

## Noise walls & barriers – Frequently Asked Questions (FAQ) Page

### Question 1: How do I get a noise wall?

Answer: WSDOT does not construct noise walls by request or petition. WSDOT has a sequential stepwise process for a community to qualify for a noise wall:

1. There must be a funded project that widens the highway, adds a new highway, moves the highway closer to residents or opens a new line of sight to traffic, triggering a noise study (known as a Type 1 project).
2. Traffic noise impacts (greater or equal to 66 decibels) must be identified within the community, including parks and schools, to move to the next step.
3. The noise wall must reduce noise levels coming from the highway traffic by at least 5 decibels at a minimum of three impacted first row homes and be constructible (feasible).
4. If the wall is feasible, we determine if the wall is cost effective to build (reasonable) and housing density plays a role in this step. Higher density housing benefits more people and is more likely to meet this criterion.

If a community meets *all* four sequential steps above, then a noise wall is recommended for construction.

### Question 2: Does my home qualify for a Type 2 noise wall?

Answer: Traffic noise abatement was not considered for roadway projects prior to May 14, 1976. Type 2 projects are known as retrofit projects because they provide noise abatement for neighborhoods that were established before many of our highways were built or expanded. All eligible locations are ranked and prioritized according to current traffic noise levels, the number of benefiting residents, cost abatement, and the achievable noise reduction. These noise abatement projects are presented to the Governor's Office and legislature for funding considerations.

To be eligible for the Type 2 program, homes must have been constructed prior to May 14, 1976, and meet all the requirements of the sequential steps 2 - 4 as listed in the first question above.

### Question 3: Why does WSDOT consider 66 dB to be at impact for residential communities?

Answer: The Federal Highway Administration (FHWA) established the Noise Abatement Criteria (NAC) based upon various land use activities and noise levels with the interference of speech. Residential communities and outdoor use areas like picnic areas, trails, schools, etc. are considered at impact at 67 decibels. This is about how loud the average human perceives speech at a 3ft distance. WSDOT, however, wants to be conservative with this number and considers impact at 66 decibels.

Figure 1 below shows the Noise Abatement Criteria (NAC) table by land use category. More information regarding the NAC can be found in WSDOT's 2020 Noise Policy under the Tools, templates & links tab of our Noise- Environmental Guidance webpage.

| Activity Category | $L_{eq}(h)^*$ (dBA) at Evaluation Location | Description of Activity Category   |
|-------------------|--|--|
| A                 | 57 (exterior)                              | Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.  |
| B                 | 67 (exterior)                              | Residential (single and multi-family units)  |
| C                 | 67 (exterior)                              | Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings |
| D                 | 52 (interior)                              | Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.   |
| E                 | 72 (exterior)                              | Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F. Includes undeveloped land permitted for these activities.   |
| F                 | -  | Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing  |
| G                 | -  | Undeveloped lands that are not permitted   |

*\* $L_{eq}(h)$  are A-weighted (dBA) hourly equivalent steady state sound levels used for impact determination and are not design standards for abatement.*

*Figure 1 Noise Abatement Criteria (NAC) by Land Use Category*

#### **Question 4: I've taken noise measurements at my home that read up to 90 decibels. What is WSDOT going to do about the noise?**

Answer: While it's great that you're monitoring noise levels, please note that cell phones, computers, tablets, and/or video cameras don't have the same accuracy as our ANSI Type I noise meters, which are calibrated yearly to meet federal standards (23 CFR 772.11 (d)(3)).

When WSDOT collects traffic noise measurements, we take a 15-minute measurement of the average sound level, weighted to reflect how the human ear hears noise. This is called an A-weighted equivalent sound level (LAeq). According to our guidelines, if the 15-minute LAeq is measured at 66 decibels or higher, it is considered an impact. However, keep in mind that a community must meet all four of WSDOT requirements to be considered for a noise wall, even if impacts occur. (See Q1 for more details).

#### **Question 5: How effective are trees/shrubs at blocking noise?**

Answer: Studies have shown that trees and shrubs generally do not significantly reduce noise levels. Partly, this is because it takes decades for trees and shrubs to reach maturity and develop dense foliage, which is necessary for significant noise reduction. To effectively block noise, you would need a 100-foot-wide area of mature trees and dense undergrowth, which would reduce noise by about 5 decibels.

Additionally, federal regulations by the Federal Highway Administration (FHWA) do not approve the use of trees and shrubs for noise abatement along highways. However, trees and shrubs can provide a psychological benefit by blocking the view of traffic, making it seem quieter even though the actual noise levels remain the same. See *Figure 2* below.

