

## Division of Preservation and Access

### **Narrative Section of a Successful Application**

The attached document contains the grant narrative and selected portions of a previously funded grant application. It is not intended to serve as a model, but to give you a sense of how a successful grant application may be crafted. Every successful application is different, and each applicant is urged to prepare a proposal that reflects its unique project and aspirations. Prospective applicants should consult with the NEH Division of Preservation and Access application guidelines at <https://www.neh.gov/grants/preservation/sustaining-cultural-heritage-collections> for instructions. Applicants are also strongly encouraged to consult with the NEH Division of Preservation and Access staff well before the grant deadline by emailing [preservation@neh.gov](mailto:preservation@neh.gov).

Note: The Attachment only contains the grant narrative and selected portions, not the entire funded application. In addition, certain portions have been redacted to protect the privacy interests of an individual and/or protect confidential commercial and financial information and/or to protect copyrighted materials.

**Project Title:** Implementing a Sustainable Environmental System to Preserve Collections

**Institution:** Glessner House Museum

**Project Director:** Mark Nussbaum

**Grant Program:** Sustaining Cultural Heritage Collections

**Funding Level:** Implementation Level II

## **Project Title**

Implementing a Sustainable Environmental System to Preserve Collections

## **Project Summary**

This grant would enable Glessner House to complete the installation of an energy efficient and environmentally sustainable geothermal power system to provide reliable temperature and humidity control. The system can be installed with minimal impact to the historic fabric of Glessner House and will protect and preserve the significant collection of original furniture, decorative arts, textiles and archival materials. As a sustainable option for climate control, it will serve as a model for historic houses and other sites where the display of materials in their original setting is an essential component of providing an authentic experience for visitors and researchers.

## **Project Dates**

October 1, 2020 – September 30, 2023

## **Grant Request**

Glessner House requests a Sustaining Cultural Heritage Collections implementation grant of \$350,000 to complete the remaining phases of our geothermal project, begun in 2015, that will reliably sustain optimal preservation conditions for our nationally significant collections. Following the well digging process and completion of zone one in early 2016, GH has developed an achievable strategy to address the preservation quality conditions required to adequately protect and preserve our collections, both in storage and on display. Completion of the project will establish holistic control of the house's environment and will provide, for the first time, dehumidification and cooling mechanisms throughout the building, as well as improving the efficiency and reliability of the heating systems, thus optimizing overall preservation conditions.

## **Introduction**

Recent environmental studies of Glessner House, a National Historic Landmark, have shown that this rich, enduring artistic and historic legacy is under threat from deficient preservation conditions. The lack of an efficient central system to monitor and control temperature and moisture levels contributes to the mechanical and chemical decay of the collections on display, as well as the huge archive of documents, photographs, and other materials maintained in collections storage.

In October 2017, the Board adopted the current five-year strategic plan which specifically addressed the preservation of the collections with two objectives:

- Continue responsible stewardship of the building and the collection
- Effectively use our multiple stories and perspectives to preserve our legacies and to connect with the lives of our audiences

Although the organization to preserve Glessner House originally began with a focus on the significant architecture, through the years it is the collections – both those displayed in the furnished rooms and the archival materials – that are the tangible links to our stories and have attracted the most attention from visitors and researchers. We are fortunate to have extensive documentation to draw upon that provides a rare opportunity to present the collections in an authentic manner. Documentation often includes information that extends beyond how the object was displayed, to include how and why it was acquired, the craftsman who made the object, how it fit into the Glessners' collecting patterns, and the rich stories that take the object out of the past and bring it to the current day, allowing those who interact with it to draw relevant connections to their own lives and interests. A frequent comment from visitors is their appreciation for the authentic environment they experience when walking through the house –

no display cases and no ropes. The house presents itself as though the Glessners have simply stepped out for a moment and will soon return to resume their activities in the house. We feel strongly about the value of displaying items in the environment for which they were created. An object placed on a neutral wall or in a display case in the best purpose-built museum, loses something when its surrounding context is lost. Seeing the collection in situ at Glessner House provides multiple opportunities for analyzing and assessing the objects – what were the lighting levels and other conditions in the space in which they were displayed, how do they compare and contrast with the objects around them, how do they relate to cultural awareness of the times, and how did designers working in different media address the tastes and interests of a particular family.

This standard of interpretation presents its own set of challenges for preserving the collections, making the climate control of all these spaces even more critical. The completed geothermal system will ensure consistent year-round temperature and humidity levels that will achieve the highest possible level of preservation conditions tied with maximum energy efficiency. As a result, the House will be able to display more of its collection, and for longer periods of time, than is currently possible. Collections storage areas will also be brought up to the desired conditions, preserving these materials which are frequently used by researchers exploring a broad variety of topics.

Another key component of the strategic plan is a commitment to sustainability for the organization. Every decision that is made is considered in the long-term, both for financial stability, but also by researching and utilizing modern technologies that provide innovative and practical solutions for the building and the collections it contains. As an extension of Glessner House's historic environmental consciousness, this marriage of a historic environment with 21<sup>st</sup> century technology will improve sustainability of the house and enhance preservation of the collections; a reduction in operating costs will improve financial performance and make more funds available for educational, exhibition, and collections-based activities that will help build audiences and increase visibility of our collections to a broader audience, including researchers. Since completing phase one of the project in 2016, Glessner House has been contacted by several historic sites around the country which are anxious to learn more about geothermal power and how it has worked for our site. As such, we consider Glessner House a leader in the field, helping to inform decision makers nationally that are responsible for irreplaceable collections.

