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ARCHITECTURAL CONSERVATION ASSESSMENT

For

The Galena – Jo Daviess County Historical Society Museum

**211 South Bench St.
Galena, Illinois 61036**

Prepared by

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For the

**Galena – Jo Daviess County Historical Society
And
Heritage Preservation**

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EXECUTIVE SUMMARY

Purposes and Objectives of this Report:

The Galena – Jo Daviess County Historical Society operates a museum and historic blacksmith shop in downtown Galena, Illinois. This report summarizes the findings of an architectural conservation survey, made in conjunction with a collections conservation survey, undertaken on October 16 – 17, 2007, the purpose of which was:

- To observe conditions which affect the well-being of the buildings as historic structures and;
- To observe conditions which affect the well-being of collections housed within these buildings and;
- To offer recommendations for the correction or further investigation of conditions causing or contributing to the deterioration or damage of either the buildings or collections.

In their request for funding these reports the institution identified the following objectives:

- to develop a long-range plan for collections
- to improve collections care
- to improve environmental conditions
- to use these reports as a tool to obtain funding for collections care
- to determine if the current building is viable, or if a new site would be advantageous.

Prioritized Recommendations:

Priority Ratings

The 2004 Heritage Preservation publication “Best Practices for Conditions Assessments of Historic Structures” defines the following Maintenance Deficiency Priority Ratings:

Critical (Should be addressed within one year)

- An advanced state of deterioration that has resulted in the failure of a feature or will result in the failure of a feature if not corrected within one year; or
- Accelerated deterioration as a result of the feature’s deficiencies if not corrected within one year; or
- An immediate threat to the health and/or safety of the user; or
- A failure to meet a legislated standard

Serious (Should be addressed within one to three years)

- A deteriorated condition that, if not corrected, within one to three years, will result in the failure of the feature; or
- A threat to the health and/or safety of the user may occur within one to three years if the ongoing deterioration is not corrected; or
- Ongoing deterioration of adjacent or related materials and/or features as a result of the feature's deficiency

Minor (Should be addressed within three to five years)

- Standard preventative maintenance practices and preservation methods have not been followed; or
- Reduced life expectancy of affected adjacent or related materials and/or systems within three to five years and beyond; or
- A condition with a long-term impact within three to five years.

During the site visit, areas of primary concern were identified regarding the preservation and conservation of the collections, the buildings and the site. They, as well as other less urgent issues, are described in greater detail in the body of this report and in the corresponding sections of the collections assessor's report. **The following list summarizes the most pressing areas to be addressed in order of priority:**

Critical (Should be addressed within one year)

1. The Society should engage in a planning program to accomplish the following objectives:

- a. Development and adoption of a Long Range Plan which defines a vision for the future and identifies immediate and long term goals*
- b. Development and adoption of a Space Needs and/or Utilization Plan which identifies facilities requirements for implementation of the Long Range Plan*
- c. Development and implementation of a Feasibility Study for Relocation of the museum*

2. The environmental conditions in collections storage and exhibit areas should be improved to prevent further deterioration of significant objects.

- a. The temperature and RH monitoring system now in place should be continued with the outside temperature recorded as well. After the conditions have been recorded through a full cycle of seasons, a preservation architect, mechanical engineer and objects conservator should be consulted to recommend permanent changes to the environmental systems and the building envelope.*
- b. Central air-conditioning should be installed in the 1922 addition.*
- c. Lighting fixtures and/or bulbs should be changed to provide UV protection and light levels that are safe for collections objects.*

3. Broken and damaged sidewalks and steps should be repaired.

4. Missing or damaged gutters and downspouts should be replaced.

5. *An Accessibility Audit should be performed with specific recommendations for the site and building and all readily achievable recommendations implemented.*
6. *Determine and mitigate the cause of damage to the floor in the Old Blacksmith Shop. Replace damaged areas with matching material.*
7. *Install fireproof cabinets in both locations and require that all flammable materials be stored therein.*
8. *The Board must begin to build an endowment fund for the museum.*

Serious: *(Should be addressed in one to three years)*

1. *Rebuild the exterior porches and railings on the Daniel Barrows Mansion to match the original design.*
2. *Using the Accessibility Audit as a guide, install a ramped sidewalk from the street and a wheelchair lift or other device to provide an accessible entrance to the museum.*
3. *The moisture problems in the Basement should be corrected.*
 - a. *A concrete slab with vapor barrier should be installed over the present dirt floor.*
 - b. *Efflorescence should be cleaned from masonry surfaces using all precautions necessary to preclude particles from entering the ventilation system where they may be deposited on, and damage, collections objects.*
 - c. *Areas of damaged, powdered and missing mortar should be repointed using specifications from "Preservation Briefs" published by the National Park Service.*
 - d. *All rotted structural wood shall be repaired or replaced as necessary.*
 - e. *Dehumidifiers should be installed and maintained on a regular basis.*
4. *Repair and repaint the windows and exterior shutters. Replace missing storm windows and remove plywood hood and cover.*
5. *Repair the retaining wall along the front sidewalk.*
6. *Remove vines from masonry and trim vegetation around the foundation. Repoint areas of damaged mortar in the exterior walls in accordance with the specifications in "Preservation Briefs" published by the National Park Service.*
7. *Repair and repaint the exterior soffits.*
8. *Develop and implement a Maintenance Plan for the facility.*
9. *Develop an Emergency Preparedness Plan and acquaint all staff, volunteers and emergency response personnel with Plan procedures.*
10. *The Board should adopt and implement a committee structure. Each committee should be chaired by a sitting member of the Board although committee membership should not be limited to Board members. Committees should include, but not be limited to:*
 - a. *Finance*
 - b. *Facilities*
 - c. *Membership*
 - d. *Programs*

Committee chairpersons should report on the work of their committees at each Board meeting to keep the entire Board apprised of their activities.

Implementation of a committee structure will ease the burden of the Executive Director and Board President by apportioning responsibility and committee membership can provide training for prospective Board members.

11. The Executive Director should complete an application for a MAP Grant which will complement, as well as address issues not covered in, this CAP Assessment.

Minor:

- 1. Install pigeon guards.*
- 2. Repair interior storm windows.*
- 3. Stabilize the stacked stone terraces behind the building.*
- 4. Develop a Housekeeping Plan for the museum and train staff and volunteers in proper care practices for collections objects and historic finishes.*

INTRODUCTION

General Information and Historic Context:

Galena is located in the northwestern corner of Illinois in an area characterized by its hills, valleys, exposed rocks and bluffs. In 1690 the French explorer, Nicholas Perrot, found the Sac and Fox Indians mining lead in the hills near the site of the present day town and founded several trading posts in the area. The first American settlers arrived in the early years of the nineteenth century and Galena was organized as a town with a population of 150 in 1826. Lead mining produced a boom in population in the years before the Civil War and, by the early 1850's, Galena was the largest port on the Mississippi between St. Paul, Minnesota and St. Louis, Missouri.

