town bus pavilion. Trails with wayside interpretation would guide visitors through the islands.

- The wetland along Shenandoah Street and Shoreline Drive would be protected and interpreted. Natural vegetation would be preserved, except where it was causing damage to cultural resources and needed to be removed.

This cultural landscape report identifies a period of significance from 1751 to 1936 for Halls Island, including the site’s initial development by Robert Harper to the closing of the Shenandoah Pulp Mill. This is a long timeframe incorporating five historical periods and a great deal of cultural landscape evolution. The Rifle Factory and Civil War periods have national level of significance with the least amount of cultural landscape integrity, while the
Shenandoah Pulp Mill Periods have a regional significance with a high degree of cultural landscape integrity. The approach for the treatment plan at Halls Island generally follows the goals as set by the GMP/EIS to preserve the regionally significant periods depicting the post war industrial era of Harpers Ferry alongside the remaining ruins of the Rifle Factory years. To enable the earlier stories to be told and access provided to the site, the development of Halls Island will be dependent on interpretive exhibits, vegetative clearing, new trails with universal access from the Lower Town bus pavilion, and a long-term plan for a new bridge over the canal at Halls Island.

**Overall Recommendations**

**Independent Identity:** Halls Island has often been associated and combined with Virginius Island in numerous park reports, maps and interpretive programs. They are often confused as one in the same. While the two islands are connected and similar in their physical attributes, the history of Halls Island is unique and very different from that of Virginius. As the first developed area in Harpers Ferry and the site of the Hall’s Rifle Works and U.S. Rifle Factory, it deserves its proper place and identity within the park.

**Update NPS Resource Inventories:** Halls Island has been determined ineligible for the listing in the Cultural Landscape Inventory; however, through this study the cultural landscapes team identified several structural ruins eligible for listing in the List of Classified Structures (LCS) inventory. These include the turbine pit, portions of the Shenandoah Canal Wall and foundational ruins of the modernization period Rifle Factory. While the integrity of Halls Island as a cultural landscape may be insufficient, it has substantial archeological integrity. Review and update of the Archeological Sites Management Information System (ASMIS) for Halls Island based on information from the CLR and any future archeological investigations.

**Preservation Maintenance Plan:** Establish a Preservation Maintenance Plan for Shenandoah Shoreline Properties to include Hamilton Street Area, Virginius Island, Halls Island and their associated properties. This plan should incorporate guidelines for vegetation management as well as ruin stabilization.

A qualified historical architect and archeologist should develop ruin stabilization guidelines for Hall’s Island. They should consider vegetation
Landscape Treatment

encroachment from roots, trunks and branching habits, as well as vegetation growth directly on the structure and the needs for preserving the structural integrity of the ruin. Any stabilization treatment developed should take a minimalist approach and be implemented only as required to stabilize and preserve the structure.

Vegetation management guidelines should be developed to minimize the establishment of invasive and exotic plant species and preserve a park-like setting with trees and lawn between Shenandoah Street and Lake Quigley wall. The herbaceous understory should be replaced with native grasses that require minimal mowing. Preserve all canopy trees in good health and selectively remove all hazardous and unhealthy canopy trees. To protect the structural and archeological ruins, selectively remove trees as needed around and near historic structures and ruins. Riparian forest areas between Lake Quigley wall and Shenandoah River should be preserved and enhanced as needed to continue the ongoing establishment of this native plant community.

Interpretive Signage Program: Develop uniform Interpretive Signage Program for Halls Island. Currently there is only one wayside sign focused on the Shenandoah Pulp Mill. Plans for interpretive signage should expand its content to include: John Hall and Hall’s Rifle Works; the U.S. Rifle Factory; Halls Island and the John Brown Raid; the Civil War Railroad and Sheridan’s command center; the Shenandoah Canal; Robert Harpers colonial mill complex; the Shenandoah Pulp Mill and Lake Quigley.

Safety Program: Develop safety program to reduce sudden trail surface hazards caused by erosion, settlement, and tree root growth. Stabilize ruins to prevent debris from falling. Consider the remote location of Halls Island relative to the rest of the Park.

Pedestrian Access/ Universal Accessibility: New guidelines for universal accessibility to outdoor developed areas are nearing final approval by the U.S. Access Board. These new guidelines focus specifically on outdoors areas managed by federal agencies and will require some updates to the existing trails and pedestrian circulation systems as the park improves or builds new trails on Halls Island. Through the CLR process, suggested routes from Lower Town and the river access parking lot to Halls Island
can be made accessible. (See Map 9) As the trails are improved and new trails built, they should be constructed to meet the ABA standards for outdoor developed areas. Trail surfaces should be firm and a minimum of three feet wide with slopes under 5%.

**Walking Trail Circuit:** Continue to develop the trail system throughout Harpers Ferry NHP and provide connections for Halls Island to tie into larger walking trail circuits within the park. Consider three trail circuits:

- **Long trail circuit:** Camp Hill - Lower Town – Armory – Virginius Island – Halls Island – Cliff Trail
- **Lower Floodplain Sites:** Potomac Armory Grounds – Arsenal – Virginius Island – Halls Island
- **Camp Hill Sites:** Storer College – Lockwood House – Cliff Trail – Halls Island
- **John Hall Circuit:** Lockwood House – Cliff Trail – Halls Island

**Sustainability:** All new features on Halls Island should be developed with a goal of sustainability. Materials should be considered for their ability to withstand heavy and frequent flooding, for minimal maintenance requirements and for consistency with those already used throughout the park.

**National Register Nomination:** Update the Harpers Ferry National Historical Park’s national register documentation and consider an independent national register nomination for Hall’s Island focused primarily on the significant archeological resource potential of the site. The site is known to have significant archeological and structural ruins from the U.S. Rifle Factory period and has a high probability of having archeological resources from the John Hall period and the Civil War period.

**Zone I Recommendations**

**Shenandoah Canal & Shenandoah Street**

The treatment goals for this area would be to preserve the remaining character defining features of the Shenandoah Canal and preserve the
historic alignment of Shenandoah Street while providing pedestrian access to Halls Island.

Short Term Treatment Tasks

1. Maintain existing shade trees and lawn character along canal and roadway. If replacement trees are needed, they should be selected from the approved list of appropriate trees (see page 242) to assure compatibility with the historic character of Halls Island.

2. Preserve and maintain historic alignment of Shenandoah Street. Maintain asphalt paving with no curb and gutter.


4. Improve existing dirt path along roadway to an accessible and uniform walkway (see page 241 for discussion of paving material options).

5. Incorporate wayside exhibit for the history of the Shenandoah Canal.

6. Add two bus stops on Shenandoah Street at location of existing Pulp mill pull-off, one for each direction of travel. Provide crosswalk, signage and dedicated waiting areas (small paved landing pad).

7. Stabilize as needed and maintain visible canal walls as part of a cyclic preservation maintenance program.

Medium Term Treatment Tasks

1. Remove all vegetation within the canal prism and on remnant walls under supervision of landscape architect and archeologist. Maintain walls free of all vegetation and include in a cyclic preservation maintenance program.

2. Maintain canal bed with rough low native grasses.
3. Maintain a 4-6’ mowed buffer with shade trees on both sides of canal.

4. Perform a phase I archeological investigation of canal wall; document and stabilize all sections of wall found during the exploration. Determine which walls can be left exposed to help emphasize the full extent of the Shenandoah Canal.

Long Term Treatment Tasks

1. Design and construct a contemporary bridge over the Shenandoah Canal in the same location as the 1820 arch stone bridge. The new bridge should have a slightly larger footprint than the 1820 arch stone bridge and carefully designed to avoid any foundational remnants from the historic bridge or the canal wall. The bridge should connect to a viewing platform for the Rifle Factory Ruins.

2. When major resurfacing is needed, work with the city of Harpers Ferry to assess feasibility of extending the macadam paving from Shenandoah Street in Lower Town up to the River Access Parking Lot at Halls Island.
FIGURE 105: MAINTAIN MOWED SHENANDOAH CANAL PRISM (NCR CLP 2009)

FIGURE 106: EXPLORE POSSIBILITY OF EXPOSING WALLS OF THE SHENANDOAH CANAL (NCR CLP 2009)

FIGURE 107: SHENANDOAH STREET DIRT FOOT PATH. (NCR CLP 2009)  

FIGURE 108: FORMALIZE PEDESTRIAN PATH TO A 3’ WALK. (NCR CLP 2009)

FIGURE 109: SHENANDOAH STREET DIRT FOOT PATH. (NCR CLP 2009)

FIGURE 110: INCORPORATE BUS STOP LANDING, SIGNAGE AND CROSSWALK NEAR THE PULP MILL DROP-OFF. (NCR CLP 2009)
Rifle Factory Area A

The treatment goals for this area are to rehabilitate and enhance the site’s means of depicting the story of John Hall, Robert Harper, the U.S. Rifle Factory, and the Civil War.

Short Term Treatment Tasks

1. Remove all understory vegetation and replace with low growing native grasses. Selectively remove diseased, hazardous and invasive tree species.

2. Additional archeological investigations should be completed based on findings in the CLR and targeted toward locating additional foundation ruins from the Hall’s Rifle Works and the U.S. Rifle Factory.

3. After archeological investigations are complete, improve finished grade of this area by adding fill soil to low spots and leveling off to a consistent finished grade. Grading activities should be completed under direct supervision and approval from the park archeologist and re-vegetate by broadcasting native grass seed to the area.

