How does AIRCRAFT NOISE Affect Your Property?

Sound that reaches unwanted levels and is annoying or even painful is considered noise. Noise can be a problem because of its impact, or perceived impact, on people and animals, and their quality of life. Awareness of the most extreme noise levels that occur at Youngstown Air Reserve Station (YARS) and beyond its boundary is essential to successful development and an enhanced quality of life!

How Is Sound Measured?

Sound intensity is quantified in terms of decibels (dB), with 45 dB or less generally considered an acceptable noise level. Normal conversation typically measures 60 dB, while an ambulance siren from 100 feet away measures approximately 100 dB. Aircraft operations may create noises in even higher dB ranges, especially during takeoff and landing. The dB scale below identifies some commonly occurring noises, as well as the decibel level at which most people find noise physically painful (140 dB). The distances in parentheses represent the decibel level at those distances from the noise source.

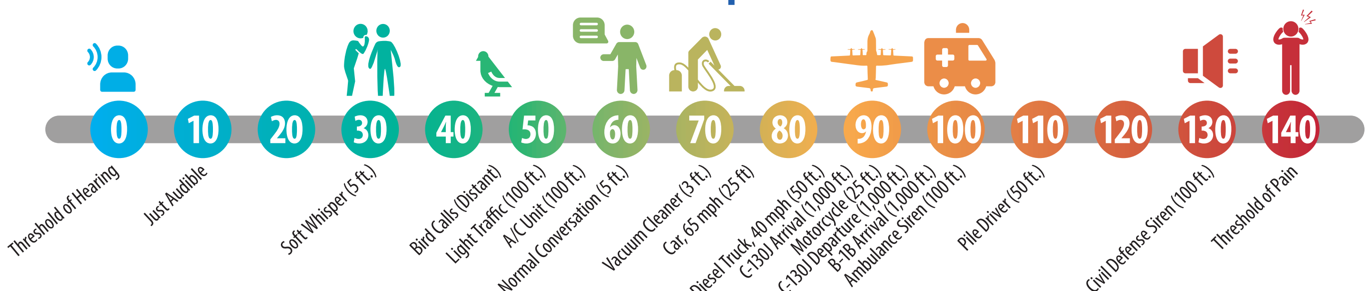
What Are Noise Zones?

To help property owners, developers, and planners anticipate noise levels around airports and military airfields, the average dB noise levels that are experienced near airfields over a 24-hour period, referred to as day-night average sound levels (DNLs), are used to define noise contours. DNLs are modeled in increments of five dB, with associated noise contours representing the farthest points away from an airfield where each DNL can be expected. The geographic expanse between DNL contours--where different land uses are considered compatible or not recommended based on noise sensitivity--are called noise zones. It is important to understand that noise contours are based on annual averages and that noise does not stop at contour boundaries. Noise exposure will vary based on several factors, including weather, aircraft type, and aircraft altitude. The DNL system is nevertheless considered a reliable model of aircraft noise patterns and means of anticipating community sensitivity to air operations.

Is Your Property Affected?