The Mississippi River was accessed by a three mile stretch of a smaller tributary originally called the Fever River, later renamed the Galena. This tributary required almost continuous dredging to keep the channel open and it flooded frequently, causing serious damage to the town on several occasions. The town also suffered serious fires in both 1854 and 1856, after which the city prohibited the use of wood in downtown buildings. In 1854 the railroad bypassed Galena and crossed the river to Dubuque, Iowa. Several years later the Galena branch of the Illinois Central Railroad was extended to the town.

The city's most famous son, Ulysses S. Grant moved to Galena to work in the family's store in 1860. He returned to Galena at the close of the War and was presented with a handsome home by the grateful citizens of the community. This home is now a State of Illinois Historic Site and is open to the public. About 80,000 visitors per year tour the Grant Home.

After the Civil War, Dubuque became the regional trade center and Galena began a quiet decline. Dredging ceased on the Galena River in 1893 and the port closed. In the 1940s the government built a levee to protect the town from chronic flooding. The levee and floodgates, along with a lack of pressure for new development, allowed the preservation of many of the historic buildings in the community. In recent years, Galena has capitalized on its history and on the charm and character of its historic buildings to become a major tourist destination in the area, attracting over one million visitors per year. September and October are the most active months for tourism, followed by July and August, which are most popular with families. Tourism numbers have remained flat for several years, due in part to competition from the National River Museum in Dubuque, prompting the formation of a local group whose purpose is to increase the number of visitors. This group has focused on the Historical Society and on improving and/or enhancing the museum.

The Galena-Jo Daviess County Historical Society was founded in 1938 "to collect, preserve, and interpret materials representative of the history and material culture of

Galena, Jo Daviess County, and the Upper Mississippi Lead Mining District of Illinois, Wisconsin and Iowa...” and operates the Galena History Museum and an historic blacksmith shop. The Society is governed by a nine member Board of Directors, has an endowment of approximately \$7,500.00 and had a 2006 FY operating budget of \$153,672.00. The Collections Committee is currently the only standing committee of the Board. A Friends Group sponsors several fundraising events each year. Admissions, memberships and fundraisers are the primary methods of funding operations with monies from grants used for supplemental projects.

The Society has a paid staff of six with only the Executive Director and Assistant Director being full-time positions. Presently, the Curator position is only funded for six days per month. Other positions include three Visitor Services personnel. The budget does include some provisions for continuing education for three staff members annually. One focus of the staff has been to increase grant funding.

The museum is currently housed in an Italianate residence constructed in 1858 by Daniel Barrows. The Fraternal Order of Oddfellows purchased the house in 1922 and constructed a large two story addition to the rear for use as a meeting hall. The building passed to the city during the Depression and was used as the City Hall and Museum until a new municipal facility was constructed some years later. Although the City of Galena retains ownership of both the Barrows Mansion and the Old Blacksmith Shop, the Historical Society operates the museums and is responsible for utilities and maintenance.

The first floor of the Daniel Barrows Mansion is used for the museum shop, orientation area and restrooms with offices and exhibits housed on the second floor. The two very large rooms in the addition are used for exhibit space with smaller areas used for workrooms. The Old Blacksmith Shop is located several blocks away on Commerce St., which runs parallel to Main St. along the riverfront. It was recently restored and is exhibited as a working blacksmith shop with items made at the forge being sold in the shop. Currently, about 16,000 visitors per year tour the two facilities (museum 11,000; blacksmith shop, 5000).

The Daniel Barrows Mansion is located at 211 S. Bench St., one block from the central business district. Access to the museum from Main St. is gained by climbing several flights of steps to Bench St. above. Most visitors arrive on foot as there is no parking at the museum. The lack of visibility and difficulty of access, along with the absence of parking, probably contribute to the disparity in the number of visitors between the Grant Home and the museum.

The museum collections are unusual for a small town institution in that they contain several objects of national importance. These include the very large (about 9' x 12') Thomas Nast oil painting entitled “Peace in Union” which depicts Lee surrendering to Grant at Appomatox and a flag from the War of 1812. The collection also includes items relating to the early history, commerce, industry and agriculture of Galena and Jo Daviess County and to the nine Civil War generals that the town produced. One of the most

popular exhibits is an actual lead mine shaft into which visitors can see from an observation area in the museum.

Although the Barrows Mansion has served the Historical Society well in many ways, its continued use as a museum presents a number of challenges. The most serious and pressing are the environmental conditions in the building and the effect that they are having on many of the objects in the collection. Although the installation of central air conditioning in the 1922 addition would help to reduce relative humidity levels during the summer months, a more comprehensive program of climate control will be needed to provide conditions suitable for some of the more important and/or fragile objects in the collection. The building also has issues pertaining to lighting, handicapped accessibility, inadequate spaces for collections storage and for programs, and lack of parking and visibility from Main St.

The renewed focus on increasing tourism has prompted the Board to consider relocating the museum. Three sites have been proposed. The first is a vacant parcel on the highway just outside the city limits adjacent to a nature area. This option would offer advantages including the opportunity to construct a new building that would be designed specifically for the museum, plenty of parking and good visibility from the main road into town, but it would be isolated from other attractions such as the Grant Home, Main St. and the Old Blacksmith Shop. The construction of a proposed four-lane highway with a bypass around Galena may divert existing Highway 20 traffic from the site.

The second site is an Italianate mansion known as Stillman Manor which is currently operated as a Bed and Breakfast. The property includes a Carriage House with a large addition that is used as a Wedding Chapel. This site is immediately adjacent to the Grant Home, the most visited site in Galena, and there is the possibility that an arrangement for a shared Visitor Center with restrooms and parking could be worked out with the State of Illinois. Although the location and partnership with the Grant Home site would be beneficial, the buildings will present many, if not more, of the same challenges that the Society faces with the current facility.

The third possibility is the acquisition of one of the industrial buildings on Commerce St. for adaptive reuse by the museum. This option would have the advantage of proximity to both Main St., with its shops and restaurants, and to the Old Blacksmith Shop. There are also several public parking lots nearby. Most of the buildings in this area have large, open spaces that might be adapted for museum use more readily than an historic house. However, none have the historical or architectural significance of either the Daniel Barrows Mansion or Stillman Manor.