4. Incorporate interpretive trail system that connects Virginius Island, the Shenandoah Pulp Mill, the Rifle Factory Ruins and the River Access Parking Lot. (See page 241 for discussion of paving material options). Wayside exhibits should include the themes of Robert Harper, John Hall, Hall’s Rifle Works, the U.S. Rifle Factory and the Civil War supply base. Trails should be uniform and consistent in design.

5. Delineate Modernization Period Rifle Factory buildings as located in the archeological explorations from the 1960s. Remove all understory vegetation within the footprint of the foundation and for a minimum of four feet in all directions surrounding the foundations creating an herbaceous buffer zone. Trees within this buffer zone should be carefully reviewed with a landscape architect, natural resource specialist and archeologist. Any trees identified by the resource specialists as a hazard to the ruins, invasive or diseased should be carefully removed under proper supervision. Plant the
herbaceous buffer zone with low or mowable native grasses and maintain on a cyclic preservation maintenance schedule.

6. Re-establish native herbaceous understory to areas outside the foundation buffer zones. Vegetation planted should be from the riparian forest community native to this region. Recommended plants are provided on page 242.

7. Provide viewing area at Turbine Pit; include appropriate barrier system along embankment edge for safety (Fig. 114). Include wayside to exhibit of how the turbines were used to assist in providing waterpower to the workshops.

8. Maintain riparian forested buffer/wetland along the upriver (or west) boundary of Rifle Factory Area.

Medium Term Treatment Tasks

1. Stabilize and maintain any visible foundation ruins and maintain as part of a cyclic preservation maintenance program.

2. Maintain entire Rifle Factory Area from Lake Quigley Wall to the Shenandoah Canal in a park-like setting with canopy trees and rough mowed lawn (meadow).

3. Delineate location of historic sluiceways.

Long Term Treatment Tasks

1. Construct a Rifle Factory ruins viewing platform and side ramps at historic factory entrance at the 1820 arch stone bridge location. The platform would be located at the center of the historic road that ran parallel with and in front of the Rifle Factory workshops. Ramps could then be constructed to provide universal accessibility to the Rifle Factory grounds (See Map 11: Treatment Plan: Rifle Factory Detail).

2. Visually delineate Rifle Factory building outlines to clearly identify the location of each workshop.
Alternatives:

a. Connect visible ruin walls and corners with stone or brick set at grade. Fill interior of factory workshop with crushed aggregate or other material per approval of archeologist and landscape architect.

b. Complete the structure outline by connecting the exposed ruins with low (18-24” high) walls of brick and stone. Fill interior of factory workshop with crushed aggregate or other material per approval of archeologist and landscape architect.

FIGURE 111: RIFLE FACTORY AREA A: REPLACE UNDERSTORY WITH NATIVE GRASSES AND SELECTIVELY THIN CANOPY TREES. (NCR CLP 2009)
FIGURE 112: INTERNAL EXISTING TRAIL (NCR CLP 2009).

FIGURE 113: INTERNAL EXISTING TRAIL WITH LOG EDGING (NCR CLP 2009).

FIGURE 114: TURBINE PIT RUIN (NCR CLP 2009).

FIGURE 115: DETAIL OF TURBINE PIT RUIN (NCR CLP 2009).

FIGURE 116: RIFLE FACTORY WORKSHOP FOUNDATION RUINS (NCR CLP 2009).

FIGURE 117: RIFLE FACTORY FOUNDATION RUINS (NCR CLP 2009).
FIGURE 118: RUIN TREATMENT OPTION: DELINEATE WITH GRAVEL FILL FOR ENTIRE FOOTPRINT (NCR CLP 2009).


FIGURE 120: SELECTIVELY REMOVE TREES WITHIN WORKSHOP FOOTPRINT, NON-HARMING TREES MAY REMAIN (NCR CLP 2009).

FIGURE 121: RUIN TREATMENT OPTION: STONE DELINEATION WITH GRAVEL FILL, INSIDE FOOTPRINT RECESSED (M. JOSEPH 1997).

FIGURE 122: MAINTAIN FORESTED RIPARIAN WETLAND ALONG WESTERN BOUNDARY OF CHARACTER AREA (NCR CLP 2009).
FIGURE 123: RUIN TREATMENT OPTION DETAILS (NCR CLP 2009).
Shenandoah Pulp Mill

The treatment goals for this area would be to preserve the remaining ruins of the Shenandoah Pulp Mill and Lake Quigley Wall and provide interpretive opportunities focused on the post-war industrial era of Harpers Ferry.

Short Term Treatment Tasks

a. Remove all vegetation from the pulp mill under the supervision of a historic architect and maintain free of vegetation with a cyclic preservation maintenance program.

b. A stabilization project is a high priority for the preservation of Shenandoah Pulp Mill; which is the largest scale ruin in Harpers Ferry NHP. All treatments shall be developed under consultation with a historical architect and archeologist to assure protection and preservation of existing ruins.

c. Remove all vegetation from Lake Quigley Wall under the supervision of a historic architect and maintain free of vegetation with a cyclic preservation maintenance program.

d. A stabilization project is a high priority for the preservation of the Lake Quigley Wall. The stone wall is 350 feet long before the breach and has 240 feet of breached or dismantled wall remnants. It is approximately 14 feet tall.

e. Improve existing accessible route from Lower Town Bus Depot to Halls Island. This route currently connects through Virginius Island; improve and maintain existing trails that connect to Virginius Island trails and provide accessible route to lower portion of the Shenandoah Pulp Mill. (Map 9)

f. Bridge over stone debris from the Lake Quigley Wall breach opening. Construct a bridge with metal grate decking and wood structural members (Fig. 131) to provide a safe crossing of the stone debris while maintaining a view of the stones below foot. Bridge framing and footings need to be carefully located with advisement from archeologist.
Medium Term Treatment Tasks

a. Design and develop a viewing platform adjacent to the existing pull-off at the pulp mill to include improved interpretive signage. Design should be simple, with limited impact on the landscape that does not detract attention from the pulp mill.

b. Develop low boardwalk adjacent to the Pulp mill (along the upriver side) and construct steps from the Pulp mill pull-off. Steps could be constructed out of stone, similar to other stone steps in Harpers Ferry NHP. Handrails along stairs should be simple pipe rails that meet the Architectural Barriers Act (ABA) standards. Care should be taken to minimize any visual and structural impacts to the Pulp mill or canal wall remnants.
FIGURE 128: EXISTING TRAIL AT PULP MILL TRAVERSES STONE REMNANTS (NCR CLP 2009).

FIGURE 129: REPLACE EXISTING PULP MILL TRAIL WITH LOW BOARDWALK (COURTESY OF WICKCRAFT WALKWAYS).

FIGURE 130: PRESERVE LAKE QUIGLEY WALL RUNS (NCR CLP 2009).

FIGURE 131: RE-DIRECT VISITORS FROM WALL BREACH & CONSTRUCT BRIDGE OVER STONE REMNANTS (NCR CLP 2009).

FIGURE 132: STABILIZE & REMOVE VEGETATION FROM WALL (NCR CLP 2009).
Zone II Recommendations

Rifle Factory Area B

The goal of this area would be to preserve any potential archeological resources, perform strategic archeological investigations while preserving and enhancing the riparian forest as a vegetated buffer between the main portion of Halls Island and the Shenandoah River.

Short Term Treatment Tasks

1. Preserve and enhance as needed the existing riparian vegetation along the Shenandoah River. In consultation with a Natural Resource Specialist, develop an invasive species removal management plan and maintain as part of a cyclic maintenance program.

2. Maintain views to Kagi Rock in the Shenandoah River and incorporate wayside exhibit to tell the story of Halls Island’s involvement in John Brown’s Raid.

Long Term Treatment Tasks

1. Additional archeological investigations including geophysical surveys such as ground penetrating radar should be completed based on findings in the CLR and targeted toward locating foundation ruins from the Hall’s Rifle Works.
CSX Railroad

The treatment goals for this area would be to preserve the historic alignment and use of railroad.

Short Term Treatment Tasks

1. Preserve any existing habitat for the rare plant species *Maianthemum stellatum*, starry false solomon’s seal.

2. Preserve historical alignment of CSX Railroad.

3. Preserve historic railroad bridge abutment walls. Remove any vegetation from the walls, provide stabilization as needed under the supervision of a historic architect, and maintain in a cyclic maintenance program.

4. Limit use of CSX service road within project boundary to service access by NPS and CSX personnel. Do not promote any use of this road for pedestrian access to Halls Island. Limit any future expansion of the service road so it does not exceed its current width. Review current agreement of the service easement with CSX and verify the terms concur with the above.
Zone III Recommendations

Riparian Forest

The treatment of this area focuses on preservation and enhancement of the existing riparian forest while establishing vegetation in areas once impacted by the construction of the Highway 340 Bridge.

Short Term Treatment Tasks

1. Preserve and enhance as needed, the existing riparian vegetation along the Shenandoah River. In consultation with a Natural Resource Specialist, develop an invasive species removal management plan and maintain as part of a cyclic maintenance program.

2. Refrain from formalizing existing informal trails or adding more within the riparian zone.
   a. An exception should be made for the area adjacent to the Highway 340 Bridge. Develop a proper trail to provide a single access point to the river from the River Access Parking Lot.
   b. Plans should be developed to encourage any off-loading of boats in specified areas determined by park staff.

