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Residential Noise Mitigation Best Practices

The Reno-Tahoe Airport Authority (RTAA) sound insulation program began in 1995 and concluded in 2014 after the RTAA had completed sound insulation construction on over 5,100 eligible homes that qualified under Federal Aviation Administration (FAA) guidelines. The primary goal of the sound insulation program was to provide a minimum 5 decibel reduction in aircraft noise within noise sensitive rooms such as bedrooms. Although the RTAA program has concluded, the RTAA recommends the following best practices for residents disturbed by aircraft noise within their homes.

EVALUATE YOUR HOME AND PROPERLY MAINTAIN IT

Building materials provide varying levels of noise buffering. For example, brick walls shield more noise than wood frame construction. Double-pane windows are quieter than single-pane windows. Focusing on the weakest points of the home will generate the greatest protection from exterior noise.

Exterior sound, such as roadway or aircraft noise, follows the path of least resistance into homes. Windows, doors and roof vents are the most common penetrations into a home. Other penetrations include air-conditioning units, pet doors, stove vents, chimneys, mail slots, etc.

If a penetration is decorative in nature and can be sealed, consider sealing it.

If a penetration cannot be sealed permanently, consider closing it when not in use. This will make it difficult for exterior sound

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EVALUATE YOUR HOME AND PROPERLY MAINTAIN IT (CONT.)

to find an easy opening into the home. Examples of penetrations which can be sealed when not in use include fireplace flues, mounted air conditioners, and swamp coolers.

Note: *All penetrations require proper maintenance of their seals. Regular caulking and weather stripping improve the seals and decrease exterior sound penetration. Additionally, installation of storm windows and storm doors can provide a layer of protection less expensive than full replacement.*

When trying to determine a starting place for your modifications, we would suggest beginning with the windows in your bedrooms. Acoustical or high grade residential windows in your bedroom could significantly reduce sleep disturbance issues associated with aircraft noise.



CONSIDER SINGLE ROOM OR PARTIAL HOME IMPROVEMENTS

Significant noise mitigation can be achieved with just single room or partial home improvements.

During our hot northern Nevada summers, open windows go a long way towards improving home livability. However, open windows allow exterior sound to enter the home. Although expensive, incorporating central air conditioning into the home would allow windows to be closed year round.

Skylights and chimneys, angled towards overhead aircraft, can be improved with the installation of a secondary pane of glass or a chimney cap damper. The secondary pane of glass would provide an additional layer of protection from exterior sound. The chimney cap damper would allow the chimney flue to be closed when not in use.

In a 2-story house, the second story provides a natural buffer for rooms on the first floor. Mitigating noise entering the second floor will greatly improve the quietness of the entire house.

If sleep disturbance is the primary issue, focusing primarily on the bedrooms will provide significant benefit.



Sound Insulation Program Home

USE ACOUSTICALLY RATED PRODUCTS AND PROVEN CONSTRUCTION METHODS

WINDOWS:

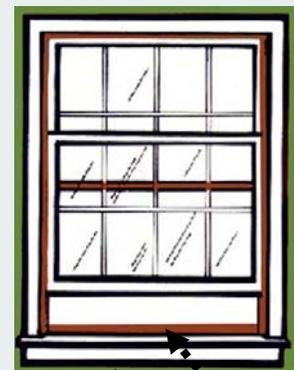
Acoustically rated windows are built in a number of different ways, but typically include multiple sashes, increased glass thickness, and increased airspace between the glass panes or window sashes. If an acoustically rated window is not feasible, we would suggest a high-grade residential, double-pane window, which should provide a significant difference, particularly in those properties that currently have single-pane, aluminum windows.

- Apply and maintain adequate quality elastomeric caulking
- Add and maintain weather stripping
- Install an acoustically rated storm window, minimum STC 30, to an existing window
- For fixed, inoperable windows, install interior pane of secondary glass, minimum STC* 39, in addition to existing window
- Replace existing single or double pane windows with acoustically rated windows, minimum STC 40

Note: *Acoustically rated windows typically have multiple sashes and larger frames which decrease the glass square footage and the amount of natural sunlight entering the home.*

ADDITIONAL TIPS:

When replacing doors and windows, it is important that any cavities between the door or window and the existing wall be filled with insulation to mitigate noise coming through any gaps between the acoustically rated door or window and the existing wall construction. Sealants should also be appropriately and generously applied to seal those same gaps and prevent unwanted weather and air from infiltrating the home.



INSULATION
& CAULKING

WEATHER
STRIPPING

Acoustically Rated Sliding Glass Door



USE ACOUSTICALLY RATED PRODUCTS AND PROVEN CONSTRUCTION METHODS (CONT.)

