

## NOISE ABATEMENT POLICY

The noise abatement evaluation is triggered by the determination of traffic noise impacts. The evaluation is to determine if abatement will meet IDOT's Feasibility and Reasonableness Policy:

### Feasibility

- Noise abatement must achieve at least a 5 dB(A) traffic noise reduction at an impacted receptor and be feasible to construct.

### Reasonableness

- Noise abatement must be less than the \$24,000 base value per benefited receptor plus adjustment factors, and achieve at least an 8 dB(A) reduction at a benefited receptor. In addition, viewpoints of benefited receptors must be considered.

## ADJUSTMENT FACTORS

To determine whether a noise abatement option is economically reasonable, three factors may be considered to adjust the base allowable cost of \$24,000 per benefited receptor. These factors include:

- Absolute Noise Level
- Increase in Noise
- Build Order of Roadway and Receptor

The consideration of these adjustment factors can potentially raise the allowable cost per benefited receptor from \$24,000 to a maximum of \$37,000.

## BENEFITED RECEPTOR

Any receptor afforded a 5 dB(A) or greater traffic noise reduction.

- May include receptors with a direct line of sight to the roadway and receptors shielded from the roadway by other buildings.
- Total number of benefited receptors is used to determine the cost per benefited receptor.
- Cost per Benefited Receptor = Barrier Cost/Number of Benefited Receptors.

## FREQUENTLY ASKED QUESTIONS

### 1. Why aren't noise barriers proposed in some cases?

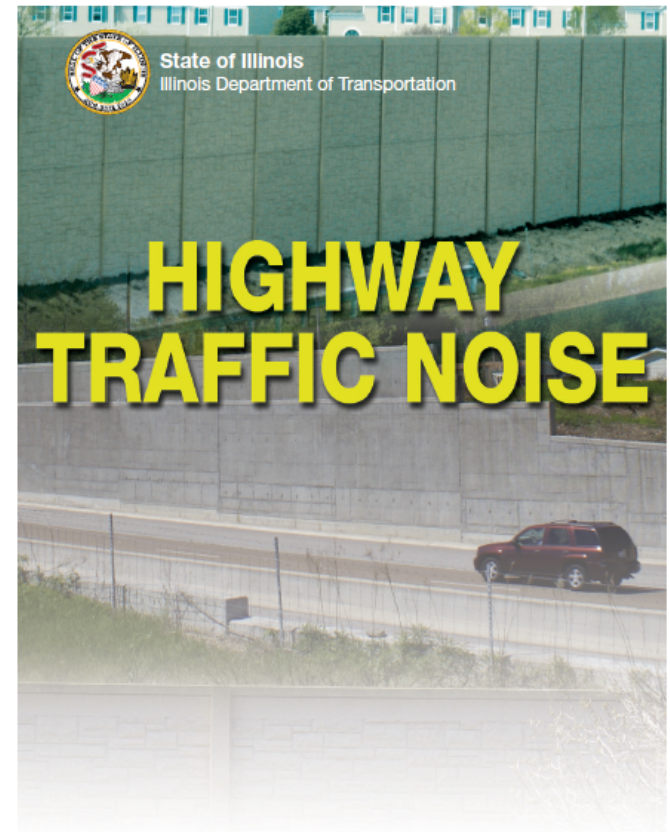
A noise barrier must meet feasibility and reasonableness criteria, achieving at least a 5 dB(A) traffic noise reduction at an impacted receptor to be feasible and an 8 dB(A) reduction at a benefited receptor to be reasonable. It also must be economically reasonable, costing less than the adjusted allowable cost per benefited receptor and also must be desired by the majority of benefited receptors.

### 2. Would a berm be as effective as a noise wall in reducing noise levels?

Studies show that earth berms actually reduce noise levels to a greater extent than noise walls due to absorption and edge effects. However, their use depends on available space. For instance, since IDOT requires at least a 3:1 slope to maintain the berm, a 12-ft. berm would be approximately 72 ft. wide at the base.

### 3. What is the cost of a noise wall?

Based on Illinois construction costs and walls built, the average noise wall construction cost is \$25 per sq. ft. including materials and installation. Areas with potential utility or drainage issues may incur added costs. Typical noise walls cost \$1,500,000 per mile.