3. Develop Vegetation Plan to regenerate riparian forest at the location of the old Highway 340 Bridge.

4. Cooperate with law enforcement rangers to periodically monitor riparian zone for unauthorized activities which may impact trails and vegetation.
River Access Parking Lot and Highway 340 Bridge

The treatment for this area accepts the contemporary uses for this area and focuses on providing vegetative buffers to help soften and screen the more utilitarian uses. Additional recommendations focus on improving the River Access Parking Lot for universal accessibility.

Short Term Treatment Tasks

1. Upgrade stairs from parking lot to meet ABA standards for handrails. Preserve and maintain stone steps in a level and secure manner free and clear of vegetation.

2. Preserve and maintain existing trees along perimeter of parking lot.
3. Maintain a minimum 3’ mowed edge around parking lot; where possible provide 6’. Include in cyclic maintenance program.

4. Provide an accessible route from parking lot to Shoreline Drive. Provide crosswalk across Shoreline Drive to corner of Halls Island and tie into accessible route along Shenandoah Street.

5. Maintain trees on east side of parking lot with native grasses as groundcover. Grass selection should be low growing or able to withstand mowing.

6. Preserve and maintain buffer planting on west and south boundaries with native woodland vegetation.

7. Maintain parking lot without curb and gutters.
FIGURE 144: MAINTAIN EXISTING PARKING LOT WITH NO CURB & GUTTER (NCR CLP 2009).

FIGURE 145: MAINTAIN BUFFER PLANTING AT PARKING LOT PERIMETER (NCR CLP 2009).

FIGURE 146: UPGRADE HANDRAILS TO MEET ABA ACCESSIBILITY STANDARDS (NCR CLP 2009).

FIGURE 147: PROVIDE ACCESSIBLE WALK FROM PARKING LOT TO SHENANDOAH STREET (NCR CLP 2009).
# Paving Materials

<table>
<thead>
<tr>
<th>Feature</th>
<th>Material</th>
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<tbody>
<tr>
<td><strong>Historic Roads</strong></td>
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<tr>
<td>Shenandoah Street</td>
<td>Short Term: Blacktop Asphalt</td>
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<tr>
<td></td>
<td>Long Term: Historic Macadam</td>
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<tr>
<td><strong>Contemporary Roads &amp; Parking</strong></td>
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<tr>
<td>Shoreline Drive</td>
<td>Blacktop Asphalt</td>
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<tr>
<td>River Access Parking Lot</td>
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<tr>
<td>CSX Service Drive</td>
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<tr>
<td><strong>Primary Pedestrian Sidewalks</strong></td>
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<tr>
<td>Shenandoah Street Sidewalk</td>
<td>Short Term: Compacted Crushed Aggregate *</td>
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<td></td>
<td>Long Term: Buff Colored Concrete</td>
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<tr>
<td><strong>Secondary Pedestrian Paths</strong></td>
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<tr>
<td>Internal interpretive trails</td>
<td>Compacted Crushed Aggregate *</td>
</tr>
<tr>
<td><strong>Tertiary Pedestrian Paths</strong></td>
<td></td>
</tr>
<tr>
<td>Non-interpretive trails</td>
<td>Compacted sandy base with bonding agent *</td>
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</tbody>
</table>

*All or a portion of these paths must meet minimum standards for universal accessibility as outlined below.

## Universal Accessibility

The primary pedestrian sidewalks should be improved and maintained to fully meet the ABA standards for universal accessibility of outdoor facilities. A minimum of 30-40% of the internal interpretive trails and the non interpretive trails should be improved and maintained to meet ABA standards for universal accessibility. However, all waysides and exhibits should be incorporated into the universally accessible portions of the interpretive path. Additional guidelines for trails and outdoor access routes are provided in Appendix B.
**Stabilizer Materials**

The park should continue to explore and experiment with new and improved materials for stabilizing aggregates and compacted sandy base material for trails. These materials should be tested in floodplain areas and assessed based on installation costs, maintenance intervals (short and long-term costs), ability to meet ABA guidelines and ability to withstand erosion within a flood prone area. The secondary and tertiary pedestrian path materials should be considered for use on trails at Halls Island based on the results from this testing phase.

**Vegetation Standards**

The predominant existing vegetation on Halls Island is a native riparian forest with limited exotic species in the canopy but substantial invasive and exotic herbaceous species in the understory. The forest is classified as Piedmont / Central Appalachian Rich Floodplain Forest and new plantings should enhance this community by selecting species from the following lists. All planting plans should be developed by a landscape architect with review by the natural resources specialist.

**Trees**

- *Acer negundo*  
  Box elder
- *Carya cordiformis*  
  bitternut hickory
- *Celtis occidentalis*  
  common hackberry
- *Fraxinus pennsylvanica*  
  green ash
- *Juglans nigra*  
  black walnut
- *Liriodendron tulipifera*  
  tulip poplar
- *Platanus occidentalis*  
  American sycamore
- *Quercus shumardii*  
  shumard oak
- *Ulmus Americana*  
  American elm

**Shrubs**

- *Lindera benzoin*  
  northern spicebush

**Vines**

- *Parthenocissus quinquefolia*  
  Virginia creeper
- *Vitis vulpine*  
  frost grape
**Herbaceous Groundcovers**

- *Asarum canadense*: Canadian wild ginger
- *Chaerophyllum procumbens*: spreading chervil
- *Claytonia virginica*: Virginia springbeauty
- *Dicentra Canadensis*: squirrel corn
- *Erythronium americanum*: yellow trout-lily
- *Floerkea proserpinacoides*: false mermaidweed
- *Hydrophyllum canadense*: blunleaf waterleaf
- *Mertensia virginica*: Virginia bluebells
- *Osmorhiza longistylis*: longstyle sweetroot
- *Packera aurea aka. Senecio aureus*: golden ragwort
- *Phlox divaricata*: woodland phlox
- *Podophyllum peltatum*: mayapple
- *Ranunculus abortivus*: littleleaf buttercup
- *Sanicula odorata aka Sanicula gregaria*: clustered blacksnakerooot
- *Viola striata*: striped cream violet

**Grasses**

From habitat description of Piedmont/Central Appalachian Rich Floodplain Forest

- *Leersia oryzoides*: Rice Cutgrass
- *Festuca subverticillata*: nodding fescue
- *Carex grisea*: woody gray sedge
- *Carex jamesii*: James’ sedge

From Virginius Island CLR

- *Agrostis alba*: Redtop Agrostis
- *Elymus virginicus*: Virginia Wild Rye
- *Fesue rubra*: red fescue
- *Panicum virgatum*: switch grass
1 GMP/ EIS, 18.
2 GMP/ EIS, 78
3 Ibid.
Maintain buffer planting around parking lot.

Improve trail from Halls Island to Harpers Ferry Visitor Center.

CSX Service Yard, below U.S. 340 Bridge maintain & enhance vegetative screening.

Existing river access trails, monitor and formalize trails as necessary to minimize disturbances to natural resources.

Supplement buffer planting to encourage re-vegetation.

Riparian Forest
Preserve and enhance as needed with native riparian vegetation.

Vegetative Buffer
Supplement buffer planting to encourage re-vegetation.

Vegetative Buffer
Preserve and enhance as needed with native riparian vegetation.

Shenandoah Street

Rifle Factory Detail Area

U.S. 340

Shenandoah Canal

Rifle Factory Boundary

Contour

Rifle Factory Boundary

Tree Canopy

Specimen Tree

Post & Chain Fence

Timber Guardrail

Existing Trail

Proposed Trail

Proposed Walk/Accessible Route

Tree Thinned Vegetation

National Park Service
National Capital Region
Cultural Landscapes Program
www.nps.gov/crlc

SOURCES
1. 2009 GIS Basemap/ T. Stidham
2. Survey of Virginia Island, 1980
3. Aerial photograph, 2007
4. Archeological and Topographic Basemap, 1962
5. Field Measurements/Observations, NCR CLP, 2009

DATE
September 20, 2010

DRAWN BY
National Park Service, D. Poss
National Capital Region/ Cultural Landscapes Program
Illustration/Photoshop CS4 / ACAD 2008 / Google SketchUp

LEGEND

Road

Railroad

Building

Contours

Rifle Factory Boundary

Tree Canopy

Specimen Tree

Post & Chain Fence

Timber Guardrail

Existing Trail

Proposed Trail

Proposed Walk/Accessible Route

Tree Thinned Vegetation

Cultural Landscape Report
Halls Island/
U.S. Rifle Factory
Harpers Ferry National
Historical Park
Harpers Ferry, West Virginia

Cultural Landscape
Treatment Plan

Map 10 of 13
Cultural Landscape Report
Halls Island /
U.S. Rifle Factory
Harpers Ferry National
Historical Park
Harpers Ferry, West Virginia

Cultural Landscape Treatment Plan:
Rifle Factory Detail

SOURCES
1. 2009 GIS Basemap / T. Stidham
2. Survey of Virginia Island, 1980
3. Aerial photograph, 2007
4. Archeological and Topographic Basemap, 1962
5. Field Measurements / Observations, NCR CLP, 2009

DRAWN BY
National Park Service, D. Poss
National Capital Region / Cultural Landscapes Program
Illustrator / Photoshop CS4 / ACAD 2008 / Google SketchUp

