traffic flow 20 years into the future. If noise measurements and analysis show an impact, must CDOT mitigate it? Noise mitigation is not automatic. The mitigation must first be determined to be both feasible and reasonable. Mitigation measures are considered feasible if they can achieve a minimum of a five decibel noise reduction, and do not create any safety or unacceptable maintenance problems. Mitigation measures are considered reasonable if they meet cost requirements and are desired by the people who will benefit from them.

Would rubberized asphalt help deaden traffic noise?
Rubberized asphalt is a blend of asphalt cement, reclaimed tire rubber and certain additives. In some instances, rubberized asphalt has been shown to initially reduce traffic tire noise by as much as six decibels at locations within 50 to 70 feet of the roadway, and two to five decibels at locations approximately 100 to 150 feet from the roadway. The benefits continue to lessen as measurements are taken farther away from the highway. Homes located anywhere between 800 and 2,000 feet from the interstate would most likely not hear a difference. Note that the long-term structural integrity of rubberized asphalt, particularly in interstate applications, is not well known. Also, the long-term noise reduction is not known. Research has shown that the noise benefits of asphalt pavements in general will likely lessen as the pavement wears.

For more information contact:

James Flohr, CDOT Resident Engineer
c/o Wilson & Company Engineers and Architects
455 E. Pikes Peak Avenue, Suite 200
Colorado Springs, CO 80903
Phone (719) 520-5800 • Fax (719) 520-0108

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The Colorado Department of
Transportation

Traffic Noise: Assessment and Abatement

Traffic Noise: Assessment and Abatement

Traffic noise is and has been an important consideration to the Colorado Department of Transportation (CDOT) from the very beginning of the I-25 Corridor Improvements Project. In fact, before any work could begin to reconstruct the interstate, noise studies were conducted in areas east and west of the interstate to determine existing levels of noise as well as to predict levels 20 years into the future.

All traffic noise studies prepared for CDOT projects must adhere to analytical procedures and requirements established by federal law and U.S. Department of Transportation regulations. This assures a consistent and uniform methodology for these studies so that everyone impacted by traffic noise is treated equitably and consistently.

If impacts are identified during a noise assessment, CDOT examines noise mitigation measures. These measures must be found reasonable and feasible and must adequately reduce noise levels in a cost effective manner before they are carried out.

Good to know – facts on CDOT noise guidelines

- A noise analysis is required when a highway is built on a new location, an existing highway is significantly altered by changing the horizontal or vertical characteristics of the road, or the number of traffic lanes is increased.
- Noise impacts are assessed at areas where people frequently gather for outdoor activities such as patios, playgrounds, front porches, etc. If there are no areas where frequent outdoor activities are present, interior areas may be considered, but this is reserved for public buildings such as libraries and schools.
- Noise abatement for impacted receptors is included on a project only if it is determined feasible and reasonable. The criteria and procedures used to determine this are quantifiable but flexible, and judgments for unusual or special circumstances are made on a case-by-case basis. In general, feasibility deals with the engineering considerations such as substantial noise reduction, safety, and maintenance. Reasonableness has to do with whether or not proposed noise mitigation measures are desired by the community in question and are cost effective.
- Common types of noise abatement measures include:
  - traffic management techniques.
  - providing sufficient distance between roadway and impacted areas when possible.
  - constructing noise walls or earth berms.

Keeping it down out there

In addition to conducting its standard noise studies and implementing typical noise abatement measures, CDOT is looking into new ways to help keep interstate traffic noise down.

- **Changes in Tining**

Tining is the creation of shallow channels in a concrete roadway surface to enhance all weather traction of an otherwise smooth surface. While tining is necessary for safe driving conditions, it does affect roadway noise. Recently published test results from CDOT that looked at different ways of applying tining found that some tining patterns could help produce lower levels of tire/pavement noise. A new process currently underway on the newly constructed northbound lanes of I-25 between the Bijou Street and Fillmore Street interchanges involves using longitudinal saw-cut grooves, a quieter surface texture than that previously used. This method will be used on upcoming I-25 improvements through the Pikes Peak Region.

- **Asphalt**

Some traffic noise in neighborhoods near the interstate is aggravated by traffic from adjacent, highly utilized local streets. CDOT is investigating pavement materials that offer some noise reduction and that are suitable for the roadways it maintains outside of the interstate. One such material is Stone Mastic Asphalt (SMA). This pavement type has performed well on lower volume roadways by providing a rut resistant pavement with a skid resistant surface. Other reported benefits include better drainage, reductions in glare and lower tire noise. In spring 2001, CDOT used SMA pavement in the residential area on Nevada Avenue between Uintah Street and Lilac Street. CDOT will analyze the effectiveness of noise reduction and SMA pavement performance on this portion of Nevada over the next few years. However, other research has shown that the noise benefits of asphalt pavements in general will lessen as the pavement wears.

- **Planning Ahead**

On any normal weekday, more than 100,000 cars pass near downtown Colorado Springs on one of the busiest stretches of Interstate 25. Twenty years from now, that number could increase to more than 170,000. An Environmental Assessment (EA) is currently underway. This study will summarize the potential environmental effects of altering the interstate, including changes in traffic noise. Current noise levels will be measured and noise levels 20 years from now will be predicted using a computer model. Acoustic engineers then can determine areas where noise is expected to increase due to changes in the interstate. CDOT will evaluate mitigation at locations that show exterior noise levels exceeding 66 decibels for residential areas and 71 decibels for commercial areas. CDOT will determine if mitigation is physically possible, if at least a five decibel noise reduction can be achieved and if the cost to mitigate is reasonable. If so, then plans to reduce excessive noise will be included as part of the interstate improvements.

- **Ongoing Testing**

In a continuing effort to explore better ways of mitigating highway traffic noise, CDOT is conducting a pavement noise analysis in test areas similar to I-25. Results from the test will be analyzed to determine if other measures would be appropriate for I-25 in the Pikes Peak Region.

Frequently Asked Questions

What requirements must CDOT follow to assess noise impacts?

CDOT is required to follow federal regulations developed by the U.S. Department of Transportation in compliance with the Federal-Aid Highway Act of 1970. This Act mandated the Federal Highway Administration to develop standards for mitigating highway traffic noise. These standards are followed by all states and form the basis for a uniform national policy for highway noise impact assessment and mitigation.

When is a noise study needed?

A noise study is required when:

- a highway is built on a new location
- an existing highway is significantly altered by changing the horizontal or vertical characteristics of the road
- the number of traffic lanes is increased

Noise studies were prepared for the I-25 Safety Projects because of the substantial change in highway design.

What is a noise impact?

Defining a noise impact depends first on how land or property is used in the affected area. For residential areas and parks, a noise impact occurs when noise levels projected at the commonly used exterior part of the property exceeds 66 decibels. For commercial properties, the exterior noise level must exceed 71 decibels. A noise impact also occurs if there is an expected change of 10 decibels or more between existing conditions and conditions that will exist 20 years into the future.

What is a decibel?

A decibel is a logarithmic unit of measurement used to quantify the sound pressure fluctuations in the air we hear as sound or noise.

How loud is a decibel?

Zero decibel is at the threshold of hearing, and 140 decibels begins to be painful. Sounds from the side of a busy urban street are typically about 90 decibels and freeway traffic from 50 feet away produces about 70 decibels.

Does CDOT take into account future changes to the alignment and capacity of the interstate when predicting noise levels?

Yes. All physical aspects of the reconstructed highway, including realignment, elevation, roadway and barrier construction materials, and the removal of buildings are considered when predicting noise levels. Traffic volume predictions, based on projections from the region's long-range transportation plan, are made to estimate