Glessner House is committed to the sustainable preservation of the collections that support its mission – to spark excitement in architecture, history, and design through a dynamic exploration of Glessner House, its family, and its preservation. An NEH SCHC implementation grant for the remaining phase of this geothermal project will achieve the preservation of the collections, while also reducing collection-related energy costs.

Glessner House is a 501(c)(3) non-profit organization, formed in 1994, after it split from the organization that saved the building from demolition in 1966. The current annual fiscal year budget is \$388,000, with income representing a mix of contributed and earned revenue. It operates with a staff of three full-time including the Curator & Program Director, Visitor Services Manager, and Development Manager, a half-time Venue Manager, and a part-time Building Manager. The House welcomes over 10,000 visitors per year which includes attendance at regular and custom tours, as well as a broad variety of programs including lectures, symposia, behind-the-scenes opportunities to explore collections in detail, musical performances on the original Steinway piano, and other ways to engage with the house and its multiple stories. The house was completed in 1887 for John and Frances Glessner, from designs by the noted

architect Henry Hobson Richardson and is considered his urban residential masterpiece. The innovative floorplan, which consists of over 17,000 square feet of space, was the result of a successful collaboration between a progressive architect and his equally progressive clients. That spirit is also reflected in the objects that the Glessners collected for their home over a half-century of occupancy. Many of the pieces were hand-crafted specifically for the family, and the collaborations often led to life-long friendships that fostered a spirit of creativity and innovation that is clearly reflected within this unique assemblage of objects. The collection, as it represents the emerging American Arts & Crafts movement in the late 19<sup>th</sup>- and early 20<sup>th</sup>-centuries, is nationally significant.

Following the Glessners' deaths in the 1930s, the contents of the home were removed and for the next thirty years, the house was home to two branches of the Armour Research Foundation before the building was threatened with demolition in 1965. In the decades since its successful rescue, the family has generously returned most original items to the house including furniture, decorative arts, and archival materials. Extensive photographs taken by the Glessners' son George have allowed for an extremely accurate recreation of the interior of the house as it appeared during the Glessner family occupancy. The three major threads that visitors explore through a range of tours, programs, and other experiences are architecture, the collections, and the family.

The collections give life to the building and the family, as tangible connections to the stories that have been carried down to us through journals, correspondence and other documentation. Original furniture is mostly custom-made for the family, and includes work by leading Chicago craftsmen, mostly notably Isaac Elwood Scott. He excelled in translating Gothic Revival, Eastlake, and Aesthetic Movement ideas into extraordinary hand-carved furniture, picture frames, and utilitarian objects. His depictions of flowers, birds, and more abstract designs regularly capture the attention of visitors. Set beside Scott's work are other important pieces of furniture, many specifically made for the house by A. H. Davenport & Co., with designs by Francis Bacon and Charles Coolidge.

The decorative arts collection is vast, ranging from Middle Eastern ceramics to French art glass, and from hand-wrought metalwork to intricately embroidered textiles. Significant pieces by Galle, De Morgan, Tiffany and many others are displayed side-by-side with objects created by Frances Glessner herself, or members of her circle. Documentation on the collection includes the Glessners' vast library, which features many books on decorative arts, showing the Glessners to be informed collectors. Archival materials include correspondence, journals, invoices and receipts, and other materials which provide the story and significance of each object.

The archives is also vast and has been used frequently by researchers anxious to learn more about the collections within their original setting. Recently inquiries have focused on De Morgan ceramics, Frances Glessner's silverwork, steel engravings, and the 36 banker's boxes of personal papers of the Glessners' daughter, Frances Glessner Lee, regarded as the mother of forensic science.

Most of the collection is original to the Glessner family. Additional materials, more limited in scope, explore the surrounding neighborhood, now the Prairie Avenue Historic District. These materials, which range from architectural fragments to artworks depicting the homes, most of which have been razed, help to compare and contrast Glessner House and its collections to those of its Gilded Age neighbors, providing additional opportunities for dialogue on why the Glessner House and its collection was both avant-garde and controversial at the time. The collection is closely controlled by a detailed Collections Management Policy, which governs acquisition of

new items, and establishes specific areas of collecting that will serve to enhance the existing collection as assembled by the Glessner family.

In 2015, Glessner House utilized a \$100,000 donation to embark on the first stage of a multi-phase effort to replace the eight gas-fired furnaces and numerous window unit air conditioners with a geothermal system. This system, utilizing wells dug 500 feet into the ground (completed during phase one), provides a constant temperature and relative humidity, and requires significantly less energy to keep the building at an even temperature through every season, with no reliance on fossil fuels. The first phase of this geothermal control system effectively manages energy and the preservation environment in only one zone of Glessner House – a portion of the first floor including the parlor, dining room, and kitchen wing and the basement spaces beneath. The remaining zones of the home will need to be completed to have the house fully operational with geothermal power.

The new geothermal upgrade will provide the necessary flexibility to monitor and control temperature and humidity fluctuations within acceptable ranges, dependent on seasonal conditions, number of visitors, and other variables. The project will have two significant outcomes. The first is a major improvement in the energy efficiency and quality of the preservation environment in Glessner House, leading to the sustainability and preservation of its collection and humanities-related research and program activities by redirecting resources to initiatives that enhance public and scholarly access to the collections. The second significant outcome is the information derived from the installation of an innovative control/monitoring interface. An investment in this project goes beyond operations; it is visionary and promises a sustainable way forward for Glessner House.