DATE
September 20, 2010

LEGEND
Road
Railroad
Canal River
Contours
Rifle Factory Boundary
Tree Canopy
Specimen Tree
Historic Tree
Selectively Thinned Trees
Post & Chain Fence
Timber Guardrail
Existing Trail
Proposed Trail
Proposed Walk/ Accessible Route
Selectively Thinned Vegetation

Shenandoah Street
Harpers Ferry National Historical Park
U.S. Rifle Factory Detail

Proposed Walk/ Accessible Route - 3’ improved pedestrian walk, stabilized crushed slate or buff colored concrete
Stabilize & preserve 1850 Shenandoah Canal wall remnants (for reference)
Proposed crosswalk at bus stop
Proposed bus stops, both sides of Shenandoah Street
Shenandoah Canal wall remnants

Modernization Period sluiceway
Location of Rifle Factory perimeter fence (Modernization Period)
Supplement buffer with native vegetation, include trees, shrubs & groundcovers to screen CSX service yard
Maintain CSX service road access, limit to service vehicles only

Proposed crosstown walk from parking to Halls Island entrance, buff color concrete
Preserve historic sycamore

Preserve and enhance as needed with native riparian vegetation,
protect archeological resources

Preserve historic sycamore

Proposed bus stops, both sides of Shenandoah Street
Shenandoah Canal wall remnants

Shenandoah Canal
Remove understory vegetation, replace with native grasses

Rifle Factory Area A
Stabilize & preserve Lake Quigley wall ruins
Stabilize & preserve Rifle Factory workshop remnants
Proposed bridge over breach in Quigley wall
Continue trail to Timberline

Rifle Factory Area B
Stabilize & preserve railroad bridge foundation wall remnants
Proposed bridge over breach in Quigley wall

Proposed crosstown walk from parking to Halls Island entrance, buff color concrete

Shenandoah Canal

River Access Parking Lot

Vegetative Buffer
Supplement buffer with native vegetation, include trees, shrubs & groundcovers to screen CSX service yard

Vegetative Buffer
Supplement buffer with native vegetation, include trees, shrubs & groundcovers to screen CSX service yard

Ramp down to interpretive trail

Accessible walk from parking to Halls Island entrance, buff color concrete

Stabilize & preserve all visible Rifle Factory foundation ruins
Delineate footprints of Rifle Factory workshops

Appalachian Trail

Map 11 of 13
DWG# 385_41086

National Park Service
National Capital Region
Cultural Landscapes Program
www.nps.gov/norco
Treatment Plan: Shenandoah Pulp Mill Detail Area

Shenandoah Canal
- Remove invasive vegetation & replace with low native grasses
- 3' Crushed shale interpretive trail

Shenandoah Pulp Mill
- Overlook with views to Shenandoah Canal & Shenandoah Pulp Mill
- Boardwalk to Boiler House ruins
- Boardwalk built low to ground to protect remnant stones and provide even walking surface
- 3' Crushed shale interpretive trail

Shenandoah Street
- Pedestrian walk
- 5' Stone steps with pipe handrail

Location of Rifle Factory
- Boundary
- Timber guardrail
- Post & chain fence
- Perimeter fence

Boiler House Ruins
- Stabilize & Preserve

Delineate footprint of 1853 Stock House & 1819 Blacksmith Shop
- Remove invasive understory vegetation & replace with low native grasses

Legend:
- Road
- Canal/ River
- Railroad
- Structural Ruin
- Tree Canopy
- Post & Chain Fence
- Timber Guardrail
- Existing Trail
- Proposed Trail
- Proposed Accessible Route
- Overlook with views to Shenandoah Canal & Shenandoah Pulp Mill
- Redirect Accessible Route - 3' Improved Pedestrian Walk, Stabilized Crushed Shale or Buff Colored Concrete
- 1860 Shenandoah Canal wall outline (for reference)

Sources:
1. 2009 GIS Basemap / T. Stidham
2. Survey of Virginia Island, 1980
3. Aerial photograph, 2007
4. Archeological and Topographic Basemap, 1962
5. Field Measurements / Observations, NCR CLP, 2009

Map 12 of 13

Cultural Landscape Report
Halls Island/
U.S. Rifle Factory
Harpers Ferry National
Historical Park
Harpers Ferry, West Virginia

DATE: September 20, 2010

DRAWN BY:
National Park Service, D. Poss
National Capital Region / Cultural Landscapes Program
Illustrator / Photoshop CS4 / ACAD 2008 / Google SketchUp

Scale: 1" = 20'
Cultural Landscape Report
Halls Island/
U.S. Rifle Factory
Harpers Ferry National
Historical Park
Harpers Ferry, West Virginia

SITE SECTIONS

SOURCES
1. 2009 GIS Basemap / T. Stidham
2. Survey of Virginius Island, 1980
3. Archeological and Topographic Basemap, 1962
4. Field Measurements / Observations, NCR CLP, 2009

DRAWN BY
National Park Service
D. Poss
National Capital Region / Cultural Landscapes Program
Illustrator / Photoshop CS4 / ACAD 2008

DATE
September 20, 2010

SECTION THRU HALLS ISLAND
SCALE: 1" = 40'-0"

OVERLOOK AT TURBINE PIT
SCALE: 1" = 10'-0"
BIBLIOGRAPHY

Published Sources


Unpublished Studies


Public Documents


Websites


Manuscript Materials

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Records of the Office of the Secretary of War. Record Group 107, National Archives.
Records of the Public Buildings Service. Record Group 121, National Archives.
Records of the Office of Judge Advocate General. Record Group 153, National Archives.
Records of the Office of the Chief of Ordnance. Record Group 156, National Archives.
Records of the United States General Accounting Office. Record Group 217, National Archives.

Newspapers

Virginia Free Press (Harpers Ferry, Va. [W.Va.]), 1824-1827.
Virginia Free Press & Farmers' Repository (Charlestown, Va. [W. Va.]) 1827-1832.
Farmers Advocate (Charles Town, Va. [W.Va.]), 1890-1948.
Baltimore Sun (Baltimore, Md.), 1961.

Maps


USDA-NRCS, Lincoln, Nebr.
Key Historic Maps

1807  Plat of Halls Island. Records of the Chief of Engineers, Record Group 77, College Park, Md.: National Archives.

1803  Plan and Section of the Canal at the lower falls of the Shenandoah. by N. King & L. Harbaugh. College Park, Md.: National Archives, RG 79, C&O Canal.


1834  A Plot Exhibiting the limits of the grounds requisite for the passage of the W&P RR through the Islands, adjacent to Harpers Ferry. Map C. College Park, Md.: National Archives: RG 77, Fortifications Map File.


1925  The Harpers Ferry Paper Company. Harpers Ferry, W.Va.: Harpers Ferry NHP Map Collection, Lockwood House.

Appendix A: Building Chronology Spreadsheet
### Hall Rifle Works & U.S. Rifle Factory Building Chronology

#### Prehistory - 1818

<table>
<thead>
<tr>
<th>CLR Map #</th>
<th>Date Built</th>
<th>Demo</th>
<th>Building/ Name</th>
<th>Size</th>
<th>Stories</th>
<th>Materials</th>
<th>Additions</th>
<th>Arch/ Superintendent</th>
<th>Use/ Machinery</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1807</td>
<td></td>
<td>Shenandoah Canal</td>
<td>An earth embankment canal w/ 2-sets of locks, upper and lower locks</td>
<td>Potowmack Canal Company</td>
<td>Potowmack Canal Company</td>
<td>Potowmack Canal Company</td>
<td>Potowmack Canal Company</td>
<td>V.I-6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 1819-1843