SLIDING GLASS DOORS:

- Apply and maintain adequate quality elastomeric caulking
- Add and maintain weather stripping
- Install a secondary sliding glass door, utilizing 1/4" laminated glass, to either the interior or exterior of the existing sliding glass door
- Replace existing sliding glass door with acoustically rated sliding glass door, minimum STC 35

Note: *Acoustically rated sliding glass doors typically have larger frames which decrease the glass square footage and the amount of natural sunlight entering the home.*

Flue Damper



FRENCH DOORS:

- Apply and maintain adequate quality elastomeric caulking
- Add and maintain weather stripping
- Replace existing French door with acoustically rated French door, minimum STC 35

Note: *Acoustically rated French doors typically have larger frames which decrease the glass square footage and the amount of natural sunlight entering the home.*

Acoustically Rated Exterior Door



EXTERIOR DOORS INTO LIVABLE SPACES (e.g. Front Door, Back Door, Garage Door between garage and house):

- Apply and maintain adequate quality elastomeric caulking
- Add and maintain weather stripping
- Install an acoustically rated storm door, minimum STC 35 to an existing door
- Replace existing door with acoustically rated door, minimum STC 38

Note: *Acoustically rated doors with inset glass are also available.*

ATTIC / WALL INSULATION:

- Install additional insulation within accessible attics to achieve minimum total R-Value** 30
- Where possible, install additional insulation within walls to achieve R-Value 19

WOOD FIREPLACE:

- Install a chimney / flue damper

ROOF VENTS:

- Install a baffle on gable roof vents

EXTERIOR VENTING RANGE HOODS AT ELECTRICAL APPLIANCES:

- Replace the existing venting range hood with a non-vented, re-circulating fan range hood

MOUNTED AIR CONDITIONERS / SWAMP COOLERS:

- Install a customized seasonably removable cover over the swamp cooler or mounted air conditioner when not in use
- Replace mounted air conditioners and swamp coolers with central air conditioning

BE AWARE OF THESE HARD-TO-MITIGATE HOME ITEMS:

SKYLIGHTS:

Skylights are extremely challenging because they are typically large in size and difficult to replace with an acoustically rated product. The extra weight of adding heavier acoustically rated secondary glass inside the skylight opening could create structural issues at the skylight opening. Additionally, applying a pane of secondary laminated glass will make it challenging to get to the exterior pane for cleaning purposes.

BAY WINDOWS / SUN ROOMS / GREENHOUSES:

The more glass, the more difficult exterior noise mitigation becomes. Bay windows, sun rooms, and small greenhouses are essentially walls of glass. The extra weight of heavier acoustically rated windows could create structural issues and require significant reinforcement. Typically, applying secondary glass is also not a feasible solution.

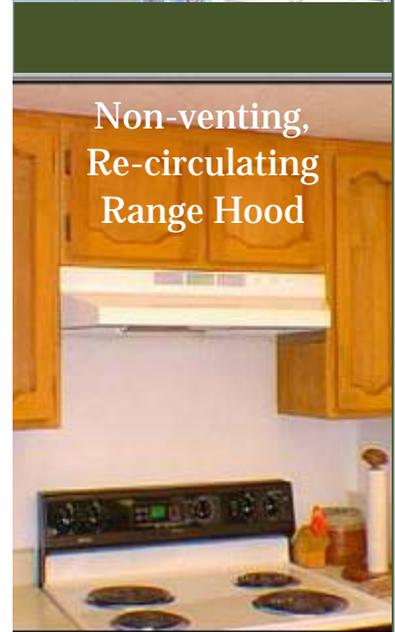
* **Sound Transmission Class** (or **STC**) is an integer rating of how well a building partition attenuates airborne **sound**. In the USA, it is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations.

** **R-Value** is the capacity of an insulating material to resist heat flow. The higher the R-value, the greater the insulating power.

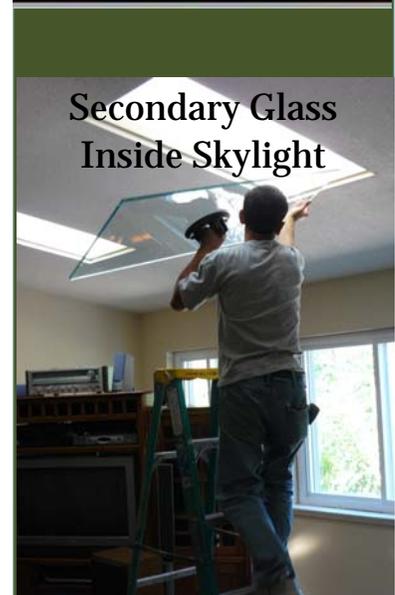
Baffle on Roof Vent



Non-venting, Re-circulating Range Hood



Secondary Glass Inside Skylight



FREQUENTLY, THE BYPRODUCT OF NOISE MITIGATION CONSTRUCTION IS THE INCREASED ENERGY EFFICIENCY OF THE HOME.

THERE ARE ADDITIONAL PROGRAMS IN NORTHERN NEVADA THAT MAY PROVE USEFUL TO HOMEOWNERS LOOKING TO MAKE THEIR HOME NOT ONLY QUIETER BUT MORE ENERGY EFFICIENT. MANY OF THE SUGGESTIONS LISTED IN THIS PUBLICATION ARE DUPLICATED IN THE WEBSITES BELOW:

SUGGESTED WEBSITES:

- [HTTPS://WWW.NVENERGY.COM/HOME/SAVEENERGY/ENERGYTIPS.CFM](https://www.nvenergy.com/home/saveenergy/energytips.cfm)
- [HTTPS://IMPACT-NV.ORG/RESOURCE/ENERGYFIT-NEVADA](https://impact-nv.org/resource/energyfit-nevada)

DISCLAIMER

** The suggested list of acoustical modifications within this document is generic in nature. Since every property has its own unique features and must comply with building, fire code and permitting requirements, it is always advisable to contact a licensed architect and/or contractor prior to making any modifications to your home.*



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