While each of these options offers opportunities for growth, each has drawbacks and challenges as well. Whether to move the museum and, if so, where to relocate are probably the most momentous decisions that the Historical Society has faced thus far and should be made only after the thorough investigation and consideration of all options. These investigations should reflect the goals and vision for the museum defined in a new

Long Range Plan and should include not only the suitability of the sites in question but also the building, rehabilitation and moving costs associated with each.

If the museum is to achieve a facility that provides exhibition and environmental conditions suitable for a collection of this significance, it will need to relocate or rehabilitate the existing building and its systems. In order to justify, and finance, such a major undertaking, increasing the number of visitors will be critical.

The future holds much promise for the museum. It is well operated, although understaffed, and has loyal supporters and hardworking volunteers from the community who provide invaluable assistance with both day to day operations and special events. The staff and the Board and members of the Galena – Jo Daviess County Historical Society are to be commended for their hard work and dedication to building a museum with a collection of national importance as well as for their foresight in planning for the future.

Conservation Assessment Program:

The Conservation Assessment Program (CAP) is a grant program of the Institute of Museum and Library Services (IMLS) and is administered by Heritage Preservation. In *The Conservation Assessment: A Tool for Planning, Implementing and Fundraising*, a publication of the Getty Conservation Institute and Heritage Preservation, the conservation assessment is defined as:

“... a broad study of the Museum’s policies, practices, and conditions that have an impact on the care and preservation of the collections. Conceptually, a conservation assessment has three components: the gathering, interpretation, and reporting of information. Thus, a conservation assessment identifies and describes the problems that affect the preservation of collections, analyzes the causes of these problems, and suggests a plan of action.

Such an assessment of the Museum’s collections and physical plant is a fundamental first step in addressing conservation needs and can be of lasting value to a museum. An assessment should not merely enumerate problems but should serve as the foundation for a long-range conservation strategy. In addition, its conclusions and recommendations may argue effectively for fund-raising efforts or for the reallocation of resources within the Museum.

The goal of the assessment is to enable the museum staff to develop an overall Collections care program, and to establish conservation as an integral part of the museum’s mission. An assessment, therefore, may not only be the impetus for a plan of action, but may become the catalyst for fundamental change, raising the level of consciousness about the need to protect the cultural patrimony.”

Funding for an architectural assessor is included for institutions that are part of historic sites, or are located in structures not originally designed as museums or in older buildings with additions and environmental systems from different time periods. **An older building that possesses historic or architectural significance should be treated as an**

artifact so that its integrity is preserved while those without significance may simply be treated as a shell which houses the collections. Since the collections and the building are interrelated, the effect on each must be weighed when considering alterations. These concerns were addressed at a meeting of conservation and preservation professionals from the Association for Preservation Technology and the American Institute for Conservation of Historic and Artistic Works in 1991 and a statement of principals, “The New Orleans Charter” was adopted. All preservation, restoration, rehabilitation or alterations to the site should recognize these principals and should be done in conformance with the *Secretary of the Interior’s Standards and Guidelines for Preserving, Rehabilitating, Restoring or Reconstructing Historic Buildings*.

According to the *Handbook for Assessors*, published by Heritage Preservation, Inc.(1998):

“The CAP survey provides an overview of issues relating to collections and building care, including environmental conditions, exhibitions, storage, the condition of the collections and building, and collections policies. The survey report resulting from the assessment will aid the institution by:

- providing recommendations for conservation action, both immediate and long-term;
- providing the basis for the development of a long-range institutional plan for the care and maintenance of the collections and building; and
- serving as a fund-raising tool for implementation of future conservation projects.”

Survey Methodology:

The primary purpose of the site visit and resulting written report is to identify conservation problems which warrant correction and to offer suggestions for their resolution. Because the information in the report is based on readily accessible conditions, some problems may warrant recommendations for more comprehensive investigation or for confirmation of findings. The architectural conservator’s role is to identify strengths and weaknesses and to recommend the next steps that should be taken to address these issues. These observations are not meant as criticism of personnel or policies, as it is recognized that many circumstances over time have contributed to these conditions, but are offered in a constructive manner for the good of the building. The good intentions of the institution or its staff are not in question.

In order to evaluate the general condition and the historic and architectural integrity of the buildings, an on-site architectural survey was conducted on October 16 & 17, 2007, by Linda F. Grubb AIA, of Linda F. Grubb & Associates, Architects, of Barrington, Illinois. A general survey of the collections was conducted concurrently by Mr. Thomas M. Edmondson of Heugh-Edmondson Conservation Services of Kansas City, Missouri.

The architectural survey consisted of the reviews of the completed site questionnaire and other documentation relating to the history and development of the site; inspections of the

buildings; interviews with Ms. Nancy Breed, Executive Director and Ms. Alice Toebaas, Curator; and informal discussions with some members of the Board of Directors and other museum volunteers and personnel. During the site visit, brief informal presentations were made by each assessor and time was provided for questions and discussion.

This report consists of an outline of recommendations for the buildings and the spaces within based on observations of the existing conditions; an explanation of proposed rehabilitation parameters to provide a framework for current and future planning; and of classification of the spaces in reference to these parameters. Appendices include supporting materials relating to the preservation and rehabilitation of historic buildings.

SITE EVALUATION CRITERIA

The decision to relocate or to rehabilitate the existing facility is the most pressing issue faced by the Board at this time and will have major implications for the museum far into the future. Such a decision should only be reached after careful study and evaluation of each option. Criteria should be established, prioritized, and applied to each site. Issues should include, but not be limited to, the following:

Site:

Visibility

Proximity to other tourism attractions

To serve as a draw for visitors who might not otherwise seek out the museum

To possibly become partners in shared facilities such as a Visitor Center, restrooms, parking and maintenance

Parking

Proximity to the Old Blacksmith Shop

Buildings:

Size

Suitability for museum use

Environmental conditions for the collections

Open space for exhibit areas

Availability of appropriate spaces for collections storage and work areas

Room for administrative offices

Space suitable for meetings and programs

Accessibility

Architectural interest and integrity (Will the building itself attract visitors?)

Condition

Cost:

Initial acquisition costs

Rehabilitation or new construction costs

Moving expenses

Operational costs

Utilities

Maintenance

Buildings

Grounds, including parking

Interest expense

Financing:

How will initial funding be accomplished?

Community involvement

City

County

Historical Society

Local groups

Individuals

Grants

Loans

Other

How will interest and additional costs of operating an expanded facility affect the yearly budget?

