

NEWLIN GRIST MILL INDUSTRIAL HERITAGE PRESERVATION GRANT PROPOSAL

Project Summary

The Newlin Grist Mill (NGM) was constructed in 1704 and continued to operate commercially until 1941. The water system is a character-defining feature of the mill site. Its design is linked to the geography surrounding the mill, and influences the location of mill structures, housing, and transportation systems. It also contains a physical record of changes on the mill site: during its nearly 250 years of commercial operation, the mill was expanded at least four times, most likely corresponding with changes in milling practice and technology.

In order to better understand this important feature and its influences on the NGM historic complex, we plan to conduct a comprehensive Water System Documentation. We are seeking funding for the second phase in the project: study of the water box flume, the headrace, and further tailrace analysis.

The first phase of documentation began in December 2013 when J&M Preservation Studio (J&M) conducted a survey and internal condition evaluation of the 210' tailrace, which includes an arched tunnel. Certain details such as thickness of walls, connections with other structures, and dating were not able to be determined. There is currently no documentary evidence for when the millrace was covered, but four different types of construction suggest that it was not enclosed during a single episode. A trench will be excavated across the tailrace, and any recovered diagnostic artifacts will allow construction dates to be determined.

Little is known about the construction and history of the 45' long water box, but it is in imminent need of repair. NGM will again engage J&M to document the construction of the water box so that it may be restored in the near future. NGM staff members Tony Shahan (Mill Historian) and Keith Doms (Archaeologist) will map the headrace and excavate a section of the tailrace. J&M will provide as-built drawings that include plans, elevations, sections, and details of the water box. Their study will provide the information necessary to understand the original design and provide critical designs necessary to restore the deteriorating water box.

The archaeology and documentation will be used as part of a larger study of the mill's entire water system. There is a lack of documentary evidence of when various elements of the water system were constructed and altered, and we seek to understand the history and development of the industrial site through the evolution and design of the water system.

Project Goals

- Record of the water box using photography and measured drawings.
- Create AutoCAD drawings of the water box.
- Map of the water box to assist with preservation and restoration
- Create a map with elevations of the head race and the water box.
- Determine design, materials, and construction techniques of the water box.
- Determine amount of silt deposited in headrace.
- Determine design, materials, and construction techniques of the tailrace tunnel.
- Obtain information to help date various periods of construction in tailrace.
- Establish criteria for evaluating maintenance and repair procedures.

Long Term Water System Documentation Goals

- Analyze the elements of the entire water system to gain an understanding of how the water system developed over time.
- Create an "as is" plan of the entire water system.
- Evaluate the various components of water system to establish plans for stabilization and/or restoration.

Application Narrative

- 1. Documentation of need for the project: What is the proposed project's significance to industrial heritage?** *Explain how the project will contribute to historical industrial resources or to a broader public understanding of industrial heritage preservation.*

The Nicholas Newlin Foundation owns and operates the Newlin Grist Mill (NGM) in Glen Mills, Pennsylvania. The private, non-profit organization was established in 1960 with the dual mission of historic and environmental preservation and education centered on the Nathaniel Newlin Grist Mill. The water system is at the center of the foundation's operation, supplying water power for the Newlin Grist Mill and feeding water to a series of trout fishing ponds.

The mill was constructed in 1704 and continued to operate commercially until 1941. Throughout its years of operation, the mill was expanded to accommodate the transformation from a custom to a merchant mill in 1739 and changes in technology in the 19th and 20th centuries. The mill was purchased by E. Mortimer Newlin in 1956 and opened to the public as a working colonial mill museum in 1960. The mill was placed on the National Register of Historic Places in 1983. The Newlin Grist Mill serves over 40,000 visitors each year.

The mill has operated continuously with water power from both the Concord and Chester Creeks for the past three centuries. The half-mile long water system at NGM offers a glimpse of early American water power and contains several distinctive features such as a diversion channel connecting water flow from dams on two separate streams and an underground tailrace that flows beneath a store building adjacent to the mill. The water system is historically significant because it reflects the story of Newlin Grist Mill's development. In the absence of documentary evidence, the physical evidence in the water system is the most likely source for understanding the development of the mill site.

The proposed project seeks to investigate three significant features in the water system in order to increase our understanding of the historic site. The water system is the character-defining feature of a water powered mill site. Because the system is built into a hillside to take advantage of the topography, it appears that little has changed since its construction. The map of the headrace will provide information on the design of a 1704 water system. Understanding the elevations and layout of an early water system and any evidence of subsequent changes is very important information.

The earlier study of the tailrace tunnel revealed different types of construction in the arched tunnel made up of two brick sections, two stone sections, and a concrete section all resting on stone walls. However, no dating information was recovered. Dating information will provide specifics about the development of this complex system of construction especially early designs for the 1704 mill. Please refer to the Drawings and Photographs prepared by J&M for further information illustrating the tailrace.

The water box is approximately 45 feet long and is accessed from both within the mill and along the south wall of the mill's exterior. The water box is made of wood and is supported by both an iron column and the masonry walls of the building. It was later shored up with an I-beam. The water box supplied two separate water wheels and has access through floor panels. A section of the current box extends outside the mill structure. The water box is not detailed in any existing drawings.

