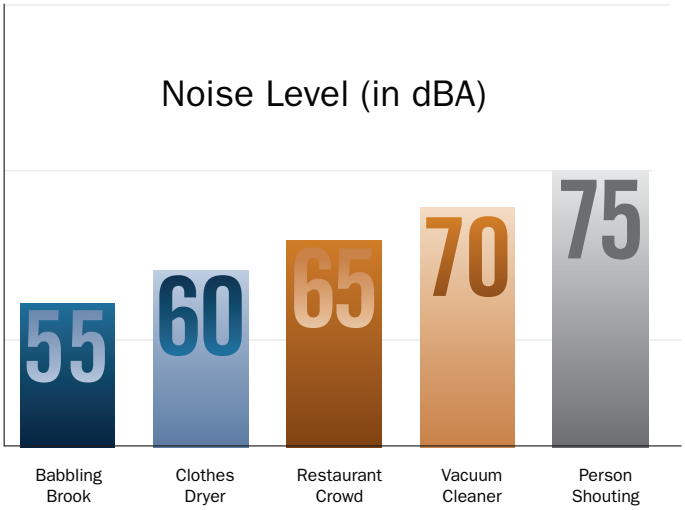
Texas Department of Transportation

BUILDING BARRIERS TO TRAFFIC NOISE

ENVIRONMENTAL AFFAIRS DIVISION



Noise Pollution

Pollution comes in many forms. We're most familiar with air, water and waste pollution, but noise is also a pollutant.

The Texas Department of Transportation (TxDOT) is concerned with noise, especially when it comes from traffic. Part of our mission is to ensure that programs are environmentally sensitive in the safe, effective and efficient movement of people and goods. This includes identifying and evaluating environmental impacts—including traffic noise—before transportation projects are ever built.

Traffic Sound

Sound produced by highway traffic comes mainly from the tires, engines and mufflers of cars and trucks. We measure traffic sound in decibels or "dB." The level of traffic sound can be determined either by a sound meter or a computer program. Its volume depends on the number and speed of vehicles, the slope of the nearby terrain and the distance between the highway and listener

Not all sound can be heard by the human ear. When we measure sound levels, our meters adjust the high and low frequencies of traffic sounds to match the way the average person hears them. This adjustment is called A-weighting and is expressed as "dBA."

Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent sound level or "Leq."

Noise Analysis of Highway Projects

The Federal Highway Administration's (FHWA) regulation on highway traffic noise requires that we conduct noise studies when building new highways or changing or expanding existing ones. The purpose of a noise study is to learn whether highway traffic sounds will have an impact on nearby outdoor areas frequently used by people.

A noise study:

- identifies land use activity areas that may be impacted by traffic noise
- determines existing noise levels
- predicts noise levels 20 years in the future
- identifies possible noise impacts
- examines and evaluates ways to reduce noise impacts (abatement measures)

Traffic Noise Impacts

FHWA has established Noise Abatement Criteria (NAC) to determine possible traffic noise impacts on various activity areas.

Noise Abatement Criteria

Activity Category	FHWA (dB(A) Leq)	TxDOT (dB(A) Leq)	Description of Land Use Activity Areas
A	57 (exterior)	56 (exterior)	Lands on which serenity and quiet are of extra-ordinary 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)	66 (exterior)	Residential
C	67 (exterior)	66 (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)	51 (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)	71 (exterior)	Hotels, motels, offices, restaurants/ bars, and other developed lands, properties, or activities not included in A-D or F.
F	–	–	Agricultural, 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.

NOTE: Primary consideration is given to exterior areas (Category A, B, C, or E) where frequent human activity occurs. However, interior areas (Category D) are used if exterior areas are physically shielded from the roadway, or if there is little or no human activity in exterior areas adjacent to the roadway.

Traffic Noise Impacts

TxDOT decides that an impact occurs when predicted noise levels are:

1 dBA below, equal to or above the criteria for a specific activity area. For example, an impact occurs at a Category B residence at 66 dBA or above,

or

more than 10 dBA higher than existing levels in any activity area. For example, an impact occurs at a Category B residence when the existing level is 54 dBA and the predicted level is 65 dBA—an 11 dBA increase.

In either of the above situations, noise abatement is considered.

Noise Abatement Measures

A noise abatement measure is any positive action taken to reduce the impact of noise from highway traffic on an activity area.

The traffic noise abatement measure used most often is the construction of noise barriers. Other measures include managing traffic, moving the highway and acquiring undeveloped property to serve as a buffer zone between the highway and the area affected by traffic noise.

Noise barriers are normally solid wall-like structures built between the noise source (highway) and the impacted activity area to reduce noise levels. Although they are usually constructed of concrete or masonry, other materials such as wood, stucco and metal can also be used.

Barriers can also be formed from earth piled into a large mound or berm. Though natural in appearance, berms require a large area of right-of-way to reach the height required to be effective.

Vegetation such as trees, shrubs and grasses, though very natural and attractive in appearance, offer little reduction in noise levels.

TxDOT evaluates proposed noise barriers to determine whether they would effectively reduce noise at a reasonable cost.

Noise Barrier Design Considerations

Designing noise barriers is a very complex process that includes:

- appearance and ability to blend in with the surrounding environment
- highway features and distances between the highway and impacted activity areas
- number and category of impacted activity areas
- access to activity areas from the highway for routine and emergency traffic
- adequate visibility around noise barriers to ensure motorist and pedestrian safety
- ability of the noise barrier (height, length and material) to effectively reduce noise level
- reasonable cost of construction and maintenance
- avoidance of utilities and easements
- desires of the public

Although the purpose of a noise barrier is to reduce noise levels for people nearby, no barrier of any design can eliminate all traffic noise.

Noise barriers are meant to be a positive addition to a neighborhood and are normally well received. However, they are not always right for all people in all neighborhoods.

Noise barriers could result in:

- restricted views
- feelings of confinement
- loss of air circulation, sunlight and night lighting
- limited access to nearby streets

Also, noise barriers could present a serious problem for businesses by restricting views and access by customers.

Public Involvement

We make our noise studies for highway projects available for review by the public and government officials.

People who live in areas affected by traffic noise are notified by mail when noise barriers are proposed for their areas. They are also informed about when and where a noise workshop will be held.

The opinions of those affected are vital to the construction of a noise barrier. Even if the noise study indicates that a noise barrier is feasible and reasonable, the final decision to build or not is by a simple majority vote.

Local officials are provided copies of the noise study and federal regulations on traffic noise to assist in future land-use planning that promotes harmony between land development and highways.

Noise Barriers Across Texas

TxDOT has constructed noise barriers all across the state, and many more are either under construction or in the planning stage.

Noise barriers are, and will continue to be, an important tool to reduce the impacts of traffic noise that result from the ongoing improvement of Texas highways.

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