The focus of this project is the installation of the second and final phase of the geothermal system. A geothermal heat pump is vastly more efficient than conventional heating systems because it does not require fossil fuels to create warmth; it simply moves existing heat from one place to another. And because temperatures underground remain a relatively constant 50 degrees Fahrenheit year-round, the system requires far less energy to cool Glessner House than conventional air conditioning systems or air-source heat pumps, which use outside air as a transfer medium. A geothermal heat pump saves on energy costs while helping the environment. The system uses clean, renewable energy by tapping into the constant underground temperature, and with a geothermal heat pump, there's no onsite combustion and therefore no emissions of carbon dioxide, carbon monoxide or other greenhouse gases. The system also eliminates any combustion-related safety or air quality issues inside the house.

The geothermal system will immediately save 30 to 60 percent on heating and 20 to 50 percent on cooling costs over conventional heating and cooling systems. Recouping these costs through energy savings could take as long as 15 years but the immediate benefits of eliminating the dependence on natural gas, while safeguarding the collections and providing a more comfortable environment for visitors and researchers, makes the project a win-win situation from the start. The indoor components typically last about 25 years (compared with 15 years or less for a furnace or conventional AC unit) and more than 50 years for the ground loop. The system has fewer moving parts and is protected from outdoor elements, so it requires minimal maintenance.

This project, the result of a successful collaboration between engineers, consultants, conservators, facilities, and collection staff, will allow Glessner House to enhance the quality and sustainability of its collection preservation standards and program activities by reducing energy

consumption and redirecting resources to initiatives that enhance public and scholarly access to the collections.

### **Significance of collections**

The collections of Glessner House are significant for several reasons including the fact that they represent the collection of a specific family at a particular moment in time. The Glessners were progressive and well-informed collectors, with a strong emphasis and interest in the Arts & Crafts movement and on hand craftsmanship, often befriending the craftsmen and craftswomen who were commissioned to create the pieces. In many cases, the objects they collected were reflective of the evolving tastes and trends of the day, establishing them as tastemakers, and indicating the major impact they had on the growing creative life in Chicago. The collection is well documented through the careful records the family kept including correspondence, journals, manuscripts written about the collection, and other documents which provide rich information on the provenance of the pieces, and why they were of interest to the Glessners. Lastly, the collection is displayed exactly as it was intended – in the carefully researched and restored rooms of the house, providing insight to the original environment and how pieces contributed to the overall aesthetics of the home's interior.

Although virtually everything in the house was removed following John Glessner's death in January 1936, most items were retained within the family. The Glessners' grandchildren were marrying and starting families of their own at this time, but ironically used little of what was in the house, as it was considered out-of-date and old-fashioned compared to 1930s tastes. The Glessners' summer estate, The Rocks, located in Littleton, New Hampshire had buildings with large amounts of storage space, so much of the collection including furniture, decorative arts, books, photographs, and other archival materials were packed and shipped to the estate for long-term storage. Many of the crates and boxes remained undisturbed for more than three decades until the Chicago house was saved from demolition and there were the first discussions about its restoration and interpretation. The surviving grandchildren were instrumental in facilitating the return of the collection to the house, donating thousands of items over a period of more than twenty-five years. The great-grandchildren continue to return items, those which specifically have been used by succeeding generations of the family.

The collection is divided into two main categories – those objects which are used to furnish the historic rooms, and those items which form the archives. There are over 5,000 objects currently displayed in the furnished rooms, and more than 15,000 objects in the archives and collections storage. Strengths of the first part of the collection include hand-made furniture, steel engravings in custom-made frames, ceramics, glassware, metal objects, and textiles. Nationally significant objects include a bronze life mask and hands of Abraham Lincoln executed by Augustus Saint-Gaudens, a privately published copy of Aaron Burr's journal, and the brass fireplace surround from the library in Alexander Hamilton's home, The Grange, in New York.

The archives are especially strong in the areas of photographs, correspondence, writings by various family members, and documentation of the family's philanthropic and cultural interests. The photograph collection includes many images taken by the Glessners' son George, a talented amateur photographer, and features important images of Chicago and beyond, in addition to those relating to the house and family. Correspondence includes letters received from important artists, architects, musicians, and other prominent individuals of the day including Julia Ward Howe, Daniel Burnham, August Saint-Gaudens, Maud Powell, and Henry Hobson Richardson, to name but a few.

Materials in the archives are critical for gaining a deeper understanding of the collections which are on public display in the rooms. For example, the appreciation of Isaac Scott's extraordinary furniture, picture frames, and earthenware pilgrim vases, is significantly enhanced by comparison with hundreds of his design sketches in the collection that show the full extent of his design capabilities. He has been cited in numerous publications as one of the most significant artisans of the Aesthetic Movement in Chicago, and the country. Another touching example is a lovely hand-carved Windsor chair, made significant by the story recorded in Frances Glessner's journal about the woman who carved it in the 1880s while learning a craft that would give her self-support, after her young husband died unexpectedly.

Since many of the items in the collection were created for, or by, the Glessners, the collection is largely one-of-a-kind. Items ranging from art glass to the books on the library shelves can be found in other collections and museums, but researchers have a unique opportunity at Glessner House to study the objects in their original setting, with the stories behind their acquisition intact. For example, several years ago, a researcher writing a scholarly publication on 19<sup>th</sup> century cookbooks was delighted to find Frances Glessner's collection of more than 100 cookbooks. Although the researcher had seen most of the books previously, she noted that the rare opportunity to see a specific collection of cookbooks gathered by one person gave a much deeper insight into the books as a whole, and why Frances Glessner would have made the selections that she did.