<table>
<thead>
<tr>
<th>CLR Map #</th>
<th>Date Built</th>
<th>Demo</th>
<th>Building/ Name</th>
<th>Size</th>
<th>Stories</th>
<th>Materials</th>
<th>Additions</th>
<th>Arch/ Superintendent</th>
<th>Use/ Machinery</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1937 c.</td>
<td>1837 c.</td>
<td>Tilt-Hammer Shop</td>
<td>40'x45'</td>
<td>1-Story</td>
<td>Brick</td>
<td>35x25 (1831-32: to Hall)</td>
<td>Stubblefield/ Annin</td>
<td>Armory Workshop: 3 hammers &amp; water wheel by 1821</td>
<td>V.I-10</td>
<td></td>
</tr>
<tr>
<td>1848</td>
<td>1849</td>
<td>Grinding Mill (later called: Bell Shop)</td>
<td>85'x40'</td>
<td>1-Story</td>
<td>Brick / Stone addition</td>
<td>Stubblefield/ Annin</td>
<td>Armory Workshop: 3 hammers &amp; water wheel by 1821</td>
<td>V.I-10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key:** Tilt hammer = Tilt-Hammer Shop; Furnace = Smith Shop
<table>
<thead>
<tr>
<th>1848 Map #</th>
<th>CLR</th>
<th>Date Built</th>
<th>Demo</th>
<th>Building/ Name</th>
<th>Size</th>
<th>Stories</th>
<th>Materials</th>
<th>Additions</th>
<th>Arch/ Superintendent</th>
<th>Use/ Machinery</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1827-28</td>
<td></td>
<td>1827-1833</td>
<td>1861</td>
<td>Captain Hall's Office (storehouse)</td>
<td>30'x35'</td>
<td>2-Story</td>
<td>Stone</td>
<td>1853 Renovation</td>
<td>Hall</td>
<td>Old office for Hall. New storehouse</td>
<td>V.II-42</td>
</tr>
<tr>
<td>1827-28</td>
<td>20</td>
<td>1843 c.</td>
<td></td>
<td>Till-Hammer Shop (Bldg 5, 1833-35 Maps)</td>
<td>45'x45'</td>
<td>1-Story</td>
<td>Most likely Stone</td>
<td>Unknown date for renovations</td>
<td>Roswell Lee Hall</td>
<td>Requested Demolition in May 1866: wanted material to erect small stock house. No evidence to verify this action</td>
<td>V.I-25</td>
</tr>
<tr>
<td>1828</td>
<td></td>
<td>1827-1833</td>
<td>1861</td>
<td>New Dwelling for Captain Hall</td>
<td>Hall Lockwood House location</td>
<td>V.I-29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1828</td>
<td>22</td>
<td>Unknown</td>
<td></td>
<td>Possible workshops built in 1st &amp; 2nd qtr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For use of employees of Rifle Works. Could this be Union Street? Not sure where this is.</td>
<td>V.I-35</td>
<td></td>
</tr>
<tr>
<td>1828</td>
<td></td>
<td>1835</td>
<td></td>
<td>Annealing Furnace</td>
<td>Hall Includes furnace for annealing barrels</td>
<td>V.I-46 / V.I-60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1828 c.</td>
<td>25</td>
<td>Unknown</td>
<td></td>
<td>Filing Shop</td>
<td>Square frame</td>
<td>Hall</td>
<td>V.I-46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1828</td>
<td></td>
<td>1835</td>
<td></td>
<td>Rod Furnace / Rod Tilting Shop</td>
<td>4' wider x 3' higher</td>
<td>Stone</td>
<td>Hall</td>
<td>To increase protection from inundations</td>
<td>V.I-45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1829</td>
<td></td>
<td></td>
<td></td>
<td>&quot;Road&quot; from Rifle Factory up to Camp Hill</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V.I-33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1831</td>
<td>23</td>
<td>Unknown</td>
<td></td>
<td>Charcoal House</td>
<td>Hall</td>
<td>V.I-45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1831</td>
<td>24</td>
<td>1835</td>
<td></td>
<td>Annealing Furnace</td>
<td>Hall</td>
<td>V.I-46 / V.I-60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1831</td>
<td>26</td>
<td>1858 c.</td>
<td></td>
<td>Rod Furnace</td>
<td>Hall Building housing furnace for hardening rods</td>
<td>V.I-46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1831</td>
<td>27</td>
<td>1835</td>
<td></td>
<td>Shed - Annealing</td>
<td>Hall Located in front of old Annealing Furnaces</td>
<td>V.I-46 / V.I-60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1832</td>
<td></td>
<td>1852 c.</td>
<td></td>
<td>Fire Engine House</td>
<td>Hall</td>
<td>V.I-47</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1832</td>
<td></td>
<td></td>
<td></td>
<td>Old Engine House</td>
<td>Hall</td>
<td>V.I-47</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1833</td>
<td>3</td>
<td>1827-1833</td>
<td></td>
<td>Stocker's Shop</td>
<td>Hall</td>
<td>V.I-47</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1834</td>
<td>16</td>
<td>1827-1833</td>
<td></td>
<td>Inspector's Office</td>
<td>Hall</td>
<td>V.I-47</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1834</td>
<td>20</td>
<td>1852 c.</td>
<td></td>
<td>US Dam on Shenandoah River</td>
<td>Completely crossed river</td>
<td>Hall Rust</td>
<td>V.I-47</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1835</td>
<td>18</td>
<td>1849 c.</td>
<td></td>
<td>Drill Shop</td>
<td>50'x17.5'</td>
<td>1-Story</td>
<td>Brick</td>
<td>1851: Repaired slate roof</td>
<td>Hall Rust</td>
<td>V.I-47</td>
<td></td>
</tr>
<tr>
<td>1836</td>
<td></td>
<td>1850</td>
<td></td>
<td>Assembling &amp; Finishing Shop</td>
<td>Completed 1851; stopped by legal battles over water rights</td>
<td>Hall Rust</td>
<td>V.I-47</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1836</td>
<td></td>
<td>1852 c.</td>
<td></td>
<td>Annealing Shop</td>
<td>Brick</td>
<td>Hall Moor</td>
<td>V.I-57 / (V.III-37)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1837</td>
<td>21</td>
<td>1850</td>
<td></td>
<td>Annealing Furnace</td>
<td>Brick</td>
<td>Hall Moor</td>
<td>V.I-57 / (V.III-37)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1837</td>
<td></td>
<td>1852 c.</td>
<td></td>
<td>Rifle Factory Canal</td>
<td>Wide</td>
<td>Earth</td>
<td>W&amp;P Railroad Company</td>
<td>V.I-62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1838</td>
<td></td>
<td>1849 c.</td>
<td></td>
<td>Drill Shop</td>
<td>50'x17.5'</td>
<td>1-Story</td>
<td>Brick</td>
<td>1851: Repaired slate roof</td>
<td>Hall Rust</td>
<td>V.I-47</td>
<td></td>
</tr>
<tr>
<td>1838</td>
<td></td>
<td>1852 c.</td>
<td></td>
<td>River Wall</td>
<td>12' x 6' W x 25' L</td>
<td>Stone</td>
<td>Hall</td>
<td>V.I-47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1838</td>
<td>19</td>
<td>1850</td>
<td></td>
<td>Vitriol Shop (Browning Shop)</td>
<td>20'x22'</td>
<td>2-Story</td>
<td>Brick</td>
<td>Hall Browning Gun Barrels</td>
<td>V.I-73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1839</td>
<td>20</td>
<td>1852 c.</td>
<td></td>
<td>Jobbing Shop for Fitters</td>
<td>25' x 25'</td>
<td>2-Story</td>
<td>Brick</td>
<td>Hall</td>
<td>For Filing parts</td>
<td>V.I-75</td>
<td></td>
</tr>
<tr>
<td>1839</td>
<td>21</td>
<td>1852 c.</td>
<td></td>
<td>Jobbing Shop for Smiths &amp; Spring makers (Forging &amp; Tempering Shop)</td>
<td>25' x 25'</td>
<td>1-Story</td>
<td>Brick</td>
<td>1845: Repaired Furnace Removed before 1856 addition to 1846 Finishing Shop</td>
<td>Hall Smith &amp; Springmakers shop</td>
<td>V.II-77 (V.II-76)</td>
<td></td>
</tr>
<tr>
<td>1839</td>
<td>22</td>
<td>1850</td>
<td></td>
<td>Barrel Welding Shop or Tilt hammer</td>
<td>35' x 20' x 15' H</td>
<td>1-Story</td>
<td>Stone</td>
<td>Hall Lucas</td>
<td>V.II-77</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Buildings Highlighted are not included on 1819-1843 Period Plan or have been included but locations are questionable.
1844-1860 Modernization Period