Community Support:

Historical Society membership including museum volunteers

City and county government

Chamber of Commerce

Tourism Board

Local service organizations

Individuals not associated with the museum

Other

Viability:

Capital Expenditures

Operational

Endowment*

**The importance of building an adequate endowment cannot be overstressed. It is often recommended that for every \$2 raised for capital expenditures, \$1 should go to endowment to ensure that the facility can be maintained and operated over time.*

It is often helpful to prioritize each of the criteria to be considered in order of importance by assigning a numeric value. The criteria should then be applied objectively to each option, including that of rehabilitating the existing facility, for comparison.

Finally, and perhaps most importantly, the Board must establish realistic parameters for viability. Every institution has an optimum size and level of operation. Serious consequences, including insurmountable debt and even failure, can occur if unachievable goals are adopted and pursued. Each of the options must be evaluated in relation to realistic expectations regarding number of visitors per year, upfront costs, ongoing expenses, increase in paid staff and volunteers that may be required, levels of funding that can be attained through a capital campaign, and the ability of the museum to meet increased yearly expenses on an ongoing basis.

Recommendations:

- 1. The Board should enter into the long range planning process as soon as possible (see below) to establish the vision and goals for the institution. The options for relocation or rehabilitation of the existing facility should be evaluated for how each would further these goals, and relate to this vision, using the criteria described above.*
- 2. A Capital Campaign should be instituted with 25% (or more) of the funds raised being restricted to endowment.*

HISTORIC AND ARCHITECTURAL CONSIDERATIONS

Consultation with the State Historic Preservation Office (SHPO) is required when Federal (and sometimes when State or even Local) government funds are expended on projects which affect properties listed on, or eligible for, the National Register of Historic Places to ensure that the property will not be adversely affected by the proposed work. This review may apply to the interior, the exterior, the site, and, in some cases, subsurface archaeological concerns. It may also apply to properties adjacent to an historic site (even though they may not themselves be historic) where alterations might affect the historic property.

It is the responsibility of the recipient of public funds to determine if such a review is required and, if so, to secure approval prior to commencing work. Failure to do so can result in forfeiture of funding if the work is deemed inappropriate.

Even if public funds are not to be expended, it is important to always treat the historic building as an artifact. It is possibly the most valuable, and the most irreplaceable, object in the collection but it is probably the only artifact that is subjected to daily use by the public and to the effects of weather. As such, it merits careful conservation using methods that will preserve the historic character, finishes and features without harm and rehabilitation measures that preserve the historic architectural integrity of the structure.

CONSERVATION PLANNING AND MANAGEMENT CONCERNS AND RECOMMENDATIONS

General Planning and Management

Long Range Plan:

The first step toward conscientious conservation of buildings and collections is careful and comprehensive planning. The Long Range Plan is a document that outlines a carefully considered set of goals and identifies strategies for meeting these objectives within a set period of time. The Long Range Plan should address each issue faced by the organization including, among other things, finances, programs, membership, collections policies, space needs, building preservation and maintenance, and capital projects such as building restoration, rehabilitation, expansion or accessibility alterations.

***Recommendation:** The Society should develop and adopt a Long Range Plan which defines the goals of the organization and outlines building and collections requirements which must be met in order to accomplish these goals. It is important to note that, should these requirements necessitate modifications to an historic building, an Historic Structures Report should be obtained to guide the work so that the integrity of the building is maintained and to ensure that all work is accurate and appropriate.*

Space Needs and Utilization Plan:

One of the most common problems facing museums is the lack or inefficient or inappropriate use of space for collections storage and/or exhibits. Although this issue will be addressed in more depth in the collections assessor's report, any implementation of the recommendations therein will have a direct effect on the buildings. The needs of both the buildings and the collections must be carefully balanced when making decisions regarding the use of existing spaces, as well as expansions or alterations, to ensure that the conservation and integrity of each is maintained. A Space Needs and Utilization Plan identifies space requirements and prioritizes major goals while addressing these concerns objectively.

***Recommendation:** Develop a Space Needs and Utilization Plan which addresses collections and museum programming needs and requirements. It is essential that this plan be completed as soon as possible since it will be essential to the consideration of potential museum sites.*

Handicapped Accessibility:

It is important that all buildings that are open to the public are accessible to everyone and accessibility is required by local building codes for new and

substantially remodeled buildings. The Americans with Disabilities Act (ADA) was enacted in 1990 and is federal civil rights legislation that is administered by the Department of Justice and these requirements are, in some cases, slightly different from local code requirements.

Title III of the ADA requires organizations to make a “good faith effort” to eliminate barriers to accessibility that are “readily achievable”. That includes those actions that can be undertaken without great cost or negative impact on the historic resource.

ADA covers a wide range of disabilities including sight and hearing impairment and conditions such as arthritis, as well as those disabilities that confine individuals to wheelchairs. While it may not be physically feasible, or financially possible, to make an historic building fully accessible, it is important to do as much as possible to make buildings and programs open to all.

An Accessibility Audit of the site and buildings is a tool that identifies areas or features that are inaccessible and suggests alterations that are “readily achievable”. Alterations should be prioritized as follows:

- Path of travel
- Restrooms
- Alternate program facilities

For instance, it makes no sense to install a handicapped restroom in a building with no accessible entrance. Once the audit has been completed alterations can be scheduled, over time, as budgetary constraints permit.

Recommendation: *If the museum remains in the Daniel Barrows Mansion, an Accessibility Audit should be performed, readily achievable recommendations implemented and more extensive modifications included in the budget to be implemented as soon as financially possible. If the museum relocates, any new construction should be made handicapped accessible. Should the museum relocate to another historic building, an Accessibility Audit should be performed and the recommendations executed as part of the rehabilitation.*

Fire Safety and Emergency Preparedness Planning:

Fire is a serious threat to historic buildings and prevention practices should be scrupulously followed. Electrical systems should be inspected regularly and brought up to building code requirements as necessary. Usage should always be limited wherever the system is at all questionable.

Smoking should be strictly prohibited on the premises as should the use of overloaded extension cords, lighted candles or wood burning stoves or fireplaces. All hazardous materials such as cleaning solvents or paint must be kept in a fireproof cabinet or, whenever possible, stored off-site. Combustibles and trash should not be allowed to accumulate.

Staff, maintenance contractors and workmen employed in any rehabilitation or construction work must be required to have a fire extinguisher with them when performing any work that requires extreme heat such as soldering pipe, removing paint or installing roofing membranes. At the end of each work period, either a fire watch of at least one hour must be maintained to make sure that no materials are smoldering or an infrared heat sensor should be used to test for concealed combustion.