## NOISE ABATEMENT

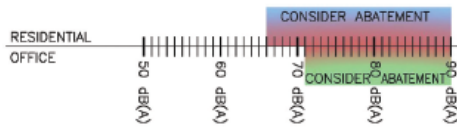
- Illinois' Commitment to Noise Abatement
  - Noise Abatement Approaches
    - Noise Barrier Evaluation
    - Noise Barrier Design

Through 2014, more than 90 miles of noise walls have been constructed in Illinois.

## NOISE LEVEL ABATEMENT POLICY

In Illinois, traffic noise impacts are determined to occur in the following situations:

- Design year build traffic noise levels (typically projected 20 years into the future) are predicted to approach, meet, or exceed the noise abatement criteria (NAC). OR
- Design year build traffic noise levels are predicted to substantially increase (greater than 14 dB(A)) over existing noise levels.



## NOISE ABATEMENT APPROACHES

Once a noise impact is identified, IDOT will evaluate feasible and reasonable noise abatement measures to reduce traffic noise impacts. Traffic noise can potentially be reduced by addressing one of the following:

- Noise Source
- Noise Path
- Noise Receiver

## NOISE SOURCE OPTIONS

Traffic noise levels can potentially be reduced by source modification, such as:

- Vehicle Noise Emission Standards
- Pavement Materials
- Traffic Restrictions
- Speed Limitations
- Engine Braking Restrictions



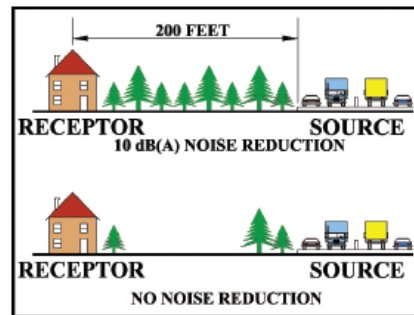
## NOISE PATH ABATEMENT MEASURES

Noise abatement can be accomplished by interrupting the noise path between the source and the receiver. Abatement measures include:

- Construction of noise barriers.
- Alteration of horizontal highway alignment.
- Alteration of vertical highway alignment.

## EFFECTS OF VEGETATION

- Vegetation can provide aesthetic value and psychological relief from traffic noise.
- Vegetation is not used by FHWA or IDOT for traffic noise reduction because:
  - It would need to be at least 200 ft wide and 18 ft high to reduce noise levels by 10 dB(A).
  - In most cases, available right-of-way cannot accommodate this width.



## ABATEMENT TYPICALLY USED – NOISE BARRIERS

When a noise impact has been identified, IDOT typically evaluates noise barriers for abatement due to:

- Cost Effectiveness
- Maintenance Issues
- No Additional Right-of-Way Required

When considering noise barriers, utilities, drainage, right-of-way, sight distance, and clear zones must be considered.

## TRAFFIC NOISE REDUCTION ATTAINABILITY

A noise barrier that just breaks the line of sight between a noise source and a receiver will reduce noise levels by 5 dB(A). Noise reductions beyond 5 dB(A) become increasingly harder to achieve.

Reduction in Sound Level	Degree of Attainability
5 dB(A)	Easily Attained
10 dB(A)	Attainable
15 dB(A)	Very Difficult
20 dB(A)	Nearly Impossible

Source: USDOT, Highway Traffic Noise in the United States, Problem and Response, April 2000

## NOISE BARRIER EVALUATION

- Conducted using FHWA approved traffic noise model.
  - Computer model evaluates barrier variations.
- ### BARRIER HEIGHT
- A barrier that just breaks line of sight between the noise source and receiver reduces noise by 5 dB(A).
  - Each additional two feet in noise barrier height reduces the traffic noise level one dB(A).

### BARRIER LENGTH

- A barrier needs to block the view of the receptor to the vehicles using the road.
- To be effective, a barrier should extend 4 times the distance between the end receptor and barrier.

### BARRIER LOCATION

- Barriers are most effective closest to the noise source or closest to the receiver.

### BARRIER ELEVATION

- The ground elevation of the area between a noise source and receiver affects the height of the noise barrier needed. In the example below, Wall A must exceed the height of the noise source to break the noise path to the receiver. Wall B, located at a higher ground elevation, can be much shorter to achieve the same noise reduction as Wall A.