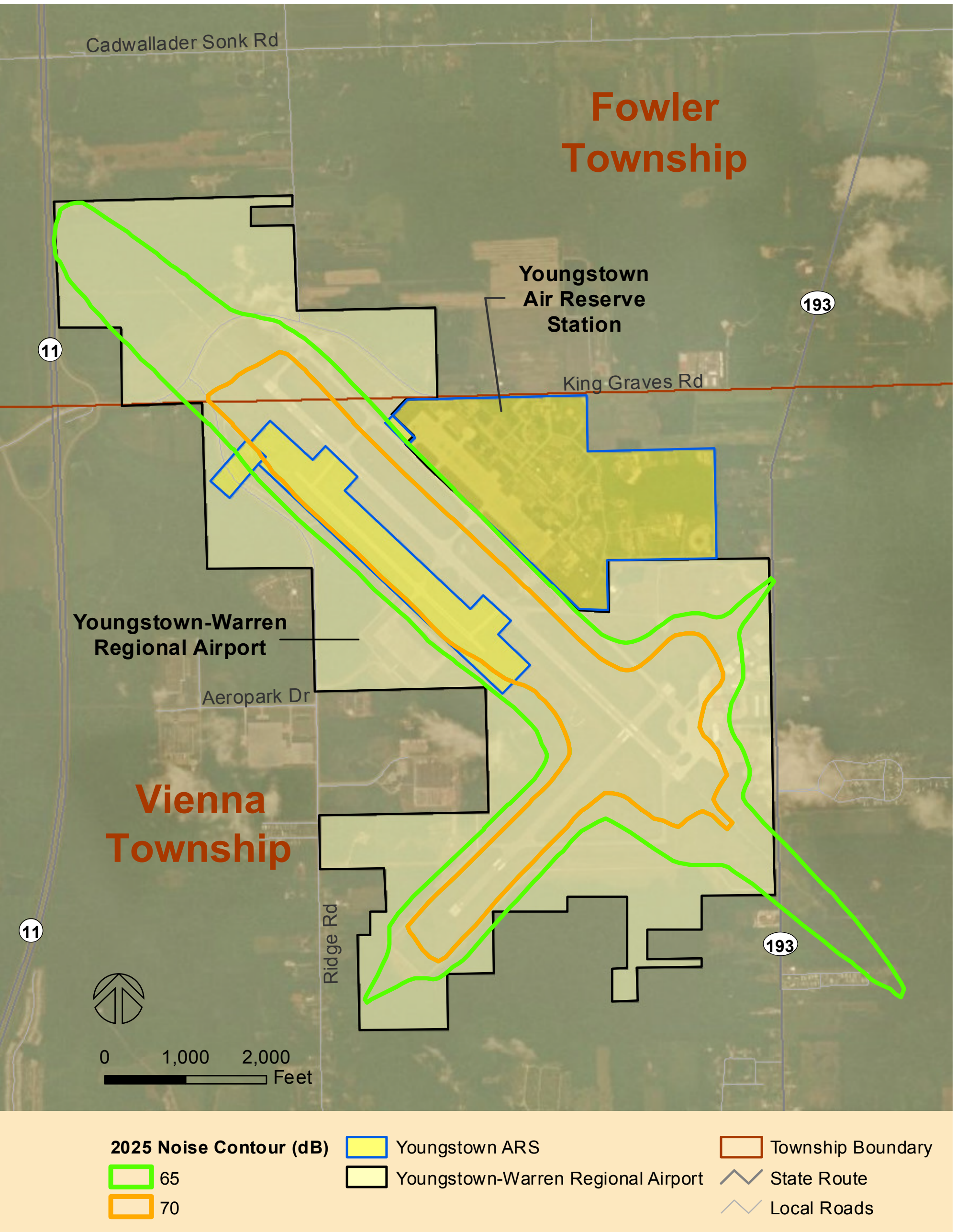
While few parcels are in noise zones, these parcels are likely to experience higher noise levels than properties outside noise zones, and noise-sensitive land uses may be negatively impacted. Before developing new land uses or expanding existing ones on property near YARS, owners and developers should know whether the property is located in a noise zone and what steps they may wish to take to reduce interior noise levels. Property owners may contact Vienna Township at (330) 394-2319 or Fowler Township at (330) 637-2653 to inquire whether a property is in a noise zone.

Common Noises Levels in Decibels from Specified Distances



Aircraft Noise at YARS

How is sound measured? Aircraft noise levels at YARS are influenced by several factors, including weather, flight frequency, aircraft type, flight altitude, and flight paths. NOISEMAP noise modeling software was used to develop the DNL noise contours at Youngstown ARS which range from 65 dB DNL to 69 dB DNL outside the airport property.



Recommended Land Use in Aircraft Noise Zones

Generalized Land Use Category	Noise Zone (dB DNL) 65-69
Residential	✔ (yellow)
Schools/Educational Services/Child Care Facilities	✔ (yellow)
Hospitals/Medical Facilities/Nursing Homes	✔ (yellow)
Public Assembly Areas and Facilities	✔ (green)
Places of Worship/Religious Facilities	✔ (yellow)
Commercial/Services/Trade/Business/Office	✔ (green)
Recreational/Open Space	✔ (yellow)
Agricultural (except livestock)	✔ (yellow)
Manufacturing/Industrial	✔ (green)
Transportation/Communication/Utilities	✔ (green)

✔ (green) = Compatible

✔ (yellow) = Compatible if structures are built to reduce interior noise levels to no more than 45 dB.

This table is meant as a general informational guide for recommended compatible uses. Specific uses within each category may be deemed compatible or not recommended. This table is not regulatory in nature.

Source: *Air Force Instruction 32-7063, Rev. December 2015*

How Can You Reduce Noise Levels in Your Home or Building?

Sound attenuation is the use of specialized construction techniques and/or sound-insulating materials to reduce noise from exterior sources inside structures. Understanding how sound is transmitted and which materials effectively block sound provides opportunities for property owners and developers to improve noise conditions inside buildings.

