Planning the Improvement of Environmental Conditions for the Brick Store Museum Collection

The Brick Store Museum planning grant from the National Endowment for the Humanities Sustaining Cultural Heritage Collections Program went towards a feasibility study and preconstruction planning for the renovations of the Kimball House, one of five 19th century buildings owned by the Museum. The Kimball House is currently used as a storage facility, a contemporary art gallery and a program center with an auditorium. The renovations that are in urgent need are the installation of climate control, improvement of the overall environmental conditions of the building and expansion of collection storage. This planning project supported bringing together a team that included staff, trustees, preservation specialists, architects and engineers to survey the building and the existing mechanical and electrical systems, as well as evaluate the storage conditions. The end result was an executable work plan to renovate the entire building with drawings and a work schedule. Since the museum falls within Kennebunk’s Historic District, the team included a preservation specialist to ensure the plan aligned with the guidelines set forth by the Secretary of Interior’s Standards for the Treatment of Historic Properties.

The outcome from this almost year-long investigation was a current systems description report that outlined the requirements for the mechanical, plumbing and electrical work that needs to be done to create a sustainable preservation environment for collections and archival storage. This report along with the construction drawings and schedule of completion together produced an executable work plan that will now be used to begin the necessary improvements and repairs to this building. Additionally, this project proved to be indispensable to educating staff, the board and the museum community of what needs to be accomplished to preserve this historic building, the museum’s collection contained within the building and expand the museum’s capacity into the future.

OBJECTIVES & RESULTS

The main objective of the proposed renovations is to preserve the humanities collection stored in the Kimball House and secondly to increase the museum’s storage capacity so the collection can be housed on museum grounds while continuing to grow. The results of this planning project show that both objectives are met with the repairs and upgrades necessary for this building to be renovated with climate control.

The plan proposes renovation of the first floor, front rooms of the Kimball House to accommodate expanding the museum’s archives; these rooms were previously rented to local businesses. These three rooms will replace the one room currently used as the archives, allowing for growth. In order for these rooms to hold the weight of the archives collection, they will need added increased support.

To make this possible, the work plan proposes structural renovations to the basement. The basement has an uneven dirt floor with a sump pit typical of 19th century structures. No
renovations have ever been done. The work plan includes adding steel supports to the basement ceiling as well as concrete piers. They plan to lay down a concrete slab in the main part of the basement, then grade and infill the crawl spaces. Damp proofing and vapor barriers will be added throughout. Most importantly, proper drainage will be added. Access to the basement will be improved with a new doorway and stairs. All of which will create a sufficiently supported, dry, climate controlled and energy efficient space above the basement for the new archives while maintaining the historic integrity of the rooms.

On the second floor of the Kimball House is a large room that was part of the original barn, it’s renovation is also key to expanding the capacity of the museum’s storage. This area has never been renovated so there is no insulation or lights.

The work plan proposes reinforcing the floor from below by installing steel beams via the auditorium ceiling. The plan also includes installing wall cripples and ridge beam in the barn itself. Insulation that will be added using cellulose with netting held up with pine strapping which will ensure the historical integrity is maintained and can be reversed without damage in the future if ever found necessary. All windows will be replaced since two out of three are broken. While inspecting the building for this grant, the staff realized that repairs to the roof of the barn could not wait. A new roof was added in October 2019.

The other main objective for this proposed work is to install an energy efficient and sustainable climate control system throughout the Kimball House using both passive and active measures. It is currently heated by an oil furnace hot water boiler distributed through most of the building via baseboards. It does not reach the current storage rooms on the second floor including the barn. Believed to have been installed during the 1995 renovation that only included half of the building, the life expectancy was estimated to be around 10 years which has long since passed. At this time, there is no air conditioning beyond two window mounted units that cool only the public auditorium spaces.

For most of the building insulation will be in the form of cellulose blown into the walls and ceiling spaces. The basement insulation will be close cell foam with a thermal barrier. The windows will remain, many of them original to the building. Following the advice of the energy audit, the doors will have weather stripping and sweeps added. The windows will have energy panels added for thermal resistance.

