

What is a noise wall?

Noise barriers are solid obstructions built between the highway and the homes along the highway designed to reduce the loudness of traffic. Barriers can be formed from earth mounds along the road, usually called earth berms, or from high, vertical walls.



Concrete noise walls take less space than earth berms. Many attempts are being made to construct noise barriers that are visually pleasing and that blend in with their surroundings.

Note: Light weight privacy fences, which are generally constructed of wood, and not normally constructed to abate noise, are usually not considered as noise barriers, since they often contain many gaps, each of which allows the transmission of noise. The fence materials are also usually not dense enough to sufficiently impede noise transmission through them.

Noise wall terms

Impacted Properties

A property whose noise level is predicted to exceed the criteria identified in the federal regulations (Table 1) and the Highway Traffic Noise Impact Guidance Manual. A property is said to be impacted if it meets either of the following criteria:

- The projected noise level approaches or exceeds the level recommended by the Federal Highway Administration (FHWA), using the noise abatement criteria table.
- The projected noise level represents a substantial increase over the current noise level.

Substantial Increase

If a property's existing noise level is predicted to increase by 10 decibels or more as a result of a proposed road project, the increase is considered substantial and therefore the property is impacted.

Insertion Loss

The effectiveness of a noise barrier is measured by examining the barrier's capability to reduce future noise levels. Noise reduction is measured by comparing design year pre- and post-barrier noise levels. This difference between unabated and abated noise levels is known as insertion loss (IL).

Benefited receptor

The recipient of an abatement measure that receives a noise reduction at or above the minimum threshold of 5 dB(A).

Noise Wall Facts

Noise walls can:

- Significantly reduce noise levels for people living next to highways.
- Reduce the loudness of traffic noise by as much as half.
- Be effective, regardless of material used.

Noise walls are:

- Most effective within 200 feet of a highway (usually the first row of homes).

Noise walls must be:

- Visually pleasing
- Designed to preserve aesthetic value.



Noise walls

About

Noise walls cannot:

- Completely eliminate all traffic noise.

Type I Projects

A Type I project involves the construction of a highway on new location or the physical alteration of an existing highway which significantly changes the horizontal or vertical alignment or increases the number of through traffic lanes. Type I project also involves the addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or a toll plaza. When the abatement criteria contained in this policy are satisfied in conjunction with a Type I project, noise abatement must be provided.

Noise sensitive receptors beyond 500 feet of the construction limits shall not be considered as part of the evaluation. However, if neighborhood continuity is required; noise mitigation shall be designed with logical termini using sound engineering practices.

Type II (Retrofit)

A Type II or retrofit project involves the construction of noise abatement along an existing highway when not in conjunction with an improvement of that highway. VDOT does not participate in Type II or retrofit noise abatement.

Type III Projects

A Type III project is a Federal or Federal-aid highway project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis.

Abatement criteria

VDOT's noise barrier cost effectiveness is based upon a Maximum Square Footage of Abatement per Benefited Receptor (MaxSF/BR) value of 1,600ft². A noise abatement measure will be considered reasonable if Square Footage of Abatement per Benefited Receptor does not exceed 1,600.

Each residential (dwelling) unit will be considered as a single residential property.

An example for calculating the barrier cost-effectiveness for areas of public use is shown on the next page and is also elaborated in [Appendix E of the Highway Traffic Noise Impact Guidance Manual](#).

Extenuating circumstances will be considered on a case by case basis.

Third-party funding

Third-party funding is limited to aesthetic and functional enhancements above and beyond that for which VDOT is responsible.

If the maximum square footage of abatement per Benefited Receptor exceeds 1,600 SF/BR, the noise barrier will not be considered reasonable.

Undeveloped land

When assessing the noise abatement measures associated with a highway project, undeveloped lands will be treated as developed lands if, and only if, a proposed land use development has received local agency approval (i.e., issuance of a building permit) prior to the project's date of public knowledge. The "date of public knowledge" shall be the date that a project's environmental analysis and documentation is approved by FHWA.

The evaluation, design, and/or construction of any noise abatement after this date become the responsibility of the localities, communities and private developers. The noise abatement feature cannot be constructed on VDOT right-of-way.

For more information

- [Highway Traffic Noise \(FHWA\)](#)

Activity Category C Calculation

A basic example of how to calculate the reasonableness criterion for Category C receptors is provided in the following text and a graphical example is provided below.

The first step is to locate the active area(s) of park, e.g. soccer field, playground, basketball court, etc and mark these points. Then draw a line connecting the points to the park boundary. This line would represent the first row of receptors. Additional receptors are obtained by drawing perpendicular lines (represented by black dotted lines in the graphics) and placing points at the end of the line. The lines are placed 100ft from each other and from the base line. Points shall be modeled in TNM if and only if there are within the park boundaries and or public usage is available. From the graphic below, the black dots would be considered the receptor sites since they are within the park boundary and public usage is available. In the example, we shall assume that all receptor sites (13) are impacted (experience noise levels of at least 66 dBA). A noise barrier with a length of 1000ft and a uniform height of 16ft is designed for the impacted areas; the barrier is shown by the continuous orange line adjacent to the roadway. Additionally, we shall assume that all the impacted receptor sites are benefited by the barrier, i.e. receive noise reduction of at least 5 dBA and that at least one of these receptor sites has a noise reduction of at least 7 dBA. Barrier reasonability calculation shall be carried out as follows:

Total Surface Area of Barrier = Length X Height = 1,000ft X 16ft=16,000SF

Total number of Benefited Receptor (BR) sites=13BR

Square feet per Benefited Receptors=16,000SF/13BR= **1,231 SF/BR**

This number is below the 1,600 max SF/BR, therefore the barrier is considered reasonable.