Fire extinguishers should be located throughout the building and all staff members should be trained in their use. Extinguishers must be inspected by the local fire department on a regular basis and fire department personnel should be acquainted with the historically significant features of the building so that, for example, in an emergency they might break out a non-historic window instead of an original one. Smoke and/or heat detectors should be installed as unobtrusively as possible throughout the building and should be alarmed directly to the fire department. Automatic sprinkler systems can prevent the catastrophic consequences of both fire and the water used to suppress it and, though costly, may merit consideration.

Procedures for dealing with other threats such as flood, wind, or even terrorist attack, and contact information for museum staff should be outlined in an Emergency Preparedness Plan. Copies of the Emergency Preparedness Plan should be on file with local fire and police departments as well as with all staff and board members. All museum staff members, as well as members of the fire and police departments, should be made familiar with the procedures outlined in the plan.

Recommendation:

- 1. Develop an Emergency Preparedness Plan and provide implementation training to all staff and selected volunteers and public safety officials.*
- 2. Install fireproof cabinets and store all flammable materials therein.*

Documentation: Often old blueprints and drawings, photographs, historic structures reports and other documentation are stored on site. So, if disaster strikes, this record of the building is lost making restoration or reconstruction difficult or impossible. Though few older buildings have complete documentation of the changes that have been made over their history, it is important to document the existing condition of each structure as well as any future alterations.

Recommendation: *All existing documentation should be copied, measured drawings made and photographs taken of the buildings. Photographs should include each exterior elevation and each interior space with close-ups of significant details. This material should be stored in a bank safety deposit box.*

Maintenance Planning:

Responsible stewardship of an historic property requires the development and adoption of suitable policies and procedures for building care. A Maintenance Plan provides a written record of these procedures and documentation of all work performed in the following areas:

Routine Maintenance - All work, no matter how ordinary, should be performed using the most appropriate treatments and materials and should be recorded.

Inspection and Documentation - Regular inspections should be scheduled and their findings recorded.

Periodic Repair and Conservation Treatments

- When conditions require work beyond routine maintenance a preservation professional should be engaged to determine what mitigation measures are appropriate and, if necessary, to prepare detailed drawings and/or specifications.
- After mitigation measures are determined, execution of the required repairs should be made and followed by a post-treatment inspection to verify that the work has been performed properly.

Records Keeping - In addition to records of routine maintenance and of special treatments undertaken, the following detailed information should be documented:

- Description of the condition requiring the work
- Name and contact information of architect or engineer consulted
- Names and contact information of contractors and their field personnel
- Copies of contracts, with costs, and scopes of work
- Detailed descriptions of the work
- Equipment manuals and warranty information
- Product information and suppliers
- Before and after condition photographs
- Comments on the effectiveness of the work

References - Maintain a library of support information including, but certainly not limited to, the following publications:

- [The Secretary of the Interior's Standards and Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings](http://www.nps.gov) (www.nps.gov)
- [Preservation Briefs](http://www.nps.gov) (www.nps.gov – copy each topic that applies to your building)
- *Caring For Your Historic House* by Heritage Preservation and the National Park Service (1998)
- *Housekeeping for Historic Sites: Assessment, Planning & Training* by the National Trust for Historic Preservation (1993)
- *Historic House Museums: a Practical handbook for their Care, Preservation and Management* by Butcher-Youngmans (1991)

Recommendation: Develop and implement a comprehensive Maintenance Plan

for the property that includes the components outlined above. Consult with a preservation architect if needed to recommend methods or materials that will preserve and/or protect historic materials.

Housekeeping Policies and Plan:

One of the most often overlooked areas of building maintenance is housekeeping, especially in non-public areas. However, the assortment of miscellaneous materials that often accumulate in basements, attics, and storage and work areas can serve as a home for pests, can encourage mold and mildew and can even, in some cases, be a fire hazard. Piles of debris can obscure problems that are occurring in the building, delaying their detection and resulting in expensive repairs.

The presence of live plants or of foodstuffs in the building can also attract or host pests that could damage collections objects. Damage to the building or collections objects can also be caused by well intentioned, but inexperienced, workers or by inappropriate cleaning products. (Ammonia-based products, for instance, can damage some objects including the plastics that are often used in protective cases.) Both of these issues will be addressed in more depth in the collections assessor's report.

It is important that sound housekeeping policies be written and adopted and that all workers are trained in these policies. The Housekeeping Plan should include the following:

Policies and Procedures – A copy of the written housekeeping policies and approved methodology for each housekeeping task

Task Schedule – All work, no matter how mundane, should be scheduled and recorded.

List of Approved Cleaning Materials and Methods – Safe materials and methods should be described in detail for each housekeeping task. Only those materials and methods listed should be used that have been investigated as to their appropriateness and approved.

Inspection and Documentation – Each space within the building and site should be inspected on a regular basis and its condition recorded. These inspections can be used to determine the need for periodic, non-routine, housekeeping tasks.

Periodic Task Schedule and Documentation – This may include such activities as cleaning out an attic and removing any debris or unnecessary accumulated materials from the site, washing mildew with bleach, or other non-routine housekeeping tasks.

Recommendation: *Develop and implement a Housekeeping Plan that includes the components listed above and train volunteers in the use of methods and materials that will preserve and protect historic finished and collections objects.*

GENERAL CONSERVATION AND ENVIRONMENTAL CONCERNS

Climate Control: The most difficult issue to be faced in adaptively reusing an historic building for housing collections is that of balancing the temperature and relative humidity inside the building so that it is safe for collections objects without causing damage or deterioration to the structure. The difficulty lies in the fact that historic construction methods allowed the relative humidity inside the building to fluctuate in concert with outside conditions, but collections objects are best conserved with constant temperature and relative humidity levels.

In a Midwestern climate, with cold winters and hot, humid summers, the set-points for indoor temperature and humidity may need to be adjusted seasonally. It is important that these changes take place slowly, over a period of weeks, for the safety of some architectural finishes and collections objects. Each building will have different tolerances and so should be assessed individually to determine set-points that are appropriate for it. Likewise, some buildings have wings from different periods that were built using different methods or materials and may need to have separate heating and humidification zones.

If indoor humidity is introduced it is important to monitor the building to detect any signs of stress. Signs that the indoor relative humidity is too high include (but are not necessarily limited to) condensation on window glass, the presence of mold or mildew, paint peeling from exterior walls, spalling of brick or masonry walls and, in some cases, efflorescence. Relative humidity levels can be raised to protect collections objects without adding moisture to the air by lowering the temperature. For this reason, it may be advisable to keep indoor temperatures between 65 and 68 degrees F during the winter months.