There has been little focus on temporary exhibitions in the house over the years, as the emphasis has always been on recreating the rooms to their original appearance. This has limited our ability to share the rich archival materials with a broader audience. However, the completion of the geothermal project will make two significant areas of the house available for this purpose.

The original schoolroom, where the Glessners' two children received their education from private tutors, is located immediately adjacent to the Visitors Center. Being set at basement level, approximately four feet below grade, has provided some challenges in terms of both temperature and humidity control, which would be alleviated once the geothermal system is installed. The room is lacking its key pieces of furniture due to its conversion to a sitting room after the children were grown and the disposition of these pieces by the Glessners. Due to this fact, there is strong interest in utilizing the room as a space that will be more interactive for visitors, rather than as a restored room, thus carrying forward the basic concept of education within the space. iPads or comparable devices will provide access to the collections database for those looking for more information on items in the rooms, or to learn what additional materials are available for research purposes but not on display. The research library, currently housed in the curator's office, which has a heavy focus on the collections, will be moved to the space as well. Temporary exhibits will focus on the major interpretive themes identified by the curator and programming committee on an annual basis, allowing many items that are rarely, if ever, on public display to be seen and studied.

The second area of interest is the original hayloft and adjacent male servants' quarters, located directly above the restored coach house. This area contains over 1,300 square feet of space but has sat unused for more than fifty years, being used only for storage of building materials and other items not impacted by the absence of heating and air conditioning. Once the geothermal system is installed, this entire space will become available to significantly expand exhibitions and programming. One thought is to take one of the male servant's rooms and adjacent bathroom to provide housing for an artist-in-residence. The artists would be selected based on the strengths of the collection, so that pieces owned by the Glessners could be used as inspiration, including ceramics, glass, silver, and wood carvings. Additionally, Frances

Glessner's hobbies of silversmithing, jewelry making, needlework could be explored in a contemporary context. The adjacent space would feature exhibitions of materials from the collection that would build upon larger themes of craft and artistry, and the first-floor coach house could be used for larger exhibitions of items made by the artist, complimented by pieces within the Glessner House collection. Both spaces could be used to conduct classes and seminars where objects from the collection could be studied by students, researchers, and others to gain a deeper understanding of design, technique, and cultural context.

With attendance at over 10,000 people per year, we believe that the enhanced opportunities for showcasing the collection in new and innovative ways will expand current audiences and attract new audiences. Craftsmanship was a central part of the spirit of the house during the Glessners' occupancy and finding ways to build upon that will make the collections relevant to visitors and researchers today. A good example, on a small scale, is the recent formation of a historic needlework group. With access to Frances Glessner's books on needlework, patterns, and many samples of her completed projects, members of the group use historic methods to create modern pieces, which are displayed and made available for sale. The opportunity for participants to sit in the historic rooms, working on crafts exactly as Frances Glessner and the female members of the family did a century or more ago, is a deeply enriching and rewarding experience for those who engage with the group. Optimum climate controls make such opportunities possible, providing adequate protection to the collection and providing a comfortable environment for participants.

Items from the collection have traveled to major museums in Chicago and beyond. In recent years, pieces have been loaned to the Chicago History Museum, the Museum of Science and Industry, and the Art Institute of Chicago. Furniture and decorative objects have also been loaned to the Cooper-Hewitt Museum in New York, the Renwick Gallery in Washington, D.C., the Metropolitan Museum of Art in New York, and the Museum of Fine Arts in Boston.

Items from the collections have been featured in numerous articles and books. A few of the more prominent books include:

- *Chicago Furniture: Art, Craft, & Industry 1833-1983* (Sharon Darling, 1984, W. W. Norton, New York)
- *In Pursuit of Beauty: Americans and the Aesthetic Movement* (Doreen Bolger Burke, Jonathan Freedman, Alice Cooney Frelinghuysen and others, 1986, The Metropolitan Museum of Art, New York)
- *Apostles of Beauty: Arts and Crafts from Britain to Chicago* (Judith A. Barter, editor, 2009, Yale University Press, New Haven)
- *Boston Furniture 1700-1900* (Brock Jobe and Gerald W. R. Ward, editors, 2016, University of Virginia Press, Richmond)

Internal publications that focus on the collection include numerous articles on our blog (launched in 2011), a monthly posting of the "Object of the Month" on the website (begun December 2015), and a "Collections Cameo" article in every issue of the quarterly newsletter. Glessner House's curatorial and education staff is actively engaged in research and publication.

Glessner House hosts unique programs that focus on developing a greater understanding of the physical nature of objects as well as the intellectual framework and methodology for using those objects as primary source material for wider historical study. Currently known as the study of material culture, this multidisciplinary field involves curators, conservators, librarians, educators, historians, and scientists as well as scholars in fields from English literature to chemistry. Crucial to this study is the close examination of the object itself, which may include a variety of imaging and analytical techniques. When this information is combined with



documentary sources, provenance, an understanding of craft practices and materials, and contemporary social and marketing norms, a complete and compelling story of an object can be told.