<table>
<thead>
<tr>
<th>CLR</th>
<th>Date Built</th>
<th>Demo</th>
<th>Building/ Name</th>
<th>Size</th>
<th>Stories</th>
<th>Materials</th>
<th>Additions</th>
<th>Arch/ Superintendent</th>
<th>Use/ Machinery</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1843-44</td>
<td>1861-65 c.</td>
<td>Filers Shop</td>
<td>73' x 24'</td>
<td>1</td>
<td>Masonry with stone basement</td>
<td>Craig</td>
<td>Finishing shop for filers work benches and vices around sides and end.</td>
<td>V.II-4</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>1845 (c.)</td>
<td>1861-65 c.</td>
<td>Repair of fencing at dwelling houses</td>
<td>Yellow pine and chestnut</td>
<td>Symington</td>
<td></td>
<td></td>
<td></td>
<td>V.II-19</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>1845</td>
<td>1861-65 c.</td>
<td>Proof House</td>
<td>19.5' x 12'</td>
<td>Wood with 2.5' thick stone back wall</td>
<td>Craig Plan/ Symington constructed as first building in HAFE</td>
<td></td>
<td></td>
<td>V.II-20</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>1846-48</td>
<td>1861-65 c.</td>
<td>The Finishing and Machine Shop</td>
<td>128' x 35.5' x 25' wings</td>
<td>Center: 2 Cotton Mill: 1</td>
<td>1855 x 25' brick 2-story stone foundation (1856) replaced water wheels (1856)</td>
<td>Symington</td>
<td>Sea-7 Turbine water wheels with cement forebays located in 25' sq wings.</td>
<td>V.II-20/ V.II-74</td>
<td></td>
</tr>
<tr>
<td>148</td>
<td>1848</td>
<td>Shenandoah Canal Walls &amp; Guard Gates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V.II-52</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>1849-51</td>
<td>1861-65 c.</td>
<td>Tilt Hammer and Smiths Shop</td>
<td>110' x 35.5' x 14.5' rear proj.</td>
<td>1-Story</td>
<td>Brick with stone basement</td>
<td>Ammot blocks repaired, 1854. Watch house partitioned off.</td>
<td>Symington</td>
<td>Cast-iron turbine wheel</td>
<td>V.II-27/ V.II-77</td>
</tr>
<tr>
<td>1851</td>
<td>1851</td>
<td>New Main tall race for all shops use</td>
<td>10' w</td>
<td>Covered</td>
<td>Symington</td>
<td>Completed the 223' tail race started in 1847</td>
<td></td>
<td></td>
<td>V.II-52</td>
<td></td>
</tr>
<tr>
<td>1851</td>
<td>1851</td>
<td>Shenandoah Canal: new revetment wall and drain culvert</td>
<td>526 perches</td>
<td>Stone</td>
<td>Symington</td>
<td>It is possible that this culvert was part of the filling in and piping of the old dividing channel???</td>
<td></td>
<td></td>
<td>V.II-53</td>
<td></td>
</tr>
<tr>
<td>1851</td>
<td>1851</td>
<td>Wooden Bridge over Shenandoah Canal</td>
<td>32'</td>
<td>Wood w two new masonry abutments with wing walls</td>
<td>Weather-boarded &amp; frame covered (1856)</td>
<td>Symington</td>
<td>To dwelling houses</td>
<td></td>
<td>V.II-49-51</td>
<td></td>
</tr>
<tr>
<td>1853</td>
<td>1851-52</td>
<td>1861-65 c.</td>
<td>Annealing Furnace and Proof House</td>
<td>60' x 36'</td>
<td>1-Story</td>
<td>Brick with stone foundation</td>
<td>FURNACES enlarged w extensive repairs, 1855</td>
<td>Symington (not building 85 need to locate)</td>
<td></td>
<td>V.II-37/ V.II-78</td>
</tr>
<tr>
<td>1853</td>
<td>1852-53</td>
<td>1861-65 c.</td>
<td>Machine Shop</td>
<td>87.7'x35' x 14'x35' center</td>
<td>Brick with stone foundation and basement</td>
<td>5' counter shafting &amp; fixtures for drawing headgates, 1856</td>
<td>Syminston - last building designed by Symington at Rifle Factory</td>
<td>Included turbine wheel placed in stone wheel pit with new stone cast iron forebay - culvert.</td>
<td>V.II-42/ V.II-78</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>1827-1834</td>
<td>1853 Repair</td>
<td>1861</td>
<td>Repaired Store House</td>
<td>30'x35'</td>
<td>2-Story</td>
<td>Stone</td>
<td>Original structure by Hall / Repair by Hugger</td>
<td>Old office for Hall. New storehouse</td>
<td>V.II-62</td>
</tr>
<tr>
<td>1853</td>
<td>1853</td>
<td>Two Cast-Iron lamp posts w/ lanterns</td>
<td>cast-iron</td>
<td>Huger</td>
<td>Likely located at entrance gate to site?</td>
<td></td>
<td></td>
<td></td>
<td>V.II-64</td>
<td></td>
</tr>
<tr>
<td>1853</td>
<td>1853</td>
<td>8' Cast-iron water pipe, w/ 3 hydrants</td>
<td>300'</td>
<td>cast-iron/ force pump purchased from J.T. Ames of Boston</td>
<td>Huger</td>
<td>Pipe was laid in front of the new workshops, water came from large force pump attached to water wheel inside Machine Shop.</td>
<td></td>
<td></td>
<td>V.II-64</td>
<td></td>
</tr>
<tr>
<td>1853</td>
<td>1853-54</td>
<td>1861-65 c.</td>
<td>Stock House (remodeled structure)</td>
<td>30'x30'</td>
<td>2-Story</td>
<td>Stone</td>
<td>Original structure by 1819 Blairstone Shop</td>
<td>Huger</td>
<td></td>
<td>V.II-61</td>
</tr>
<tr>
<td>1853</td>
<td>1853-54</td>
<td>1861-65 c.</td>
<td>Coal House</td>
<td>21'x25'</td>
<td>1-Story-15'</td>
<td>Brick - covered with sheet iron</td>
<td>Huger</td>
<td>Store charcoal, anthracite and bituminous coal</td>
<td>V.II-63</td>
<td></td>
</tr>
<tr>
<td>1853</td>
<td>1853</td>
<td>Shenandoah Canal: Revetment Wall</td>
<td>409' North/ 224' South</td>
<td>Dry stone wall (6.5' h x 3' thick)</td>
<td>1858-59 Additional wall</td>
<td>Huger</td>
<td>North side of canal was built in 2 sections-both sides of bridge. South side wall was built adjacent to the finishing shop and across the opening of old sluiceway which has been filled up.</td>
<td>V.II-68/ V.II-88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1854c</td>
<td>1854c</td>
<td></td>
<td>Picket Fence</td>
<td>100' panels</td>
<td>post, rail, and picket fence</td>
<td></td>
<td></td>
<td>Constructed to enclose the grounds of Upper Halls Island</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1856-58</td>
<td>1856-58</td>
<td></td>
<td>Perimeter Fence</td>
<td>2,665 LF, 5' W</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1856</td>
<td>1856</td>
<td>perimeter wall</td>
<td>6,823' wall/ 4,895' coping</td>
<td>Dry Stone Wall, heights varied from 1'-6', and thickness: 2'-4'</td>
<td>Clowe</td>
<td>Included substantial excavation &amp; filling. To protect banks from injury by floods, heavy rain &amp; other casualties</td>
<td></td>
<td></td>
<td>V.II-87</td>
<td></td>
</tr>
<tr>
<td>1856</td>
<td>1856</td>
<td>Sunken Road</td>
<td>dirt/ macadam?</td>
<td>Clowe</td>
<td>Road below W&amp;P RR to access Shen. River to obtain sand for bldg. purposes</td>
<td></td>
<td></td>
<td>V.II-82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>1859-60</td>
<td>1861-65 c.</td>
<td>Barrel Drilling and Finishing Shop</td>
<td>57.5' x 49.5'</td>
<td>2-Story</td>
<td>Brick with stone masonry</td>
<td>Barbour Super. Arch style of Symington.</td>
<td>Constructed between and connected the 1853 Machine Shop and the 1851 Hammer and Smith Shop</td>
<td>V.II-70</td>
<td></td>
</tr>
<tr>
<td>1859</td>
<td>1859</td>
<td>Iron Gate</td>
<td>Cast-iron</td>
<td>Barbour</td>
<td>At gateway entrance near factory side of arched bridge</td>
<td></td>
<td></td>
<td>V.II-84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1859</td>
<td>1859-60</td>
<td>Additional yard lights, hydrants &amp; pipes</td>
<td>cast-iron posts/ cast-iron pipes</td>
<td>Barbour</td>
<td></td>
<td></td>
<td></td>
<td>V.II-85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>House #</td>
<td>Built</td>
<td>Demo</td>
<td>Description</td>
<td>Tenants</td>
<td>Rent</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---------</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>155</td>
<td>1807</td>
<td>1848</td>
<td>wood, 1-Story, Class 13, $200</td>
<td>Leonard Harbaugh</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>156</td>
<td>1819-34 c.</td>
<td>1864 c.</td>
<td>22'x16'', Brick 2-Story, Class 7, $1000 (1848) Class 6, $800 (1850)</td>
<td>William Richards, Armorer (1848-1852)</td>
<td>$72 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>157</td>
<td>1819-34 c.</td>
<td>1854?</td>
<td>28'x30', Wood 2-Story, Class 10, $400 (1848) Class 5, $450 (1850), Class 9, $450 (1852)</td>
<td>William Baden, Watchman (1848-1850) J.G.W. Hyatt (1851-1852)</td>
<td>$35 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>158</td>
<td>1819-34 c.</td>
<td>1864 c.</td>
<td>28'x28', Brick (or Stone) 2-Story, Class 5, $1000 (1848) Class 5, $900 (1850)</td>
<td>James W. Burton, Master Armorer (1848-1849) A.J. Amiss (1850) John Earnest (1851-1852)</td>
<td>$75 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>159</td>
<td>1819-34 c.</td>
<td>1854?</td>
<td>14'x18', Stone 2-Story, Class 6, $200 (1848), Class 13, $200 (1852)</td>
<td>J.G.W. Hyatt (1850) Austin McCann (1851-1852)</td>
<td>$35 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>1819-34 c.</td>
<td>1854?</td>
<td>28'x18', Stone 1-Story, Class 15, $100 (1848) Class 12, $250 (1850)</td>
<td>William F. Fitzsimmons (1848-1850) Joseph Mauzy (1851)</td>
<td>$30 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>161</td>
<td>1819-34 c.</td>
<td>1854?</td>
<td>14'x20', Stone 1-Story, Class 11, $500 (1848) Class 13, $200 (1850)</td>
<td>William Orm, Armorer (1848-1852)</td>
<td>$35 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>162</td>
<td>1819-34 c.</td>
<td>1850</td>
<td>38'x18', Wood 1-Story, Class 8, $500 (1850)</td>
<td>Lawson &amp; Greer (Pre 1848) (owed $119.50 back rent) William Clark (1848) (owed $24.37 back rent)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>163</td>
<td>1819-34 c.</td>
<td>1854?</td>
<td>56'x22' (includes house 164), 1-Story Wood, Class 9, $450 (1848) Class 11, $300 (1850)</td>
<td>William Graham (1848-1850) George Cockrell (1851)</td>
<td>$38 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>164</td>
<td>1819-34 c.</td>
<td>1848</td>
<td>2-Story Brick, Class 2, $2500 (1848) Broken up in 1848</td>
<td>John Rowe (1848-1850) Peter Woodhall, Armorer (1850-1852)</td>
<td>$35 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>165</td>
<td>1819-34 c.</td>
<td>1854?</td>
<td>18'x16', 1-Story Stone, Class 9, $450 (1848) Class 11, $300 (1850)</td>
<td>John Earnest, Armorer (1848-1850) Henry Fassett (1851)</td>
<td>$35 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>166</td>
<td>1819-34 c.</td>
<td>1854?</td>
<td>26'x16', Stone 1-Story, Class 9, $450 (1848) Class 11, $300 (1850)</td>
<td>John Earnest, Armorer (1848-1850)</td>
<td>$35 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>167</td>
<td>1819-34 c.</td>
<td>1850</td>
<td>Stone 1-Story, Class 9, $450</td>
<td>Philip Burkhart, Armorer (1848-1852)</td>
<td>$60 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>168</td>
<td>1819-34 c.</td>
<td>1864</td>
<td>36'x18', Stone 2-Story, Class 5, $1000 (1848) Class 6, $800 (1850)</td>
<td>Philip Burkhart, Armorer (1848-1852)</td>
<td>$60 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>169</td>
<td>1819-34 c.</td>
<td>1854?</td>
<td>Wood 1-Story, Class 7, $600 (1848) Class 9, $450 (1850)</td>
<td>Thomas Nargin (1848-1850) Charles Holt (1851-1852)</td>
<td>$48 Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Dimensions taken from 1834-35 W&P RR Plans
* Data from Philip R. Smith, Jr., Historic Building Site Survey Report: History of the Upper Hall Island, Harpers Ferry 1796-1884, (HFR 258) and Charles W. Snell, A Comprehensive History of the Construction, Maintenance and Numbers of Armory Dwelling Houses, 1796-1869