2. **What research methods will you employ?** *Explain how research or other activities will be conducted. Cover methods, objectives, tools and a timetable.*

Water Box Documentation

NGM staff will remove silt from the structure and then complete a photographic study and field measurements of the water box structure and framing details. NGM staff will provide J&M with the field measurements. J&M will create drawings in AutoCAD from the field measurements made by NGM staff. J&M will revisit the site to verify drawings. The final documents will include layouts of plans, sections, elevations, and details of the water box. Each sheet will be annotated with dimensions and call-outs for materials.

Tailrace Archaeology

The archaeological excavation will open a trench 6' wide by 14' long. Its placement will allow it to uncover the top of the arch and the connection of the arch to the walls of the store building. The excavation includes area outside the tailrace attempting to locate an early occupation level beside the race wall. Shovel testing revealed that the top 3.5' of soil is a single-fill episode, so the top level will be removed mechanically. All soils will be sifted through ¼" screen. The excavations will be documented with photography, mapping, and elevation drawings.

Headrace Mapping

The mapping will be accomplished by using tapes and a laser level to establish permanent data points and a baseline along the line of the water system. A grid will extend outward to encompass the water system features. Sections will be surveyed every 25 feet.

Timetable

The project to document the water system will be initiated once weather permits and funding is confirmed. Work is anticipated to begin in June 2014, and will continue through November or December 2014. Some work may occur simultaneously, while other components must be chronological.

The water box documentation will consist of:

- 1 day to remove silt
- 1 day of photography
- 3-4 days of field measurements
- 3 weeks to complete CAD drawings

The archaeological investigation will consist of:

- 1 day excavating machine (½ day of excavation, ½ day of backfill)
- 5 days of excavation and sifting
- 10 days of artifact cleaning and processing

The Mapping of the water system will consist of:

- 1 day layout datum and baseline
- 4 weeks to complete field measurements
- 2 weeks to compile measurements into a map

3. **Who is responsible for your project?** *Name key personnel and describe their qualifications and project responsibilities. Attach resumes and letters of support.*

Tony Shahan, the director of the Newlin Grist Mill, will coordinate the mapping project, assist with the excavation, and oversee the water box study. Tony has 25 years experience working in museums and

supervising major projects including: restoration, public programs, special events, archaeology, and architectural documentation. Tony has extensive experience engaging with and overseeing contractors, as he managed the restoration of a 1760s grist mill, the reconstruction of 1810 textile mill, the nine-year restoration of mill water system (including the excavation of silt, restoration of stone and timber structures, archaeology), and the restoration of metal truss bridge. Tony also ran experimental archaeology projects in bloomery iron making, brick making, and potash manufacturing.

In addition to professional museum positions, Tony operated a consulting business conducting historical documentation and research. He has practical experience doing restoration work in timber framing, masonry, and period carpentry work. Tony spent eight years doing carpentry and renovation, and worked two years with restoration stone mason Donald Blevins.

Tony has subcontracted work on historic structure restoration, constructing wooden and metal water wheels, and both restorations and reconstructions of historic artillery pieces.

Keith Doms, the site manager at Newlin Grist Mill, will direct the excavation, conduct the field sketches of the water box, and assist with the mapping. Keith has 35 years of archaeology experience in the Mid-Atlantic region, which has given him training in historic construction techniques and styles, and documenting historic structures. As the Site Manager, Keith has extensive experience working with contractors and is the point person for all maintenance and repairs of the historic structures at Newlin Grist Mill. Keith has experience excavating at mill sites and is the archaeology coordinator for NGM

J&M Preservation Studio, the engineering firm selected to conduct the water box study, was founded in 2013 by Jessica Senker, Assoc. AIA, and Melanie Rodbart, PE. Ms. Senker and Ms. Rodbart have dedicated more than eighteen years to design and historic preservation under the leadership of Samuel Y. Harris. Harris was a leader in the field with combined degrees in architecture, engineering, and law with extensive experience in historic preservation, construction, and planning.

Other participants will include members of the Society for Pennsylvania Archaeology and professional archaeologists from the region.

4. What tangible products do you expect to produce with this project? Explain how materials will be circulated, stored and distributed.

Project deliverables will include the following items in electronic format:

- Photographic records of the water box
- AutoCAD drawings of the water box
- Map of the water box to assist with preservation and restoration
- Elevation map of the water box
- Map of headrace
- Archaeological report for excavation of tailrace

The project materials (reports, photographs, and drawings) will be housed in the H. Dabbs Woodfin Archive at Newlin Grist Mill. The archives are available to researchers along with the Society for the Preservation of Old Mills Archive collections. When the water system documentation project is completed, the findings will be compiled into a final report and distributed to the local Concord Township library (Rachel Kohl Library) and the library at Hagley Museum and Library.

Budget

Water Box Documentation		
J&M Preservation Studio for professional services		
<i>(Please see attached proposal)</i>		\$3,720
Archaeological Excavations		
Staff time (excavation)		\$2,535
Machine Time (2 days)		\$2,400
Processing and storage materials for artifacts		\$ 100
Mapping equipment		
Laser Level, stadia rod, 200' tape		\$1,000
Graph paper and supplies		\$ 45
Staff time (mapping fieldwork)		<u>\$1,900</u>
	Total Project Budget	\$ 11,700

Sources of matching funds

\$ 1,000	NGM Funds dedicated for Water System Documentation (committed)
\$ 2,535	Staff time for excavation (committed)
<u>\$ 1,900</u>	Staff time for mapping (committed)
\$ 5,435	Committed
\$ 3,265	June 2014 Music Festival fundraiser (pending)
<u>\$ 3,000</u>	SIA grant (pending)
\$ 6,265	Pending