In 2018, Glessner House partnered with the Terra Foundation during its initiative Art Design Chicago. The house presented several programs on various artists who are represented in the collection, and this collaboration helped to broaden the exposure of the collection to a wider audience. Additionally, we developed a new behind-the-scenes tour, “Glessner House and the Arts & Crafts Movement” which focused on those pieces within the collection that demonstrated the works of Chicago artists in the movement. We also brought out pieces from storage that are not normally on display, including Frances Glessner’s extraordinary 1906 calendar with a page for each day of the year designed and executed by the leading artists, musicians, and social and business leaders of the day. The tour was highly successful, so it has been made into a permanent tour, renamed the “Decorative Arts Tour,” that is offered several times per year.

A popular annual event is our “Treasures from the Collection,” held each year in early summer, where items are brought out of storage and their stories shared with the audience. All portions of the collection have been explored during the ten years this event has taken place, and it is among the most popular we offer. At present, it is a one-day event, but we look forward to the opportunity of engaging more people with these types of exhibitions, when additional spaces benefit from the geothermal system, thus making them appropriate for exhibitions of longer duration. Musical programs featuring collections include concerts on the Glessners’ original 1887 Steinway, at times incorporating pieces of music found in our music library. Children’s programming, such as our “Time Travelers” program which introduces underserved third-graders to the house and collections, includes a specific focus on the collection – how items were made and acquired, why the Glessners collected what they did – leading to questions about the types of objects the students themselves collect.

Researchers frequently reach out to the house for information and images relating to their topics of interest, many having found out about our collections through our online offerings. In the past few years, the largest number of requests have come in from researchers studying Frances Glessner Lee and her work in developing the field of forensic science. Lee was a pioneer in the field, also creating a series of “Nutshell Studies of Unexplained Death” to be used as tools in training police and medical investigators how to investigate the scene of an unexplained death. We are fortunate to have Lee’s extensive personal papers, which have valuable information about her work with the police and the creation of the Nutshells. The author of the forthcoming definitive biography of Lee, *18 Tiny Deaths: The Untold Story of Frances Glessner Lee and the Invention of Modern Forensics*, spent three days pouring through her papers and making some spectacular discoveries which added significantly to the book.

Other recent research inquiries include one from a scholar writing about the work of the English ceramicist William De Morgan and, in particular, his direct involvement with clients; the Glessners’ work on founding and supporting the Chicago Symphony Orchestra; books in the library written by family friend F. Hopkinson Smith; Frances Glessner’s collection of music written for piano four hands; cookbooks and recipes used by Mattie Williamson, the Glessners’ cook from 1892 until 1912; wallpapers, textiles, and upholstery fabrics by Morris & Co. used to decorate the house; and many others.

### **Current conditions and preservation challenges**

Glessner House is a solid masonry building, with granite cladding over brick, that contains approximately 17,400 square feet of space distributed on four levels, including the basement (which extend approximately four feet below grade), and the attic level, set beneath a clay tile roof. The structure utilizes both timber and steel beams, dependent on the span. Heating is provided by seven gas-fired furnaces, two located in the basement, one in the coach house, and four in the attic level. The coach house has a central air conditioning system, and there are five window unit air conditioners placed in strategic locations throughout the building, including collections storage, although this does not begin to provide cooling throughout the building. The first phase of the geothermal system, which became operational in early 2016, provides heating, cooling, and humidity control for “Zone 1” consisting of the parlor, dining room, kitchen wing, and servants’ hallways on the first floor, and the comparable spaces beneath these rooms in the basement.

The house contains 33 rooms divided as follows:

- 17 restored and furnished rooms
- 4 rooms used for collections storage (2 of which also function as offices)
- 2 small rooms used as permanent exhibition galleries
- 2 programming and meeting spaces (coach house and former conservatory)
- 4 offices (in former servants’ bedrooms)
- 2 rooms utilized as the Visitors Center
- 2 rooms used as storage (hayloft and basement areas)

Virtually all of collections storage is located on the third floor/attic level of the house. This area presents specific preservation challenges due to its proximity directly beneath the clay tile roof, which absorbs heat during the summer months. Window unit air conditioners are utilized in these spaces to try and maintain a consistent temperature, but during prolonged hot spells this becomes virtually impossible. Additionally, four of the seven gas-fired furnaces are located on this level. Although they are housed in separate furnace rooms, the ambient temperature in collections tends to be several degrees warmer than in the second-floor spaces serviced by the units. The fourth room is in the unheated hayloft and is used only for architectural fragments and items that are not impacted by dramatic swings in temperature.

With the exception of the rooms noted above which are serviced by phase one of the geothermal system, most of the furnished rooms do maintain consistent temperatures during the heating months, but there is no system currently in place to control temperature and humidity during the summer months. Several box fans are used to circulate the air, but this is primarily for the comfort of visitors, and does little to alter the temperature. A dozen Onset HOB0 data loggers are located throughout the furnished rooms and collections storage areas which are downloaded regularly to record temperature and humidity levels.

The installation of a geothermal system would alleviate all the problems described above. For the first time in the history of the house, it would provide a system to control and maintain constant temperatures and humidity levels twelve months of the year. Another advantage of the new system, is that it would follow a similar configuration to what is currently in place, providing for a total of ten zones throughout the building, allowing each zone to be monitored and maintained as needed, based on the use of that space. Collections storage would be much better controlled with this configuration, comprising two dedicated zones. Furnished rooms could be adjusted as needed depending on activity in the rooms – tours, special programs, etc., and proposed exhibition areas could also be monitored independently of other spaces.

