



CITY OF SAN ANTONIO
OFFICE OF HISTORIC PRESERVATION

HISTORIC DESIGN GUIDELINES
SUSTAINABILITY GUIDE FOR HISTORIC STRUCTURES

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Sustainability in Historic Preservation

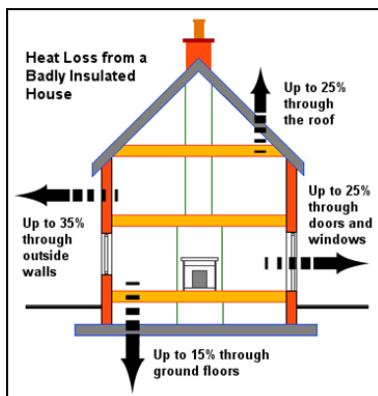
Historic structures offer many advantages to their inhabitants. Simply by inhabiting a historic structure, one can reduce the amount of construction related carbon emissions as well as the amount of raw materials that are consumed in the manufacturing of building materials and the construction of new structures. Historic houses were constructed using materials and construction techniques that different from those of the past few decades. Many massing and architectural features exist to provide natural ways of cooling, natural light and ventilation. Knowing this, increasing the energy efficiency of a historic structure must be done strategically in a whole-house approach.



Throughout the life of a structure, many repairs will need to be made. Wood windows will need to be restored, the roof will need to be replaced, the foundation will need to be leveled, porches will need to be reconstructed, siding and trim will need to be repaired and repainted and electrical, mechanical and plumbing systems will need to be upgraded. With each of these previously mentioned scopes of work, the home owner may be able improve the energy efficiency of their structure all while maintaining its architectural integrity. While a period of rehabilitation is an opportune time to improve your structure's sustainability, strict attention to detail must be paid to the many significant elements that are original to the structure. All work should be done in accordance with the *Historic Design Guidelines*.

Where should you start?

Energy audits are a great way to begin the process of increasing your historic structure's energy efficiency. Whether performed by a professional auditor or by you, pinpointing areas of heat gain and loss is vital. Blower door tests and infrared sensors can be used to find air leaks, however, you may need to analyze your energy usage from the past year or longer in order to determine what changes will be effective.



Reduce your structure's air infiltration

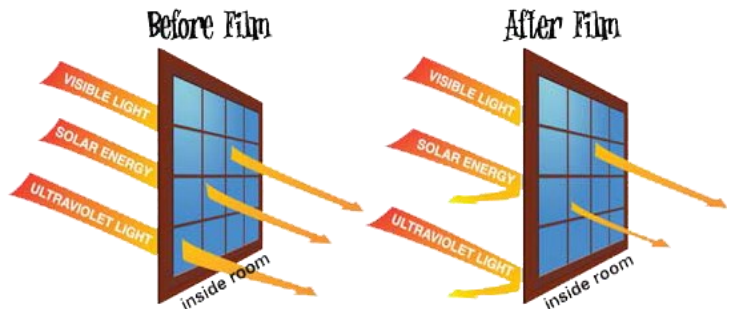
If you're looking for just one thing that you can do to improve your historic structure's energy efficiency, you can start by reducing air infiltration. Historic structures often feature structural and architectural elements that have over time developed gaps or cracks in their surfaces which allows conditioned air to escape. Any penetration in the structure's envelope can potentially allow conditioned air to escape if not properly sealed and insulated. A few common areas of air infiltration are shown in the diagram to the left and are: bypasses in the attic floor, crawl spaces, electrical and gas service entrances, window and door openings and cracks in façade materials.

Did you know? Did you know that a gap of only 1/8 of an inch under a 36-inch wide door lets in as much air as having a 2.4 inch wide hole in your house's wall?

Heating and Cooling

Historic structures can have outdated and inefficient heating systems. Given that many historic structures do not feature the floor, wall and attic space for modern HVAC units, a holistic approach may be needed to maximize on your structure's heating and cooling potential. If a complete rehabilitation and upgrade in mechanical, electrical and plumbing systems is in your approved scope of work, a modern system may be your best option. Below are ways that you can maximize your historic structure's heating and cooling potentials as a collective effort.

Solar window film which is available clear in appearance, can be approved administratively by Office of Historic Preservation staff and can reduce the amount of visible light, solar energy and UV light that enters your historic structure. Reducing these elements reduces the amount of solar heat your structure gains, which in turn could reduce your energy bills during summer months. Most importantly, clear film is non-invasive to your historic structure.



Draft blocking window inserts can be installed on the interior side of historic wood windows. Whether you select custom fabricated window inserts or a “do it yourself” insert, this solution can result in greater energy efficiency for your historic house.