How Sound Travels Through Building Materials (Sound Transmission)

Sound transmission is characterized as either airborne or structure-borne. Airborne sound travels through the air as well as through materials and assemblies such as ceilings, walls, and windows. Structure-borne sound arises from the impact of an object hitting a surface and the resulting vibrations. The Sound Transmission Class (STC) is a numeric rating of how well materials and assemblies block airborne sound. Simply put, the higher the STC rating, the more effective materials are at soundproofing. A glass windowpane has an STC rating of about 25, meaning that sound can easily travel through the material, while an 8-inch-thick concrete wall has an STC rating of 72, meaning that very little sound will pass through it. Using higher-rated materials or combining materials to increase the overall STC rating of assembly types during construction or renovation can greatly reduce interior noise levels.

Recommended Sound Transmission Class Ratings for Common Walls

STC	Wall Assembly Type
33	Single layer of 1/2″ drywall on each side, wood studs, no insulation (typical interior wall)
39	Single layer of 1/2" drywall on each side, wood studs, fiberglass insulation
44	4″ hollow concrete masonry unit
45	Double layer of 1/2″ drywall on each side, wood studs, batt insulation in wall
46	6″ hollow concrete masonry unit
50	10″ hollow concrete masonry unit
55	Double layer of 1/2" drywall on each side, on a staggered wood stud wall, batt insulation in wall
59	Double layer of 1/2" drywall on each side, wood studs, resilient channels on one side, batt insulation
63	Double layer of 1/2" drywall on each side, double wood/metal stud walls (spaced 1″ apart), double batt insulation
72	8″ concrete block wall, painted, with ½′ drywall on independent steel stud walls, each side, insulation in cavities

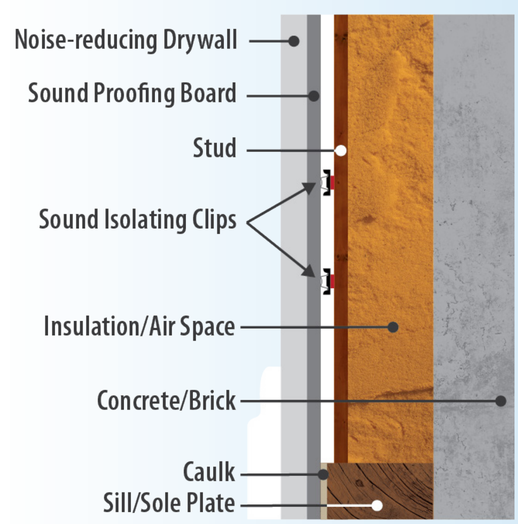
Source: *Noise Control in Buildings: A Practical Guide for Architects and Engineers, Cyril M. Harris, 1994*

Techniques to Soundproof a Wall

The primary sound barrier in any building is its walls, and several techniques can improve their STC ratings:

- ***Choose a noise-reducing drywall.*** Noise-reducing drywall usually consists of two dense gypsum cores separated by a layer of viscoelastic polymer, designed to absorb sound.
- ***Add mass to or thicken walls.*** Density and thickness are major factors in a partition's ability to block sound. Thick concrete walls attenuate sound better than drywall. Wall mass can by increased by adding layers of gypsum. When wall mass is doubled, STC ratings can increase by 5 dB.
- ***Increase or add air space.*** Air space within a partition that creates two independent walls can increase sound insulation. However, the resulting STC rating will be much lower than the combined ratings of each wall. A common way to add air space is with the resilient channels and a layer of gypsum. STC ratings can be improved by approximately 3 dB by adding a 1.5-inch air space, 6 dB by adding a 3-inch air space, and 8 dB by adding a 6-inch air space.
- ***Add insulation within the walls.*** Insulation fills the gaps between walls and studs, disrupting sound wave transmission and effectively absorbing noise. Using insulation with higher STC ratings and completely filling wall cavities will achieve the best sound reduction.
- ***Consider sound isolating clips.*** If you have access to the underlying studs of the wall, sound isolating clips can be used to help keep physically transmitted sounds from traveling through the studs to the drywall.

Materials Used to Soundproof a Wall



Wall Soundproofing Cross Section

YARS ▪ How does AIRCRAFT NOISE Affect Your Property?

How to Reduce Noise in Your Home or Business

Windows, doors, and other structural features that allow sound waves into your home or business can be modified or upgraded to reduce interior noise levels.