When new systems are introduced into an historic building it is essential that the work does not damage the historic fabric of the structure. Forced air systems are often preferred in buildings housing collections because the danger of leaking pipes is mitigated. However, installation of ductwork can be difficult in many older buildings. In a multi-story building it is often preferable to install one system in the attic and one in the basement so that vertical duct runs can be reduced or eliminated. If air-conditioners or humidifiers are installed in an area above collections, or even finished space, they should be installed on a metal pan and with condensate drain lines to prevent leaks. It is always wise to engage a preservation architect to work with mechanical engineers or HVAC contractors to ensure that the integrity of the building is maintained whenever installing or altering heating, cooling, humidification or de-humidification systems.

There are four gas forced-air furnaces in the existing facility, each four years old. The two systems in the Barrows Mansion include central air-conditioning but funds were not available at the time to include central air with the furnaces in the 1922 addition, where a window unit is currently being used on the second floor and nothing is used on the main floor. The Society has applied for a grant to pay for the installation of a central air-conditioning system in this wing.

Recommendations:

- 1. Continue the environmental monitoring program and log information on a regular schedule. The outside temperature should always be recorded at the same time as the indoor conditions.*
- 2. If the museum is to remain in the existing facility, a preservation architect and/or mechanical engineer with experience with historic buildings used as museums should be consulted, in conjunction with an objects conservator, to design alterations to the system using data recorded through a full cycle of seasons. These alterations should include the installation of central air-conditioning systems in all exhibit and collections storage areas.*
- 3. If the Society decides to relocate the museum, new environmental systems will be important in the design, or redesign, of the new facility. The design and specification of these systems should be prepared by a mechanical engineer in consultation with an architect, both of whom have experience in museums located in historic buildings, and an objects conservator familiar with the collection.*

Airborne Pollutants and Dirt:

The most common airborne pollutants are dust and gaseous contaminants. Gaseous contaminants include the sulfur dioxide from automobile exhaust systems; volatile organic compounds from fresh paint, stains and finishes and new carpet; ozone from aerosol cans; formaldehyde from certain composition wood products; and other similar pollutants. Some of these pollutants can cause pitting or staining on brick or stone walls. The serious damage that they can cause to collections will be addressed in the collections assessor's report.

Dust and dirt are abrasive and will hasten wear on historic finishes and wear as well as on the fibers in textiles. A more serious form of common dirt is urban soot, which can cause discoloration and stains on building materials and collections objects. Dust caused by farming practices can be a seasonal problem in more rural areas. Cleanliness in a museum setting is essential, not only for the protection of the collection but also to avoid frequent repainting, which is not only costly but also adds to the build up of finishes on historic surfaces. Dust and dirt allowed into the building also requires more dusting of collections objects which, even with carefully trained housekeepers, can result in accidental damage.

Recommendations:

- 1. Change the filters on heating and ventilation equipment frequently and use fine particulate filters wherever possible.*
- 2. Keep windows and doors closed as much as possible. Check weatherstripping and/or caulk around openings and repair as required.*

- 3. Use "HEPA" vacuums for housekeeping to remove fine particulates from the air and to avoid moving dust around the building.*
- 4. Keep basement and storage areas clean to prevent the transmission of dust, dirt and pests through the building through ventilation systems.*

Light Management:

Both architectural finishes and collections objects are subject to light damage. Light levels, duration of exposure, and ultraviolet rays must all be carefully monitored and controlled or eliminated. Ultraviolet light, though not visible to the human eye, is especially damaging to finishes and to most collections objects. This type of light is found in sunlight, in fluorescent lights and in some kinds of halogen lights.

Light control is critical because light damage is cumulative and it is irreversible. Architectural finishes, especially historic textiles and wallpaper, are subject to fading and color change as are fabric or paper collections objects and paintings, a subject which is addressed more completely in the collections assessor's report. Furniture or finishes on stained wood millwork or floors will fade with prolonged light exposure. Light fixtures inside display cases can also generate enough heat to damage sensitive items.

The windows in the exhibit areas are fitted with shades or are covered, which protect objects from sunlight, but the incandescent and most of the florescent lighting fixtures are giving off high levels of UV emissions. There is also a skylight that lets high levels of ultraviolet light into the upstairs hallway where some paper objects, which are particularly light sensitive, are displayed.

Recommendations:

- 1. The lighting fixtures and/or bulbs should be replaced as per the recommendations in the accompanying Collections Survey.*
- 2. A new lighting plan for exhibit areas should be devised to even the light out to about 10 FC uniformly throughout and UV at less than 25 microwatts / lumen.*
- 3. An ultraviolet filter should be installed on the skylight or it should be removed and the opening sealed.*

Pest Control:

Pests, which include insects, rodents, birds, and small animals, represent a variety of threats to both the building and to the collection. Buildings are most vulnerable to wood-destroying insects such as powder post beetles, termites and carpenter ants, but mice, squirrels and even raccoons can cause serious damage, especially if they become trapped and try to chew their way out. Birds can carry neurological diseases and bats are sometimes rabid. Their droppings can stain surfaces and have the potential to transmit disease.

Most wood-damaging insects are attracted to dampness so it is important to keep soil at least 8" below the top of building foundations and to divert water from the roof, or from

overland drainage, away from the building. Leaks in roofs, around flashings, or from other vulnerable areas should be repaired immediately. Because water travels it is possible to have dampness at some distance from the actual leak, making regular inspections of the entire building for water and insect damage essential.

In order to avoid damage from pests it is important to prevent them from entering the building, to institute and maintain good housekeeping practices, and to inspect for signs of their presence on a regular basis. When pests are discovered, it may be advisable to engage the services of an exterminator who has an understanding of the special requirements and restrictions of museum collections. If no exterminator with this experience is available in your area, museum staff may need to write specific instructions on safe methods and materials to be used and may need to oversee the treatment.

Recommendation: *Continue the Pest Management Program and seal all openings in the building where rodents or insects can enter.*

Lead Paint:

Given the age of the structure it is likely that some of the paint found on, and inside, the building contains lead. Subject to local code requirements, finishes that are sound and are not alligatored or flaking generally should not be removed. If covered with new, sound coatings they are considered to be encapsulated. The effect of paint removal on the historic fabric of the building should always be considered. Should it become necessary to remove paint finishes containing lead due to severe deterioration or damage, all work should be done in strict accordance with approved methods for the removal, and disposal, of hazardous materials and in conformance with local building codes and ordinances.

Recommendation: *If old finishes must be removed, a qualified specialist should be consulted to identify hazardous materials and to specify and oversee abatement procedures.*

GLOSSARY of TERMS

Preservation Terms:

Preservation focuses on the maintenance and repair of existing historic materials and retention of a property's form as it has evolved over time.

Rehabilitation acknowledges the need to alter or add to a historic property to meet continuing or changing uses while retaining the property's historic character as it has evolved over time.