1819 3 dwelling houses built
Appendix B: ABA Guidelines
ARCHITECTURAL BARRIERS ACT

Draft Final Accessibility Guidelines for Outdoor Developed Areas

Viewing Areas

Viewing areas are defined in F106.5 as an outdoor space developed for viewing a landscape or point of interest such as a mountain range, a valley, or a waterfall.

Viewing areas on trails are addressed in the scoping provisions for trails in F247.5.1 and are discussed under Trails. All other viewing areas are addressed in the scoping provisions in F246.

The scoping provisions require each distinct viewing location within a viewing area to comply with the technical provisions in 1015, including clear ground space, turning space, and unobstructed view. A conditional exception is added to the technical provisions for viewing areas and is discussed under Conditional Exceptions. An exception is added to 1015.3 that permits guardrails and other safety barriers to obstruct the view. Advisory 1015.3 recommends using see-thru panels or screened openings to create an unobstructed view where guardrails or other safety barriers are provided.

The scoping provisions require at least 20 percent of each type of outdoor constructed feature provided within a viewing area to be accessible. The scoping provisions also require an outdoor recreation access route to connect accessible parking spaces or other site arrival points to the accessible outdoor constructed features, elements, spaces, and facilities within the viewing area.

Outdoor Recreation Access Routes

The scoping provisions for outdoor recreation access routes are contained in the scoping provisions for camping facilities, picnic facilities, viewing areas, and trailheads. The scoping provisions are discussed under the Summary of Provisions for those facilities. Outdoor recreation access routes can only be provided at these facilities. Where a roadway serves as the general circulation path for pedestrians at these facilities, the outdoor recreation access route can be provided within the roadway. Outdoor recreation access routes are not required where camping facilities, picnic facilities, viewing areas, or outdoor constructed features are provided on trails.

1016 Outdoor Recreation Access Routes

1016.1 General. Outdoor recreation access routes shall comply with 1016.

EXCEPTIONS: 1. In alterations to existing camping facilities, picnic facilities, and trailheads where a condition in 1019 does not permit full compliance with a specific requirement in 1016 on a portion of an outdoor recreation access route, that portion of the outdoor recreation access route shall comply with the specific requirement to the maximum extent feasible.
2. At viewing areas, where a condition in 1019 does not permit full compliance on a portion of an outdoor recreation access route with a specific requirement in 1016, that portion of the outdoor recreation access route shall comply with the specific requirement to the maximum extent feasible.
3. Where outdoor recreation access routes are provided within vehicular ways, outdoor recreation access routes shall not be required to comply with 1016.4, 1016.7, and 1016.8.

1016.2 Surface. The surface of outdoor recreation access routes and their related passing spaces and resting intervals shall be firm and stable.

Advisory 1016.2 Surface. A stable surface remains unchanged by applied force so that when the force is removed, the surface returns to its original condition. A firm surface resists deformation by indentations.

1016.3 Clear Width. The clear width of outdoor recreation access routes shall be 36 inches (915 mm) minimum.
**EXCEPTION:** The clear width shall be permitted to be reduced to 32 inches (815 mm) minimum for a length of 24 inches (610 mm) maximum provided that reduced width segments are separated by segments that are 48 inches (1220 mm) long minimum and 36 inches (915 mm) wide minimum.

**1016.4 Passing Spaces.** Outdoor recreation access routes with a clear width less than 60 inches (1525 mm) shall provide passing spaces complying with 1016.4 at intervals of 200 feet (61 m) maximum. Passing spaces and resting intervals shall be permitted to overlap.

Advisory 1016.4 Passing Spaces. Entities should consider providing either a 60 inches (1525 mm) minimum clear width on outdoor recreation access routes, or passing spaces at shorter intervals if the clear width is less than 60 inches (1525 mm), where an outdoor recreation access route is:

- Heavily used;
- Adjoins outdoor constructed features that are heavily used;
- A boardwalk; or
- Not at the same level as the ground surface adjoining the outdoor recreation access route.

**1016.4.1 Size.** The passing space shall be either:

1. A space 60 inches (1525 mm) minimum by 60 inches (1525 mm) minimum; or
2. The intersection of two outdoor recreation access routes providing a T-shaped space complying with 304.3.2 where the base and the arms of the T-shaped space extend 48 inches (1220 mm) minimum beyond the intersection. Vertical alignment at the intersection of the outdoor recreation access routes that form the T-shaped space shall be nominally planar.

**1016.5 Obstacles.** Obstacles on outdoor recreation access routes and their related passing spaces and resting intervals shall comply with 1016.5.

**1016.5.1 Concrete, Asphalt, or Boards.** Where the surface is concrete, asphalt, or boards, obstacles shall not exceed ½ inch (13 mm) in height measured vertically to the highest point.

**1016.5.2 Other Surfaces.** Where the surface is other than specified in 1016.5.1, obstacles shall not exceed 1 inch (25 mm) in height measured vertically to the highest point.

Advisory 1016.5 Obstacles. The vertical alignment of joints in concrete, asphalt, or board surfaces can be obstacles. Natural features such as tree roots and rocks on outdoor recreation access routes can also be obstacles. Where an outdoor recreation access route is provided within a vehicular way, traffic calming devices can be obstacles. Where possible, obstacles on outdoor recreation access routes should be separated by a distance of 48 inches (1220 mm) minimum so persons who use wheelchairs can maneuver around the obstacles.

**1016.6 Openings.** Openings in the surface of outdoor recreation access routes and their related passing spaces and resting intervals shall comply with 302.3.

Advisory 1016.6 Openings. Spaces between the boards in a boardwalk and drainage grates are examples of openings. Where possible, drainage grates should be located outside the minimum clear width of the outdoor recreation access route.

**1016.7 Slopes.** The slopes of outdoor recreation access routes shall comply with 1016.7.

**1016.7.1 Running Slope.** The running slope of any segment of an outdoor recreation access route shall not be steeper than 1:10. Where the running slope of a segment of an outdoor recreation access route is steeper than 1:20, the maximum length of the segment shall be in accordance with Table 1016.7.1, and a resting interval complying with 1016.8 shall be provided at each end of the segment.

**Table 1016.7.1 Running Slope and Resting Intervals**
### Appendix B

#### Running Slope of Segment of Outdoor Recreation Access Route

<table>
<thead>
<tr>
<th>Steeper than</th>
<th>But not Steeper than</th>
<th>Maximum Length of Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:20</td>
<td>1:12</td>
<td>50 feet (15 m)</td>
</tr>
<tr>
<td>1:12</td>
<td>1:10</td>
<td>30 feet (9 m)</td>
</tr>
</tbody>
</table>

**Advisory 1016.7.1 Running Slope.** Running slope can also be expressed as a percentage (grade).

#### 1016.7.2 Cross Slope.  The cross slope shall comply with 1016.7.2.

#### 1016.7.2.1 Concrete, Asphalt, or Boards.  Where the surface is concrete, asphalt, or boards, the cross slope shall not be steeper than 1:48.

#### 1016.7.2.2 Other Surfaces.  Where the surface is other than specified in 1016.7.2.1, the cross slope on other surfaces shall not be steeper than 1:33.

#### 1016.8 Resting Intervals.  Resting intervals shall comply with 1016.8.

#### 1016.8.1 Length.  The resting interval length shall be 60 inches (1525 mm) long minimum.

#### 1016.8.2 Width.  Where resting intervals are provided within an outdoor recreation access route, resting intervals shall be at least as wide as the widest segment of the outdoor recreation access route leading to the resting interval.  Where resting intervals are provided adjacent to an outdoor recreation access route, the resting interval clear width shall be 36 inches (915 mm) minimum.