## vegetation, distance and noise reduction

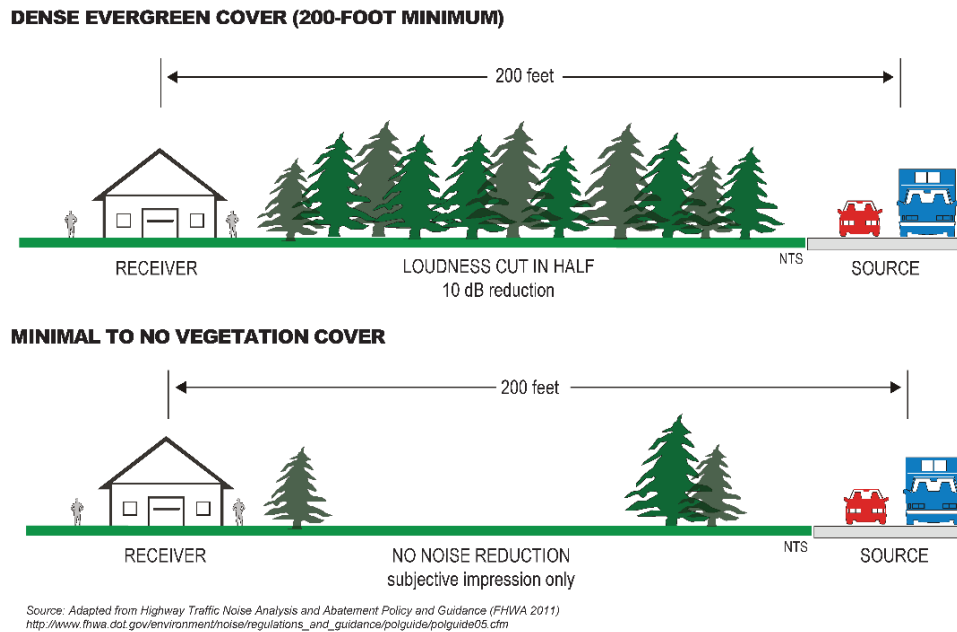


Figure 2 Vegetation, Distance, and Noise Reduction

### Question 6: I can hear trucks using their compression brakes ("Jake" brakes) from my home. Does our community qualify for a noise wall?

Answer: A community does not qualify for a noise wall just because of the sound from compression brakes, also known as "Jake" brakes. These brakes are an important safety feature and are legal in Washington if the noise they make is below 90 decibels measured at 50 feet. Trucks may need to use these brakes to safely slow down or stop, making this feature potentially lifesaving.

Excessive noise from compression brakes often comes from illegally modified exhaust systems. Local law enforcement is responsible for enforcing these laws, but it's very difficult for them to do so. The Washington State Patrol (WSP) is not equipped with noise meters and can only cite drivers if there is a problem with the muffler, brakes, or related parts. Alternatively, local municipalities may have their own laws regarding the use of compression brakes, so it's a good idea to check your local jurisdiction's municipal codes. WSP has found that very few trucks have issues with their compression brake systems.

### Question 7: I recently purchased a home next to the freeway, and the noise is louder than expected. How do we get WSDOT to build our community a noise wall?

Answer: We understand that freeway noise can be challenging, especially after moving into a new home. However, WSDOT can only build noise walls in specific situations. Federal regulations require us to conduct a noise study only when there's a Type 1 project, such as a highway expansion or major roadwork, that could increase traffic noise. Even then, a community must meet all four steps of WSDOT's noise policy to qualify for a noise wall. Please see Q1 for more details.

It's also important to consider noise levels when choosing a home near a freeway. Local jurisdictions or cities determine how close homes can be built to highways, and we recommend discussing any noise concerns with them as well.

### Question 8: What steps can I take to reduce noise in and around my home?

Answer: Residential communities are under Category B of FHWA's land use activities and only qualify for exterior or outside noise abatement measures, such as noise walls. As a result, here are several steps you can take yourself to reduce noise in and around your home:

- **Home Improvements**
  - Consider installing double or triple-pane windows, especially on walls facing the highway or in bedrooms.
  - Reinsulating your walls and ceilings
  - Sealing doors, windows, and other cracks are also considered helpful.
  - Use noise-absorbing material in the walls of new buildings during construction, although this acoustic insulation is very expensive.
- **Use Noise Masking Devices**
  - Place white noise machines or fans in bedrooms to help mask traffic noise while you sleep.
- **Install Water Features**
  - Outdoor water features, like fountains or ponds, can help mask traffic noise with soothing sounds.
- **Landscaping**
  - Use visually interesting landscaping to obscure the roadway. Even though plants do not effectively reduce noise levels, they give a sense of privacy and serenity. Talk to a landscape architect for ideas.
- **Build a "Do-it-Yourself" Noise Barrier**
  - If properly built with appropriate materials, you can get significant noise reductions around your home. Talk to an acoustical consultant to make sure the barrier you plan to build will provide the noise reduction you expect. To prevent a substantial amount of noise, consider the following:
    - The material used must weigh at least 4 pounds per square foot.
    - The wall or fence can't have gaps.
    - Blocking the line of sight to the noise source will usually result in a 5-decibel reduction.
    - Increasing the height of the barrier will provide additional noise reduction until the fence fully blocks the line of sight to the roadway. Beyond that, the noise reductions from additional height are minimal.
    - Either the fence must be long enough to prevent noise from coming around the ends, or it must continue around the property line to enclose the target area.

Effective noise walls often extend onto neighboring properties, with the height and length determined by a noise study conducted by qualified companies, which can be found here [Qualified Noise Professionals List \(wa.gov\)](#).

***\*Please note that WSDOT does not allow construction of private structures within WSDOT right of way (ROW).***

### Question 9: It's louder at my house in the wintertime. How does the weather affect how I hear traffic noise from my house?

Answer: Weather conditions such as temperature, wind direction, and humidity can influence how traffic noise is perceived. In colder weather, sound waves travel faster and farther due to lower air density, which can lead to increased noise propagation. Additionally, during winter months, trees

typically have fewer leaves, which can create a perception that traffic noise is louder because the direct view of traffic is less obstructed.

However, it's important to note that noise walls constructed by WSDOT are designed for permanent noise abatement purposes based on traffic volumes and noise studies, rather than seasonal variations in weather conditions or wind patterns.

#### **Question 10: Does WSDOT consider berms for noise abatement?**

Answer: Yes, WSDOT considers berms for noise abatement, and we have a few throughout the state. WSDOT prefers to construct noise walls over berms as walls usually take up less space near our right of way (ROW). A general guideline is that berms should be five times as wide as their height. For example, a 12-foot-tall berm would require a 60-foot-wide base whereas a 12-foot noise wall would only need a base of a few feet.

#### **Question 11: I do not think the noise wall in my backyard is working. Can someone check on it?**

Answer: WSDOT does not have the available staff or capacity to take noise measurements behind an existing noise wall upon request. In general, WSDOT does not measure the effectiveness of noise walls after construction since this is objective of our modeling prior to construction. However, the traffic noise model that WSDOT uses to model the noise wall is very conservative.

It is important to note that the purpose of a noise wall is to *reduce* noise, not eliminate it completely. When sound waves encounter a noise wall, some of the energy is reflected back towards the source (highway), while some may diffract over the top or around the sides of the wall. This means that while noise walls significantly reduce the intensity of traffic noise reaching residential areas, they are not capable of completely eliminating all noise.

#### **Question 12: Can WSDOT install quieter pavement technology in front of my house instead of a noise wall?**

Answer: The Federal Highway Administration (FHWA) regulations do not allow for quieter pavement technologies as a noise abatement measure. Studies in Washington State have shown that quieter pavements are generally ineffective in reducing traffic noise to levels that meet federal standards due to the degradation of the pavement from the use of studded tires and Washington's weather conditions. This method of noise abatement is not cost effective to the acoustical benefit due to the short lifespans of this type of pavement. Therefore, WSDOT focuses on other noise mitigation strategies such as noise walls and other approved methods to address noise impacts in communities adjacent to highways.

#### **Question 13: How can I get a noise wall near my house to help reduce the risk of vehicle collisions?**

Answer: WSDOT constructs noise walls primarily and only for noise abatement purposes, following specific federal guidelines. These walls are designed to reduce traffic noise for nearby communities but are not federally approved safety features to protect against vehicle collisions.

If you are concerned about safety due to vehicle collisions, please contact your Region Project Office [Offices & regions | WSDOT \(wa.gov\)](#). They handle requests related to traffic safety measures such as speed limits, traffic signals, and road design improvements, which can help address safety concerns more directly than noise walls.

Federally approved safety features include highway improvements such as guardrails, rumble strips, and improved signage. These measures are specifically designed to enhance roadway safety and reduce the risk of car collisions.