Glessner House maintains a Collections Work Plan which is reviewed regularly by the curator, in conjunction with the House & Collections Committee. Recommendations arising out of the plan are brought to the Board of Directors for vote by the chair of the House & Collections Committee, who is a voting member of the board. The Work Plan includes sections on security, fire, emergency preparedness, monitoring temperature and humidity, integrated pest management, pollutants, storage, display, lighting, maintaining collections records, and assessing conservation needs. An annual grant from the Chicago Community Trust, of about \$4,000, is allocated to collections-related projects and needs. Funds for larger projects are raised through special fundraising initiatives.

An extensive Emergency Preparedness and Disaster Recovery Plan is updated annually, with copies stored in various locations throughout the building, including all staff and collections offices. Detailed information is included in the plan to cover a wide range of emergencies including accidents, bomb threats, civil disturbances, earthquakes, environmental emergencies, fires, floods, hazardous materials, mechanical failures, mold, pests, power loss, security/thefts, structural failures, and tornados and windstorms. Additional sections include emergency clean up procedures, chain of command, collections priorities (if collections are seriously threatened and need to be immediately removed from the building), evacuation preparedness, location guides for fire extinguishers, utility shut-offs, and hazardous materials, updated vendor list, incident forms, and procedures for the consistent backup of the collections database.

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[Redacted] Guests are not allowed to tour the house on their own; all tours are led by certified docents. (b) (4)  
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[Redacted] The cleaning of collections items on display in the furnished rooms is done by the curator and a team of volunteers who have been properly trained in the handling and cleaning of objects.

The house is in the midst of a two-year inventory project of the entire collection, overseen by the curator, and being undertaken by graduate student interns and other volunteers. Although the collection is fully cataloged in PastPerfect, the current project is designed to upgrade entries, take new images, and improve intellectual control. At present, only a small portion of the collection is remotely accessible to researchers, primarily through blog articles, and postings on the collections section of the website. The result of this inventory project is to make significant portions of the collection available online. Given the significant number of inquiries we already receive with limited access, we believe the online catalog will significantly increase awareness of, and interest in, the collections by researchers, scholars, and the general public.

The project will have two major outcomes that will significantly impact collections. The first is the quality of the environment in which the collections are maintained, and the ability to monitor and control fluctuations, while simultaneously reducing operating costs, thus making additional resources available for investment in exhibitions, research, conservation, publications, and programming that make the collections more accessible and more widely utilized. The second is broader in scope, in that Glessner House will be seen as a leader, and can inform and advise other institutions with similar collections how the geothermal system is optimal to protecting collections with the added benefits of energy efficiency and no reliance on

fossil fuels. Upon completion, the curator intends to write a white paper, give presentations to peer organizations, and serve as a resource for comparable institutions considering a similar project.

## **History of the project**

The genesis of the current project was the receipt of a grant from the Institute of Museum and Library Services in the amount of \$8,280 for an environmental study. The Building Committee of the Board of Directors, which was in the process of preparing a maintenance manual for the house, was asked to identify both expected outcomes from the report and the contractor to undertake the investigative work. The Committee consisted of three architects – Gunny Harboe, Mark Sexton, and John Waters – and Jack Tribbia, the vice president of the restoration division of Berglund Construction, a large Chicago-based firm that had done previous work on Glessner House. Harboe, Sexton, and Tribbia had all previously worked on projects that involved the installation of a geothermal system, and strongly recommended that the focus of the study be on the feasibility of installing a geothermal system to replace the eight gas-fired furnaces and multiple window unit air conditioners that were currently providing heat and limited cooling for the building and collections. Geothermal was immediately considered as a viable option due to the large private courtyard which could provide the necessary space for the installation of the wells and could accommodate the equipment necessary to drill them.

In early 2009, the Building Committee met with Mark Nussbaum, principal of Architectural Consulting Engineers, a firm that provides consulting services to architectural firms and building owners to evaluate existing mechanical systems, and design new systems. Two members of the committee had worked on projects with Nussbaum and recommended that his previous experience with both historic buildings and geothermal systems would make him the ideal person to undertake the study. The report was completed in May 2009, confirming that not only was the installation of a geothermal system viable, it was the logical solution for several reasons. These included the elimination of dependence on fossil fuels, minimum impact on the building, the ability to regulate temperature and humidity, and the relatively short period of payback over the cost of installing a traditional system. Plans were then put on hold while funding the project was considered.

In the summer of 2012, a long-time supporter of Glessner House approached the Executive Director with her intention of providing the house with an anonymous \$100,000 gift during its 125<sup>th</sup> anniversary year. She was specifically interested in a project that would help sustain the building and the collections and asked for a list of current projects under consideration. As she was a strong advocate for green technology, she quickly selected the geothermal system, allowing us to proceed with phase one of the project.

In October 2012, the Building Committee met with Mark Nussbaum to define the scope of the project and authorize the creation of a comprehensive work plan. Throughout much of 2013, Nussbaum spent extensive time evaluating every space within the house to determine current conditions, how the new system would fit into existing spaces, and consulting with the curator on the specific environmental conditions required for the collections in all areas of the building. Committee members reviewed the plans and provided suggestions for revisions, which continued into mid-2014. During the same period, the curator also had the opportunity to visit the Evanston History Center, located just north of Chicago, where Nussbaum was overseeing the installation of a geothermal system in its 1894 building. This provided valuable information on the logistics of the project and specifics on how the system could and would impact the environment for collections.