New insulation such as spray foam can improve your historic structure's energy efficiency. Depending on your structure's date of construction, it might not have any insulation at all. Air sealing and insulating key places in historic structures such as attic spaces, crawl spaces, around heating/cooling ducts and water pipes provide a benefit with a low risk of damage to your structure's architectural integrity. This should be done by a professional to insure that proper air movement and ventilation remains to prevent mold growth and low air quality.

High efficiency lighting potentially could not only reduce the amount of energy you use, but lights such as LED's produce less amounts of heat than traditional incandescent or halogen light bulbs, provided that a proper thermal management environment has been created.

Sun shades are vernacular to San Antonio and may be appropriate depending on design, materials and installation method.

Windows

In historic homes, windows are an integral part of the design. They were designed to not only be aesthetically pleasing, but were necessary as a functioning component to the building by providing light and ventilation. The loss of original windows also has great potential to negatively impact the appearance of a historic home. Building facades lose proportionality and depth as modern replacements are introduced.

Historic wood windows can be maintained or restored to working order. Preservation of original architectural features, including windows, is encouraged in the City of San Antonio Historic Design Guidelines. Nevertheless, there is an abundance of replacement window products that are too often used by historic home owners seeking to “upgrade” their aging properties.

In an age where energy reduction is at the forefront of every homeowner's mind, windows are often blamed as the leading culprit of heat gain/loss. The criminalization of “drafty old windows” is nothing new; window manufacturers have long been pointing out the faults of old windows while promoting attractive solutions (their products). New low-e, gas-filled and triple pane replacements may seem like an exciting solution for homeowners coping with their monthly energy bill. Walk into any home-improvement store, and you may be feeling the pressure to replace.

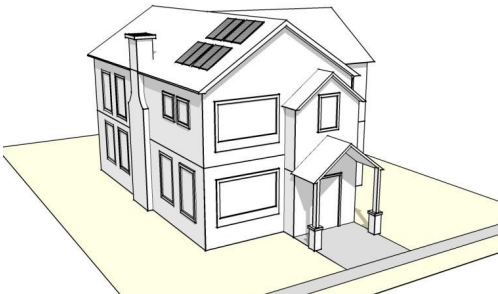
Refer to the Historic Design Guidelines, Windows: Repair, Replacement and New Construction for more information regarding new windows in relationship to sustainability.

Solar photovoltaic systems

There are benefits to the installation of solar photovoltaic systems to any structure, however, the installation of these systems to historic structures and within historic districts should be done in an appropriate manner. There are factors to take into consideration when installing a solar photovoltaic system to the roof of a historic structure. The Guidelines for Additions 6.C. and the Guidelines for New Construction 7.C. address the proper location and installation of solar photovoltaic systems within San Antonio's Historic Districts and landmarks.

Location— Solar photovoltaic should be located on the side or rear roof pitch of the primary historic structure. When systems cannot be located appropriately on the side or rear roof pitch, locate solar collectors on a garage or outbuilding. Ground mounted systems are also appropriate. Where possible, locate solar collectors behind roof forms that will obscure their view from the public right of way.

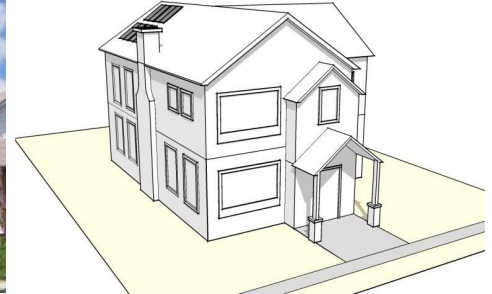
Inappropriate location



Inappropriate location



Appropriate location



Mounting—Solar photovoltaic panels mounted on sloped roofs should be mounted flush with the surface of the roof. Additionally, panels mounted to flat roofs should be mounted flush to the roof surface. If a flush mounting is unachievable, panels should be located toward the interior of the roof surface where they will not be seen from the public right of way. Collectors that are similar in color to the roofing material should be used.

Inappropriate mounting—slope and color



Appropriate mounting—slope and color



Appropriate mounting—slope and color



Ensure that the installation of solar photovoltaic systems does not negatively impact original or architecturally significant roof features. An installation that may harm the structural integrity of the roof should be avoided. When submitting an application for the installation of a solar photovoltaic system, a site plan, roof plan (showing the location of panels), photos of the existing roof and mounting information should be submitted with a completed HDRC Application.