The mechanical renovations include three heat pump condensing units strategically located outside with a fourth pump mounted in carriage stalls. The three outside units will be screened with foliage in keeping with the recommendation of our historic preservation consultant. Eight internal units will be located on the first floor. Eight internal units will be located on the second and third floors. Each unit will be either wall or floor mounted in a place in the room keeping them from direct line of sight upon entering the room to maintain the historic integrity of the building. All ductwork will be within the walls.
Additional complimentary updates will include new energy efficient LED lighting throughout the building as well as new life safety signage.

The result of the preconstruction phase of the project has produced an effective and sustainable means of managing the environmental conditions of this large historic building using both passive measures and new mechanized systems, all while keeping within the Standards for the Treatment of Historic Properties.

For a small non-profit institution, it was absolutely essential to have the grant funding to conduct this preconstruction planning and to have the drawings and schedule of completion produced. It was the impetus the museum needed to begin such a major renovation that is necessary to preserve its collection stored in this building and expand the storage capacity. Due to limited funds, the Museum has only been able to accomplish incremental changes toward the larger problem of heating, cooling and preserving this structure. Dehumidifiers and window air conditioners strategically placed in attempts of maintaining adequate temperatures and humidity in storage during the summer have never been a long-term solution. Neither was the patching of the oil furnace, the roof and the short-term measures for expanding storage. The museum needed a long term comprehensive, energy efficient and sustainable plan to address the needs of this historic building and collections storage. This grant enabled this planning.

This project also provided a wonderful learning opportunity for the staff and the Board of Trustees, many who are new to the museum and knew very little of the history of the building and potential problems that need to be addressed. The project helped bring everyone together to work towards a common solution and address several immediate needs such as the new roof on the barn of the Kimball House which was completed in October 2019.

With any large project, there were several unanticipated delays. The first was the shutdown of the government in the beginning of the year. Unsure if we were going to be able to receive reimbursements for work for those few weeks, the energy audit as well as DeStefano’s study were delayed until the government reopened. The major delay was with the work done by DeStefano & Associates. It took longer than anticipated which was turned into a learning opportunity for staff. The major takeaway was to keep constant communication with contractors to ensure everyone stays on schedule and your project does not get sidelined for other projects. The two month delay was not a major problem in the end and the results were well worth the wait.

**Outcomes**

Several decisions have already been made as a result of this planning project. The museum has replaced the aging roof that was over the barn this past fall. The front of the Kimball House had been rented to local businesses for several years to help mitigate the costs of heating the building. After the energy audit and the study of the building envelope, the museum did not renew the rental contract of the current occupants. It was decided that it was more cost and energy efficient to reclaim the space and use it as storage until we can renovate the entire building. Lastly, it was determined that the museum could not wait for potential grants to replace the oil furnace. The cost to maintain and repair have
outpaced the cost to replace. Taking into consideration that climate control will be installed, the conclusion from John DeStefano was to keep a furnace in the building to help supplement the future climate control system. This is the same auxiliary system that the other four 19th century museum owned buildings currently use. With the cold winters of Maine, the HVAC units are often strained to heat the buildings and need the additional support, in combination it becomes more sustainable and energy efficient. Currently, the Executive Director and the Board are conducting a feasibility study to see if the building can be switched to a gas furnace. The results and the new furnace will be installed within the year.

The energy audit conducted at the beginning of the project had some surprising and positive results. The building was not as in bad a shape as expected. The windows and doors can remain in the building with the help of new storm windows and door sweeps, this also maintains its historic integrity. Overall, moisture was relatively well controlled considering the lack of gutters in some areas and the standing water in the basement. The fundamental problem was with the loss of air from the building, it is twice as drafty as a building of this age should be mostly due to the lack of insulation. Air sealing and insulation were recommended as immediate needs to be addressed as well as a new furnace and hot water heater.

The last positive outcome was the cost of all these upgrades, the estimate for the entire building renovation was less that expected. The Brick Store Museum will be applying to NEH for an implementation grant toward these improvements. The Executive Director and the Board of Trustees fully support this new plan and are confident that raising the additional matching funds is achievable. All the solutions proposed balance energy efficiency and sustainability with the least impact to the historic building. This project was just the first step to create a sustainable preservation environment for the collection and the preservation of the Kimball House. The Brick Store Museum is committed to investing in expanding our capacity to serve the community and moving to the next phase of the renovations.