Drawings, schematics, and the work plan were completed by early 2015, and were sent out to three companies for bid. Ultimately, the project was awarded to Y-tech Heating and Air Conditioning, both for their familiarity with this type of project, and for their competitive bid. Great Lakes Geothermal was selected as the sub-contractor to dig the two wells. Work on phase one, to include the digging of the 500-foot deep wells, and installation of the first heat pump and all new ductwork in zone one, was scheduled for late fall 2015, after the season had closed for hosting courtyard weddings.

One change made to the plans was to select a new product for the tubing in the wells, one that had recently been introduced to the market. The final product selected was Rygan Corporation's high performance geoexchange (HPGX) system, which was determined to be more efficient at transferring heat back and forth from the ground in a relatively small space like the Glessner courtyard. The system went live on January 28, 2016 at a total cost of \$108,000. The entire process was documented in a series of blog articles published on the Historecycle website (<https://www.historecycle.com/>), which showcases historic building renovations where green, sustainable technologies are integrated into the building design.

The completion of phase one of the geothermal project has achieved the desired outcomes. We were fortunate to have knowledgeable individuals on the board who could use their expertise and experience to assess the situation and provide the best alternatives, while also recommending the ideal firm to undertake the planning and project management. The ability to monitor and regulate temperature and humidity has met and exceeded expectations. The project addressed specific objectives in the strategic plan including the continuing responsible stewardship of the building and the collections, while also addressing the objective of sustainability, both financially and environmentally. Lastly, it has served as a model for other historic sites with similar collections, and the staff of Glessner House has been contacted for information on logistics and outcomes.

### **Methods and standards**

Environmental management is a holistic issue, so the status of the building envelope is of high importance to the evaluation of the mechanical systems. The building is a three-dimensional network of interconnecting areas – not only rooms connected by hallways and stairwells, but also rooms connected to chases and joint cavities, crawlspaces and attics, chimneys and utility shafts, etc. These interconnections allow environmental conditions that exist in one area of a building to be transported to other areas via differences in building pressures, building temperatures, and vapor pressures. A thorough understanding of the envelope construction and deficiencies helped to inform our understanding of likely areas of concern as they relate to environmental management, and the impact upon collections.

The expertise and experience of the Building Committee members and the contractor retained for the project allowed for a thorough understanding of options, the primary design features of the system, the short- and long-term benefits of embracing a sustainable technology, how a geothermal system could adequately address the specific issues at Glessner House, and the optimum preservation conditions that would result. It was also quickly determined that system efficiencies twice that of conventional gas-fired heating and electric cooling systems were easily achievable. Discussions with owners of other historic buildings which had geothermal systems installed took place to learn as much as possible about impact and desired outcomes. The ability to see a comparable system being installed in another historic building with similar collections also proved illuminating in fully understanding the system and its impact on the building and

collections. All of the main components of the system, from the underground wells and sleeved-openings cut through the foundation in the basement, to the ductwork and the heat pumps were carefully evaluated, so that the best choices were made for the system, the building, and the collections. Advances were continually being evaluated for their appropriateness to our project, resulting in modifications (such as the introduction of the Rygan HPGX system) that provided a system that was as efficient and up to date as possible.

Two key recommendations in the Secretary of the Interior's Standards for the Treatment of Historic Properties were addressed and successfully incorporated into the project. The first was that the installation of the new system would result in the least alteration possible to the building and its character-defining features. The wells are completely concealed below ground and are connected to the interior heat pumps via openings cut through the foundation approximately two feet below ground level. Additionally, the new system will adapt the existing ducted forced air system resulting in minimal need to create openings for new ductwork.

The second recommendation from the Standards was that the system components – including heat pumps, ducts, and pipes – could be confined to closets, service areas, and wall cavities to preserve the historic character of the interior space. These recommendations were key both in our continuing effort to share as much of the building as possible with visitors and researchers, but also because it maximized the amount of usable space that could be utilized for the storage and exhibition of collection materials. The current gas-fired units, in addition to creating potential fire and carbon monoxide hazards, also require more space to take in enough combustion air. The new heat pumps will eliminate these hazards and can be placed in smaller areas due to the reduced need for combustion air.

Throughout the planning phase and the completion of phase one, a continual assessment was made of the specific impact on collections. This was a key consideration in the historic furnished rooms where placement of furniture and other artifacts was largely pre-determined by historic photographs and other documentation. This situation led to informed decisions regarding placement of vents and registers, with an attempt to use historic locations as much as possible and only introducing a new opening when it was determined that the original configuration was deficient or when it was agreed to be in the best interest of the collection to provide uniform conditions throughout the spaces.

In planning for the remaining phases, which include collections storage areas, considerations have also been given to relocating and shifting materials within the existing spaces and into new spaces that will become available when the system is fully functional. Issues addressed include storing items with similar environmental needs in close proximity, segregating collection materials that are frequently referenced from those that are used less frequently, maximizing air flow in the rooms and around storage units, and attempting to separate office and storage areas. Additionally, it is planned that the third-floor collections storage areas, which currently tie into two corresponding spaces on the second floor (where the thermostats are located) will be separated and reconfigured into two dedicated zones. This area, due to its location on the third floor just below the roof level, and because of the collections materials stored there, will thus benefit from an independently controlled system capable of relatively tight environmental control. The heat pumps would be served by a new insulated piping system routed up from the basement through the wall cavities and a variable speed pump would minimize circulation of the fluid to an as needed basis further reducing energy consumption.