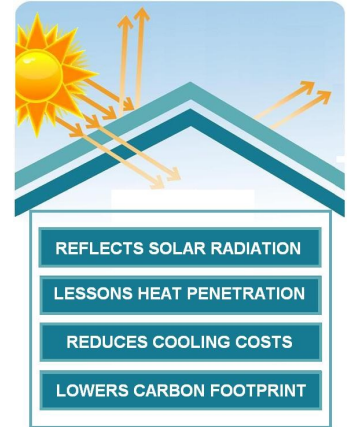
Did you know? Did you know that CPS Energy is developing a solar program available for San Antonians who aren't able to located solar photovoltaic systems at their own property? For more information regarding CPS Energy's solar rebate program, visit: <https://www.cpsenergy.com/en/my-home/ways-to-save/rebates-rebate/solar-photovoltaic-rebate.html>

Roof Design

Did you know that the installation of a white roof on a historic structure can lower the amount of energy used in cooling? Light colored roofing materials can better reflect the sun's ray ultimately reducing the structure's heat gain. In addition to the use of a white colored roofing material, there are also white roofing materials that can be installed beneath a roof's visible surface material that can also reflect the sun's heat. This allows for a wider variety of roofing materials and can lead to a more energy efficient historic structure that maintains its historic roofing material.

OHP Historic Design Guidelines and White Roofs

- Changes to roof material color (without change in material) will continue to be approved administratively. For example, gray asphalt shingles could be replaced with white asphalt shingles.
- Roll-on white coatings applied to asphalt shingles will require HDRC approval and will be reviewed on a case-by-case basis.
- Roll-on white coatings applicant to metal roofs may be approved administratively provided that the roof has been previously painted.
- New metal roof installations will follow current protocol.
- Historic roofing materials which are indicative of the character or construction period of the building should be preserved (clay or concrete tile, slate, etc.).

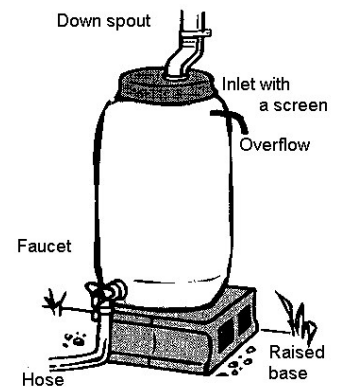


Landscape Design

Water conservation is often priority amongst residents of South Texas. By living in a historic district, individuals have already taken a large step toward water conservation by living on smaller lots. There are however additional actions that homeowners can take to increase the level of water conservation of their property. Each of these actions should be done in accordance with the *Guidelines for Site Elements* of the *Historic Design Guidelines*.

Rainwater catchment systems can be used to harvest rainwater. Whether your rainwater use goes toward maintaining landscape elements, gardening or toward heating or cooling your historic structure, there are many catchment designs available with varying levels of incorporated technology that can be located out of sight from the public right of way. Rainwater catchment systems may be appropriate to remain unscreened provided they feature appropriate materials and an appropriate design for a historic district.

Native xeric plant materials that are native to South Texas should be used in landscape design to reduce water usage. At no time should the historic lawn coverage of the lot be reduced by more than fifty percent. The Unified Development Code Appendix E: San Antonio Recommended Plant List provides a list of xeric plant materials that are appropriate for historic residential settings. Inappropriate materials for wholesale front yard landscaping include materials such as artificial turf, decomposed granite and gravel. Maintenance to landscaping should remain in compliance with all City Codes and Ordinance.



Appropriate landscape design



Inappropriate landscape design



SAWS (San Antonio Water System) offers a variety of outdoor conservation programs, information and rebates to promote water efficiency in landscaping and irrigation. Resources including species selection and xeriscaping techniques are available at their website: <http://saws.org/Conservation/Outdoor/>

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Additional Resources

Keeping a historic structure in good condition is an ongoing process which if done properly can maintain the structure's energy efficiency. Below are some resources from the National Trust for Historic Preservation, the National Park Service and the United States Environmental Protection Agency that provide information on various sustainability efforts.

The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings: <https://www.nps.gov/tps/standards/rehabilitation/sustainability-guidelines.pdf>

Weatherizing and Improving the Energy Efficiency of Historic Buildings: <https://www.nps.gov/tps/sustainability/energy-efficiency/weatherization.htm>

New Technology and Historic Properties: <https://www.nps.gov/tps/sustainability/new-technology.htm>

Greening Older and Historic Buildings: <http://www.preservationnation.org/information-center/sustainable-communities/buildings/#.V0jVejUrJQI>

Saving Windows Saving Money: <http://www.preservationnation.org/information-center/sustainable-communities/green-lab/saving-windows-saving-money/#.V0jVnDUrJQI>