Restoration depicts a property at a particular period of time in its history, while removing evidence of other periods.

Reconstruction re-creates vanished or non-surviving portions of a property for interpretive purposes.

Redesign changes the architectural concept of a building.

Renovation modernized an historic building by means of inappropriate alterations and the elimination of important features and details.

Architectural and Structural Terms:

Architrave: In classical architecture, the member between the capital and frieze; also the framing of a door or window opening.

Ashlar: A smoothly-dressed or squared rectangular building stone.

Baluster: An upright railing support.

Balustrade: The railing and its balusters comprise a balustrade.

Belt Course: A horizontal board or a horizontal band of masonry that extends across a façade or around a building; often it is connected at window levels.

Chamfer: A beveled edge or corner.

Clapboard: A thin horizontal board with a thicker lower edge, used as siding.

Coping: A protective cap placed along the top of a masonry wall to protect it from water penetration.

Corbel: A supporting projection or a series of masonry projections, each stepped farther out from the plane of the wall.

Dentil: A single rectangular member of a row of small, toothlike blocks used as a decorative element.

Double pile: A rectangular building that is two rooms deep in plan.

Entablature: The horizontal member comprising the architrave, frieze and cornice.

Fenestration: The arrangement and proportion of windows and doors in the walls of a building.

Frieze: The middle portion, often ornamented, of a classical entablature.

Header: A brick or stone block laid so that one of its short faces is visible.

Lunette: A semicircular window or opening.

Modillion: A low, ornamental bracket or scroll under the soffit or the cornice.

Mullion: A vertical member separating two windows.

Muntin: A secondary horizontal or vertical framing member separating panes of glass in a window or panels in a door.

Newel: The post that supports a handrail at the foot or landing of a staircase.

Parapet: A low wall projecting above the roofline.

Pediment: A triangular or curved gable above a window, door or wall.

Quoins: Blocks of bricks or dressed stone defining the corners of a building, laid so the blocks are alternately long and short.

Reeding: Narrow half-round moldings resembling bundled reeds, used as a decorative element.

Reveal: The vertical side of a door or window opening, between the frame and the wall.

Rustication: An architectural treatment used primarily in masonry, but sometimes in wood as well, where beveled or cut edges are used to define joints.

Shiplap: Interlocking horizontal tongue and groove wood siding that is overlapped so that the lower edge of each board interlocks with a groove in the top edge of the board below it.

Single pile: A rectangular building that is one room deep in plan.

Soffit: The underside of an architectural element such as an overhang.

Stretcher: a brick or stone block laid so that one of its long faces is visible.

Transom: a small operable or fixed window set above a door or window.

Winder: The wedge-shaped tread used where a stair turns at an angle.

Conservation Terms:

Damp-proof course (DPC): A layer of impervious material that prevents moisture from rising from the ground into the walls of a building.

Efflorescence: A white powdery deposit on masonry or plaster caused by mineral salts migrating to the surface as a result of evaporation.

Hygro-thermographs: Instruments used to monitor temperature and humidity levels over a period of time, preferably through a full cycle of seasons.

Repointing: The process of removing deteriorated mortar from the joints of a masonry wall and replacing it with new mortar to match the original.

Rising damp: The process in which water in moist soil is drawn into brick or stone walls by capillary action.

Sandblasting: The process of cleaning a surface with a jet of abrasive sand or grit.

Spalling: Flaking of the outer face of masonry, often caused by expanding moisture in freezing conditions.

Vapor barrier or vapor retarder: A layer of impervious material that prevents the passage of moisture laden air.

FOR THE JOINT PRESERVATION OF HISTORIC STRUCTURES AND ARTIFACTS

Arising from a concern for the coexistence of historic structures and the artifacts within them; Recognizing our responsibility as stewards to provide the highest levels of care for the structures and other artifacts placed in our care; Recognizing that many significant structures are used to house, display, and interpret artifacts; Recognizing that historic structures and the contents placed within them deserve equal consideration in planning for their care; Recognizing that technologies and approaches will continue to change; and Recognizing that those involved in preservation are part of a continuum, and are neither the first nor the last to affect the preservation of historic structures and artifacts: We, therefore, adopt these principles as governing the preservation of historic structures and the artifacts housed in them:

1. Institutions' statements of mission should recognize the need to preserve the unique character of both the historic structure and artifacts.
2. The preservation needs of the historic structure and of the artifacts should be defined only after study adequate to serve as the foundation for the preservation of both.
3. Requisite levels of care should be established through the interdisciplinary collaboration of all qualified professionals with potential to contribute.
4. Appropriate preservation must reflect application of recognized preservation practices, including assessment of risk before and after intervention, and the expectation of future intervention.
5. Measures, which promote the preservation of either historic structure or the artifacts, at the expense of the other, should not be considered.
6. Regarding the public use, the right of future generations to access and enjoyment must outweigh immediate needs.
7. Appropriate preservation strategies should be guided by the specific needs and characteristics of the historic structure and artifacts.
8. Appropriate documentation of all stages of a project is essential, and should be readily accessible and preserved for the future.
9. The most appropriate action in a particular case is one which attains the desired goal with the least intervention to the historic structure and the artifacts.
10. Proposed preservation strategies should be appropriate to the ability of the institution to implement and maintain them.

CLIMATE CONTROL in HISTORIC BUILDINGS

Few historic buildings are easily adapted to incorporate modern mechanical systems. Careful planning by a team of qualified preservation professionals is required to ensure that the design and installation of these systems are appropriate to the individual structure and that they do not damage or detract from the architectural integrity of the historic building.

It is important to recognize that applying modern standards of occupant comfort and providing specialized environments for museum collections and archival materials can prove detrimental to historic building materials and decorative finishes. While collections conservation needs must be addressed, a balance should be achieved that will not cause damage or deterioration to the historic fabric of the building.

Since the life cycle of most mechanical systems is only 15 to 30 years, an historic building should not be drastically altered or its integrity sacrificed in order to meet short-term systems objectives. Installing exterior wall insulation and vapor retarders, weatherstripping openings, and sealing operable windows and vents can make the building more energy efficient but will also affect the performance, and may reduce the life, of historic materials. A thorough understanding of the relationship between interior and exterior temperature and relative humidity levels, and of how the various components of a building work together as a system, is essential.

Moisture is the element that causes more damage to buildings than any other. Moisture can be present in a building in the form of vapor, liquid or solid. Water vapor travels by air movement or by diffusion; water in liquid form travels by capillary action. Air movement is reduced in a building that has been tightly weatherized by installation of vapor retarders; insulation; and by sealing, caulking and weatherstripping air leaks. Moisture may have to be removed from a very tight building by means of mechanical ventilation.