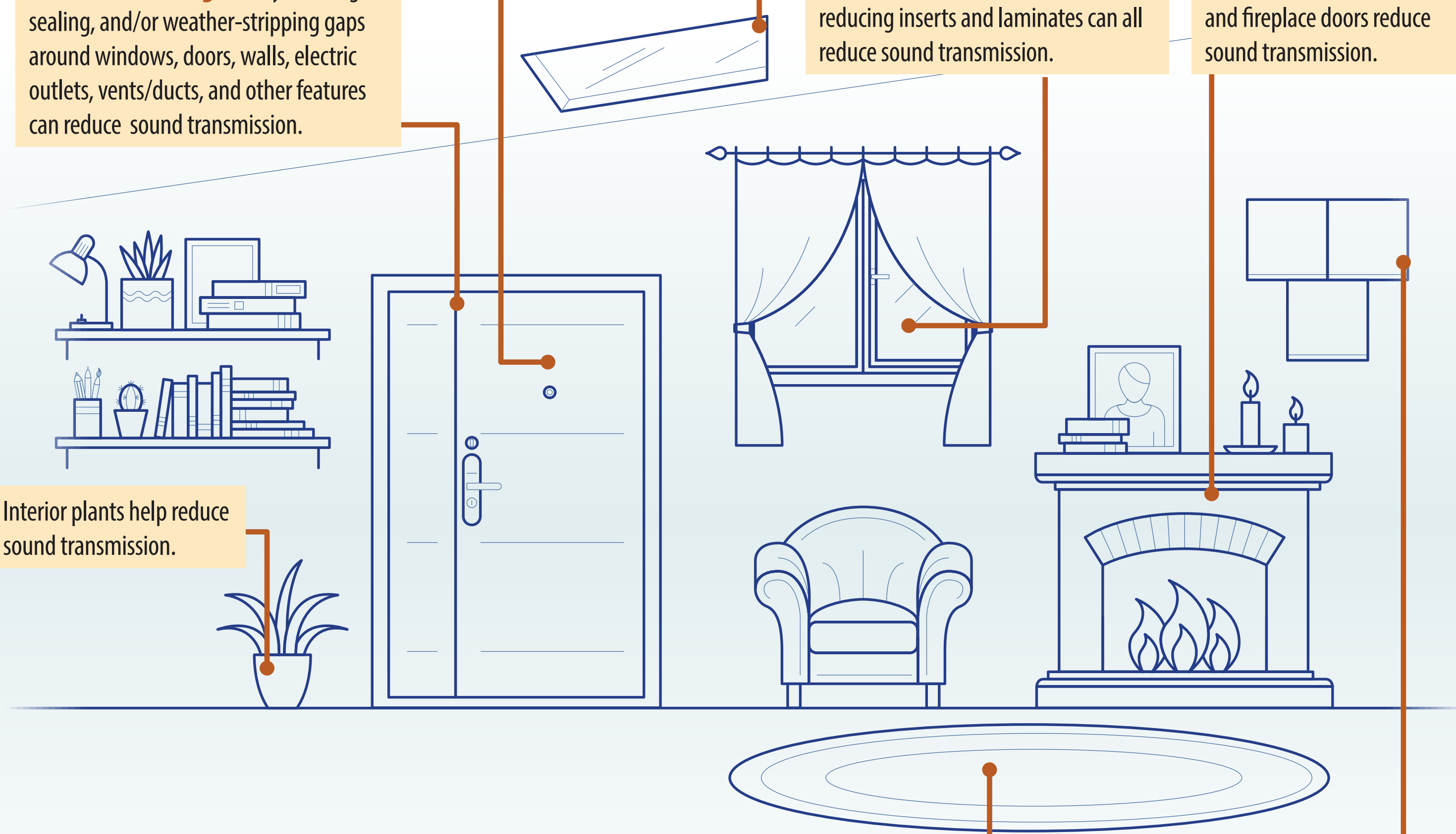
Doors. Acoustical doors and storm doors are heavier than typical doors and use special weather-stripping to enhance door seals. When installed properly, acoustical doors can attenuate a significant amount of noise.

Skylights. Acoustical skylights and secondary interior skylight panels are available to insulate building from sound.

Caulk and sealing. Safely caulking, sealing, and/or weather-stripping gaps around windows, doors, walls, electric outlets, vents/ducts, and other features can reduce sound transmission.

Windows. Double and triple pane windows, storm windows, and sound-reducing inserts and laminates can all reduce sound transmission.

Fireplaces. Acoustical chimney-top dampers and fireplace doors reduce sound transmission.



Interior plants help reduce sound transmission.

Fabrics and textiles such as carpet, furniture upholstery, and thick window curtains can absorb sound.

Sound-dampening panels and tiles absorb sound waves and effectively reduce interior noise.

For More Information Contact:

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www.planning.co.trumbull.oh.us

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