The system is zoned, dividing the building into ten sectors. This is an extremely efficient method of addressing and monitoring the varied conditions ranging from potentially higher humidity

levels in the basement, to higher temperatures in the third/attic level during summer months. Each zone will be controlled with its own thermostat and monitored with Onset HOBO data loggers providing current conditions that can be easily reviewed and addressed in real time. The data loggers are downloaded by the curator regularly (including one placed on the exterior of the building to capture outdoor temperature and humidity), providing historic information that will be especially valuable as areas are converted from the current system to geothermal. Seasonal fluctuations will become evident, allowing for proactive adjustments to keep temperature and humidity levels as close to constant as possible.

Policies are currently in place to ensure preventative measures are undertaken including regular replacement of filters by the building manager, and the annual cleaning and inspection of units by a licensed contractor, and these will be continued with the new system. A distinct advantage is that the new units will be much lower maintenance, with few movable parts and the elimination of heat exchangers and other components that need repair and replacement over the life of traditional units. Energy consumption will also be analyzed, with the long-term goal being to eliminate the need for natural gas service throughout the building as geothermal also provides the opportunity for nearly free domestic water heating. A modest increase in electrical consumption is expected as a significant portion of the building is currently not cooled during the summer, but that increase is offset significantly by the elimination of gas service. Electric consumption will be monitored, to ensure all aspect of the system are functioning at maximum efficiency.

## **Work Plan**

The implementation plan for the remaining phase of installation was fully developed at the time phase one was installed. The steps to complete this phase can be completed within a three-year time frame as outlined below. Mark Nussbaum of Architectural Consulting Engineers will serve as project director to oversee all aspects of project implementation.

Year One: October 1, 2020 – September 30, 2021

- Initial meeting with team – project director, curator, and contractors – to review all elements of plan, prioritize work, and revise specifications based on any advances in the field since the work plan was prepared in 2015;
- Completion of Zone 2 comprising main hall, library, schoolroom (including reactivation of historic wall-mounted brass radiator), and Visitors Center. Typical completion of a zone includes any required demolition, installation of a heat pump and electric heater, connection to the geothermal loop, installation of ducts, controls, damper system, insulated supplies and returns per drawings, reconnection to existing vents, new electric as needed and new thermostat and related controls.
- Completion of Zone 3 comprising one-half of the third-floor collections storage and curator's office. Additional work for this zone and zones 4 through 8 includes the installation of an insulated piping system from the basement up to the third floor.
- Completion of Zone 4 comprising the remaining half of the third-floor collections.

Year Two: October 1, 2021 – September 30, 2022

- Completion of Zone 5 comprising Simmerling exhibition gallery, master bedroom, dressings rooms, master bathroom, bedroom hallway, and spiral staircase.
- Completion of Zone 6 comprising corner guestroom and second floor main hall.
- Completion of Zone 7 comprising Beidler meeting room and courtyard guestroom.
- Completion of Zone 8 comprising second floor staff offices.

Year Three: October 1, 2022 – September 30, 2023

- Digging of additional well to service coach house wing of house, cutting through foundation and connecting to new interior pump.
- Completion of Zone 9 comprising coach house program and exhibition space.
- Completion of Zone 10 comprising current hayloft and male servants' quarters, to be utilized as exhibition space after completion of project.

## **Project Team**

### Project Director – Mark Nussbaum (Consultant)

Nussbaum, who prepared the plan, schematics, and drawings for the project, will be responsible for direct oversight of the contractor, his team and the subcontractors, will confirm all design details and materials, and will address any issues that arise in the field that require modifications to the plans. As the principal and design engineer for Architectural Consulting Engineers for 25 years, he is a registered professional engineer in both Illinois and Wisconsin and is a member of the International Ground Source Heat Pump Association, among many other professional associations. His projects on historic buildings have earned him numerous awards, including recent work on Frank Lloyd Wright's Unity Temple, the Charles Gates Dawes House in Evanston, and Howard Van Doren Shaw's Ragdale in Lake Forest.

### Primary Contact/Grants Administrator – William Tyre (Curator & Program Director)

Tyre has served on the staff of Glessner House since October 2007, overseeing all aspects of operations including curatorial functions, collections management, programming, interpretation, building maintenance and repair, budgeting, fundraising, marketing, and community outreach. He will administer the grant and will be on site each day serving as the communication link to the Project Director. He holds a B.A. in Accounting and previously worked for the Society of Architectural Historians where he administered numerous grants, including four received from NEH. He earned his M.S. in Historic Preservation in 1999 from the School of the Art Institute with a focus on historic site management, returning there in 2013 to teach on that subject along with non-profit management. Tyre has been directly responsible for the planning and execution of numerous restoration projects in the house totaling more than \$400,000 since 2008 and oversaw the installation of phase one of the geothermal system.

## **Project results and dissemination**

There are four major expected outcomes that will result from the completion of this project.

- First, and foremost, to create a safe and sustainable environment that will adequately protect and preserve the collections so that they may be explored by researchers, enjoyed by visitors, and utilized to tangibly share the rich stories of Glessner House, its family, and the objects they gathered over their lifetime.
- Embrace a green technology that is sustainable and environmentally responsible by eliminating a reliance on fossil fuels, thereby becoming a model for the successful marriage of historic buildings and modern technology.
- Achieve several goals and objectives in the strategic plan including continued responsible stewardship of the collections; preserving our legacies through the exploration of the tangible objects that convey our rich stories; and providing a financially responsible and sustainable system that increases resources available for mission-driven activities.
- Share the planning, logistics and outcomes of the project, including the ongoing monitoring of conditions and energy savings, with the broader cultural heritage community to demonstrate the successes and possibilities of utilizing sustainable preservation strategies.