#### 1016.8.3 Slope.  Resting intervals shall have a slope complying with 1016.8.3.

#### 1016.8.3.1 Concrete, Asphalt, or Boards.  Where the surface is concrete, asphalt, or boards, the slope shall not be steeper than 1:48 in any direction.

#### 1016.8.3.2 Other Surfaces.  Where the surface is other than specified in 1016.8.3.1, the slope on other surfaces shall not be steeper than 1:33 in any direction.

#### 1016.8.4 Turning Space.  Where resting intervals are provided adjacent to an outdoor recreation access route, a turning space complying with 304.3.2 shall be provided.  Vertical alignment between the outdoor recreation access route, turning space, and resting interval shall be nominally planar.

#### 1016.9 Protruding Objects.  Constructed elements on outdoor recreation access routes and their related resting intervals and passing spaces shall comply with 307.

**Advisory 1016.9 Protruding Objects.** Protruding objects on outdoor recreation access routes and their related resting intervals and passing spaces can be hazardous for persons who are blind or have low vision. Signs and other post mounted objects are examples of constructed elements that can be protruding objects.

#### 1017 Trails

#### 1017.1 General.  Trails shall comply with 1017.

**EXCEPTIONS:** 1. Where an entity determines that a condition in 1019 does not permit full compliance with a specific requirement in 1017 on a portion of a trail, that portion of the trail shall comply with the specific requirement to the maximum extent feasible. The entity shall document the basis for the determination, and shall maintain the documentation with the records for the construction or alteration project.

2. Where an entity determines that it is impracticable for an entire trail to comply with 1017, the trail
shall not be required to comply with 1017. The entity shall document the basis for the determination, and shall maintain the documentation with the records for the construction or alteration project.

Advisory 1017.1 General Exception 1. Exception 1 can be applied to specific requirements in 1017 on a portion of a trail where full compliance with the requirement cannot be achieved due to any of the conditions in 1019.

Advisory 1017.1 General Exception 2. An entity should first apply Exception 1 to determine the portions of a trail where full compliance with the specific requirements in 1017 cannot be achieved. An entity should then evaluate the entire trail, taking into account the portions of the trial that can and cannot fully comply with the requirements in 1017 and the extent of compliance where full compliance cannot be achieved to determine whether it would be impracticable for the entire trail to comply with 1017. The determination is made on a case-by-case basis.

1017.2 Surface. The surface of trails and their related passing spaces and resting intervals shall be firm and stable.

Advisory 1017.2 Surface. A stable surface remains unchanged by applied force so that when the force is removed, the surface returns to its original condition. A firm surface resists deformation by indentations.

1017.3 Clear Tread Width. The clear tread width of trails shall be 36 inches (915 mm) minimum.

EXCEPTION: The clear tread width shall be permitted to be reduced to 32 inches (815 mm) minimum for a length of 24 inches (610 mm) maximum provided that reduced width segments are separated by segments that are 48 inches (1220 mm) long minimum and 36 inches (915 mm) wide minimum.

1017.4 Passing Spaces. Trails with a clear tread width less than 60 inches (1525 mm) shall provide passing spaces complying with 1017.4 at intervals of 1000 feet (300 m) maximum. Where the full length of the trail does not comply with 1017, the last passing space shall be located at the end of the trail segment complying with 1017. Passing spaces and resting intervals shall be permitted to overlap.

Advisory 1017.4 Passing Spaces. Entities should consider providing either a 60 inches (1525 mm) minimum clear tread width, or passing spaces at shorter intervals if the clear tread width is less than 60 inches (1525 mm), where a trail is:

- Heavily used;
- A boardwalk; or
- Not at the same level as the ground surface adjoining the trail.

Where the full length of the trail does not comply with 1017, placing the last passing space at the end of the trail segment complying with 1017 enables a person using a wheelchair to turn around and exit the trail.

1017.4.1 Size. The passing space shall be either:

1. A space 60 inches (1525 mm) minimum by 60 inches (1525 mm) minimum; or
2. The intersection of two trails providing a T-shaped space complying with 304.3.2 where the base and the arms of the T-shaped space extend 48 inches (1220 mm) minimum beyond the intersection. Vertical alignment at the intersection of the trails that form the T-shaped space shall be nominally planar.

1017.5 Obstacles. Tread obstacles on trails and their related passing spaces and resting intervals shall comply with 1017.5.

1017.5.1 Concrete, Asphalt, or Boards. Where the surface is concrete, asphalt, or boards, treadmill obstacles shall not exceed ½ inch (13 mm) in height measured vertically to the highest point.

1017.5.2 Other Surfaces. Where the surface is other than specified in 1017.4.1, treadmill obstacles shall not exceed 2 inches (50 mm) in height measured vertically to the highest point.
Advisory 1017.5 Tread Obstacles. The vertical alignment of joints in concrete, asphalt, or board surfaces can be tread obstacles. Natural features, such as tree roots and rocks, within the trail tread can also be tread obstacles. Where possible, tread obstacles should be separated by a distance of 48 inches (1220 mm) minimum so persons who use wheelchairs can maneuver around the obstacles.

1017.6 Openings. Openings in the surface of trails and their related passing spaces and resting intervals shall comply with 302.3.

**EXCEPTION:** Openings shall be permitted to be a size that does not permit passage of a ¾ inch (19 mm) sphere where openings that do not permit the passage of a ½ inch (6.4 mm) sphere cannot be provided due to the conditions in 1019.

1017.7 Slopes. The slopes of trails shall comply with 1017.7.

1017.7.1 Running Slope. No more than 30 percent of the total length of a trail shall have a running slope steeper than 1:12. The running slope of any segment of a trail shall not be steeper than 1:8. Where the running slope of a segment of a trail is steeper than 1:20, the maximum length of the segment shall be in accordance with Table 1017.7.1, and a resting interval complying with 1017.8 shall be provided at each end of the segment.

<table>
<thead>
<tr>
<th>Running Slope of Trail Segment</th>
<th>Maximum Length of Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steeper than 1:20</td>
<td>But not Steeper than 1:12</td>
</tr>
<tr>
<td>1:20</td>
<td>1:12</td>
</tr>
<tr>
<td>1:12</td>
<td>1:10</td>
</tr>
<tr>
<td>1:10</td>
<td>1:8</td>
</tr>
<tr>
<td></td>
<td>200 feet (61 m)</td>
</tr>
<tr>
<td></td>
<td>30 feet (9 m)</td>
</tr>
<tr>
<td></td>
<td>10 feet (3050 mm)</td>
</tr>
</tbody>
</table>

Advisory 1017.7.1 Running Slope. Running slope can also be expressed as a percentage (grade).

1017.7.2 Cross Slope. The cross slope shall comply with 1017.6.2.

1017.7.2.1 Concrete, Asphalt, or Boards. Where the surface is concrete, asphalt, or boards, the cross slope shall not be steeper than 1:48.

1017.7.2.2 Other Surfaces. Where the surface is other than specified in 1017.7.2.1, the cross slope on other surfaces shall not be steeper than 1:20.

1017.8 Resting Intervals. Resting intervals shall comply with 1017.8.

1017.8.1 Length. The resting interval length shall be 60 inches (1525 mm) long minimum.

1017.8.2 Width. Where resting intervals are provided within the trail tread, resting intervals shall be at least as wide as the widest segment of the trail tread leading to the resting interval. Where resting intervals are provided adjacent to the trail tread, the resting interval clear width shall be 36 inches (915 mm) minimum.

1017.8.3 Slope. Resting intervals shall have a slope complying with 1017.8.3.

1017.8.3.1 Concrete, Asphalt, or Boards. Where the surface is concrete, asphalt, or boards, the slope shall not be steeper than 1:48 in any direction.

1017.8.3.2 Other Surfaces. Where the surface is other than specified in 1017.8.3.1, the slope on other surfaces shall not be steeper than 1:20 in any direction.
1017.8.4 Turning Space. Where resting intervals are provided adjacent to the trail tread, a turning space complying with 304.3.2 shall be provided. Vertical alignment between the trail tread, turning space, and resting interval shall be nominally planar.

1017.9 Protruding Objects. Constructed elements on trails and their related resting intervals and passing spaces shall comply with 307.

Advisory 1017.9 Protruding Objects. Protruding objects on trails and their related resting intervals and passing spaces can be hazardous for persons who are blind or have low vision. Signs and other post mounted objects are examples of constructed elements that can be protruding objects.

1017.10 Gates and Barriers. Where gates or barriers are constructed to control access to trails, gates and barriers shall comply with 1017.10.

1017.10.1 Clear Width. Gate openings and openings in barriers for hiker passage shall provide a clear width complying with 404.2.3.

1017.10.2 Gate Hardware. Gate hardware shall comply with 404.2.7.

1017.11 Trail Signs. Trail signs shall include the following information:

1. Length of the trail or trail segment;
2. Surface type;
3. Typical and minimum tread width;
4. Typical and maximum running slope; and
5. Typical and maximum cross slope.
Appendix C: Selected Historical Maps
Plan and Section

of a Canal at the lower falls of the Shenandoah, and its junction with the public Canal at Harper's ferry, and the Montpury Locks.

Surveyed &olicitd by King, and I. Harbaugh,

for the U.S. and the Potowmek Company.

Feb'y, 1803

Scale of Plan 16" per inch in an inch.
Scale of Section heights, 30 ft & an inch.