Moisture transfer through diffusion is also more critical in a tightly sealed building. As water vapor diffuses through building materials, it may be cooled to the point where it turns to liquid or ice and thus will cause damage. Vapor retarders and vapor barriers are used to reduce the rate of moisture transfer. They should always be used on the warm side of the wall.

Air temperature determines the amount of water vapor the air can hold. As air temperature rises, the amount of water vapor it can hold increases. Conversely, as air is cooled, the amount of vapor it can hold decreases, and condensation may occur. The dew point is the temperature at which air has been cooled to the point where water vapor condenses to liquid. The greater the differential between inside and outside temperature and humidity levels, the greater the opportunity for damage to occur through water vapor diffusion and condensation.

Relative humidity is the amount of moisture air holds in relation to the maximum amount it could possibly hold at a given temperature. The higher the relative humidity the higher the dew point temperature and therefore the risks of condensation are greater.

Convection refers to the action of warm air moving upward until it is cooled, or until it strikes a cooler surface, which can also result in condensation.

In an exterior wall, condensation can occur in or on building materials on the cold side as natural vapor pressure moves moisture from a warm, humid area to a cooler, dryer area. This action can cause deterioration of structural members; dampen insulation; hold moisture against exterior surfaces; cause corrosion of metal nails, angles, anchors, or wire lath; cause exterior paint failure; and result in efflorescence and salt deposits on exterior masonry. During cold weather the build-up of excess moisture in exterior walls can result in freeze-thaw damage. Condensation on cold surfaces, such as windows, results from too much moisture in the building and can cause deterioration of wood and metal sash and sills. Unfortunately, the installation of a vapor retarder in an historic wall is difficult and can result in damage to, or destruction of, significant materials. The installation of insulation and vapor retarders in an historic building should be undertaken

only after a thorough study of the building by a qualified licensed preservation professional has justified this step.

Climate control in an historic building used to house collections and archival materials involves a delicate balancing of the conservation requirements of the building and the collections and the comfort of the occupants. For instance, while conservators usually recommend a constant humidity level of somewhere between 40%-55%, with fluctuations over a 24-hour period never to exceed 10% (and ideally not to exceed 1.5%), as being best for most organic materials and mixed collections, the humidity level that is optimal for an historic building fluctuates with the outdoor conditions, especially temperature. Since wide swings in temperature, both daily and seasonally, are common in the Midwest, a constant 50% relative humidity level in the building would likely result in damage to historic materials. Likewise, while most historic buildings were designed for and function best with natural ventilation, this can be detrimental to collections by allowing dust, pollution, and insects into the building and by causing abrupt fluctuations in temperature and humidity levels to occur.

Each historic structure is unique, and the design and installation of new mechanical systems, or the rehabilitation and retrofit of existing systems, should be undertaken by a qualified team of preservation specialists consisting of a preservation architect; mechanical, electrical and/or structural engineers with experience in historic buildings; and a collections conservator. Their recommendations will be based on the use of the building; the existing construction systems and conditions; the architecturally significant spaces, finishes, and other features to be preserved; local building, fire and accessibility codes; and the cost and maintenance requirements of the system. As a general rule, heating, ventilation and air-conditioning (HVAC) systems in historic buildings, especially those used to house collections, should be operated and monitored on a daily basis only by trained museum or maintenance staff to ensure preservation of the building and collections.

EFFLORESCENCE

Efflorescence is the whitish stain of soluble crystallized salts that is deposited on the face of masonry by the evaporation of water. These salts may come from the materials in the wall or may be drawn into the wall from ground water carrying dissolved mineral salts, as from fertilizer. Water that rises vertically, or “wicks up” into a wall, is called rising damp. It can be identified by a “tidemark”, or horizontal stain of efflorescence, on the wall. The wall is relatively dry and salt free above the tidemark but remains damp, with the salts in solution, below. The tidemark can be relatively wide because it will rise and fall with the seasons as ground-water levels change.

Other causes of efflorescence may be air or water-borne pollutants, excessive washing or chemical cleaning of the masonry with too strong a chemical or by inadequate rinsing after cleaning. Another source is moisture moving through the wall picking up the soluble salts found in ordinary Portland cement and depositing them on the surface. Although Portland cement mortar is too hard to be used safely with softer old brick, because it is commonly used in modern masonry construction, it is often inadvertently used to repoint old masonry.

Although efflorescence itself is sometimes more unsightly than it is harmful to the building, these salts can be damaging to collections and therefore it is especially hazardous in a museum, especially in exhibit or collections storage areas. It is, however, a warning sign that water is entering the wall and that more serious damage may follow. Efflorescence may also indicate the presence of subflorescence, an accumulation of soluble salts beneath the surface of the masonry which can lead to conditions such as appalling and exfoliation and eventually to deep deterioration of the materials.

Efflorescence can be monitored by brushing it off the wall and watching it for at least two weeks to see if the stains return. This method may indicate whether or not the moisture problem is currently active. However, it is possible for a wall to continue to effloresce for some time after a water problem has been resolved or not to effloresce while it is still somewhat damp and salt laden. Laboratory analysis of the crystallized salts can help identify the cause of efflorescence.

Two excellent sources of information concerning efflorescence and its diagnosis and mitigation are *Preservation Brief #39: Holding the Line, Controlling Unwanted Moisture in Historic Buildings*, published by the U.S. Government Printing Office and available at www.nps.gov and *Masonry: How to Care for Old and Historic Brick and Stone*, published by the National Trust for Historic Preservation.

While it is often possible to correct moisture problems in foundation walls by improving drainage around the building, the moisture may be derived from other sources. It is probably advisable to consult with an architect trained in the preservation or conservation of historic buildings who can help to diagnose the source of moisture causing the efflorescence. Causes and the corresponding remediation should be studied carefully and cautiously to ensure that no unintended damage to the building will result

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Helpful Websites for Preservation and Rehabilitation Information

www.cr.nps.gov/ National Park Service (Source for preservation, conservation, rehabilitation and restoration information)

www.nationaltrust.org National Trust for Historic Preservation

www.ncptt.nps.gov/pir/ National Center for Preservation Technology and Training

www.culture.gov.on.ca/english/culdiv/heritage/conote9.htm Accessibility and Historic Buildings

<http://disaster.lib.msu.edu> Disaster Mitigation Planning Assistance

www.culture.gov.on.ca/english/culdiv/heritage/conote1.htm Eight Guiding Principles in the Conservation of Historic Buildings

www.solinet.net/ Solinet (Online Library)