NEH LITA HVAC 2021 White paper
Due 10/31/21

PF-260790-18
Enhanced Conditions for Humanities Exhibitions

Project Overview:
Adirondack Experience, the Museum on Blue Mountain Lake (ADKX) is located in northern New York, near the center of the six-million-acre Adirondack Park, and is open seasonally from mid-May to mid-October. The regional climate is one of the most severe in the continental United States. This project covers the replacement of the HVAC systems in its largest exhibition building.

The ADKX is the preeminent humanities resource for the Adirondack region, serving as the central platform for documenting, preserving, and disseminating the history, art, and culture of the Adirondacks. The ADKX’s mission is to “expand public understanding of Adirondack history and the relationship between people and the Adirondack wilderness, fostering informed choices for the future.” The ADKX’s humanities exhibitions emphasize the interplay between people and the Adirondack environment and the way culture shapes, and is shaped by, climate and topography.

Through this project, the ADKX replaced the outdated HVAC systems serving its 45,000 square foot Life in the Adirondacks (LITA) building, erected in 1969 of steel and concrete. Many of the HVAC system components were between 25 and 50 years old. They were inefficient, in danger of failure, and were unable to maintain a consistent environment to fully protect the artifacts on display without significant time and effort on the part of museum staff. The antiquated control system was not designed to meet today’s standards in museum environment—it lacked alarm points and trending capability; was not designed to maintain a constant %RH; was not designed to dehumidify; and the interface was archaic and difficult to use. With the help of this grant from the NEH, the ADKX replaced the obsolete HVAC systems serving the 33,500 square feet of exhibition space in the LITA building.

New elements include: chiller, boilers, electrical feeders, humidifiers, sensors, controls, and ductwork. The new system is energy-efficient, reliable, and capable of maintaining a consistent environment. The integrated modern controls and modern interface provide for more active management—helping to achieve cost-efficiency while maintaining the preservation environment. These improvements allow the organization to present new and more dynamic humanities exhibitions, in addition to helping preserve the institution’s unique collections for generations to come. These improvements will likely reduce both the fuel usage for this building and the organization’s overall carbon footprint.
The enhanced environmental conditions resulting from a more reliable HVAC system has facilitated the inclusion of more paintings, works of art on paper, and other fragile materials in exhibitions within the building. Having a reliable preservation environment allows curators to design more interdisciplinary exhibitions that fully present humanities themes without the need to separate objects of material culture from works of fine art (with the acknowledgement that the most fragile materials are exhibited in enclosed vitrines for additional protection).

**Challenges faced during the project:**
As mentioned previously, the regional climate of the Adirondacks is one of the most severe in the continental United States. This HVAC upgrade project was informed by extensive data collection and analysis of the environment in the various zones in the LITA building as well as the outdoor environment. This information allowed ADKX staff to understand and manage the preservation environment in the building prior to the HVAC upgrade and also informed the design of the upgrade. The ADKX’s conservator conducted detailed analyses of the building envelope and the exterior environment using data collected in each HVAC zone during the previous 5 years. Analysis was conducted using eClimateNotebook, a web-based tool for managing and analyzing environmental data. Staff used this data to identify problem areas that would need increased attention in the form of sensors in the upgraded system.

Data analysis heavily informed the design of the HVAC project. Data was provided to a consultant, Williamstown Art Conservation Center (WACC), and the project engineering firm, Landmark Facilities Group (LFG), during their assessments so the project design would be as informed as possible. A meeting was held at the ADKX with WACC and LFG in June 2018, in which the design criteria for temperature and %RH was confirmed. During the meeting, a walk-through of the building was performed, with a focus on problem areas (as identified through data analysis). We believe that this data analysis was essential to the success of the project; this deep understanding of the interior and exterior environment provided the opportunity to design a system that would fit the needs of the ADKX.

Another major challenge of this project was the design of the 45,000 square foot structure, which was not designed with a preservation environment in mind. Prior to the project, many improvements were made to the building to bring it up to code and to ensure the efficiency of the new HVAC systems. These improvements included, but were not limited to: insulation, waterproofing, walling off large windows, installation of LED lighting, and installation of enclosed vestibules at entrances and exits. Although these improvements were made prior to the NEH grant, they appear to have been important to the success of the project. In addition, a thorough understanding of the structure’s deficits prior to the design phase enabled the engineer to design the system to function properly despite the structure’s quirks. For example, airflow patterns were changed and sensors were relocated.
A third challenge during this project was the presence of art and artifacts in the exhibition spaces. Due to costs, timing, and available storage space, it was not feasible for ADKX to empty the building of artifacts prior to the upgrade of the HVAC in the building. Because the work took place outside of the exhibition galleries in a subbasement mechanical room and on the roof, artifacts were not in danger of harm from the active construction work. To protect the artifacts from a harmful environment (such as rapid changes in RH), the schedule of component replacement was arranged to take advantage of temperate outdoor environment—thus avoiding rapid changes in %RH while system components were offline. For example, boilers and humidifiers were replaced before the coldest season, and the chiller was replaced before the onset of the warm, humid season. Artifacts were covered as necessary or appropriate to protect them, and the most sensitive artifacts are installed in enclosed vitrines, which provide appropriate and stable microenvironments.

Additional challenges that ADKX faced during this project were the occurrence of the SARS-CoV-2 pandemic and also the remote location of this institution. These factors affected contractor’s schedules and material availability. Neither factor was insurmountable, but the project lasted longer than originally expected. A two-year extension of the project, approved by the NEH, allowed for the completion of the project within the deadline regardless of these factors.

**Conclusion:**
The biggest takeaway from this project is the need for a good understanding of an existing structure before design and installation of a new HVAC system. Data collection and analysis can identify possible problematic areas ahead of time so those areas can either be modified or the design of the system can accommodate the specific issues. Clear communication between the museum staff and the engineering firm of the building’s issues and staff’s expectations of the new system was essential to project success.