



INNOVATIVE APPROACH TO PUBLIC INVOLVEMENT:

SOUND OF TRANSIT AND HIGHWAY

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Gannett Fleming - Acoustics

- **Vice President and Lead Manager for Noise and Vibration Impacts Analysis**
- **Education**
 - Ph.D. Environmental Engineering (Noise & Vibration)
 - M.Sc. Environmental Engineering
 - M.Sc. Water Resources Management
 - B.Sc. Civil Engineering
- **Elected to the Transportation Research Board (TRB) ADC40 Committee, Acoustical Society of America (ASA), and Institute of Noise Control Engineering (INCE)**





Gannett Fleming

*Excellence Delivered **As Promised***

The “Sound of Transit”

Hearing is Believing

Winner of the 2011 Honor Award ACEC/PA
and
Mass Transit Top Tech Innovation

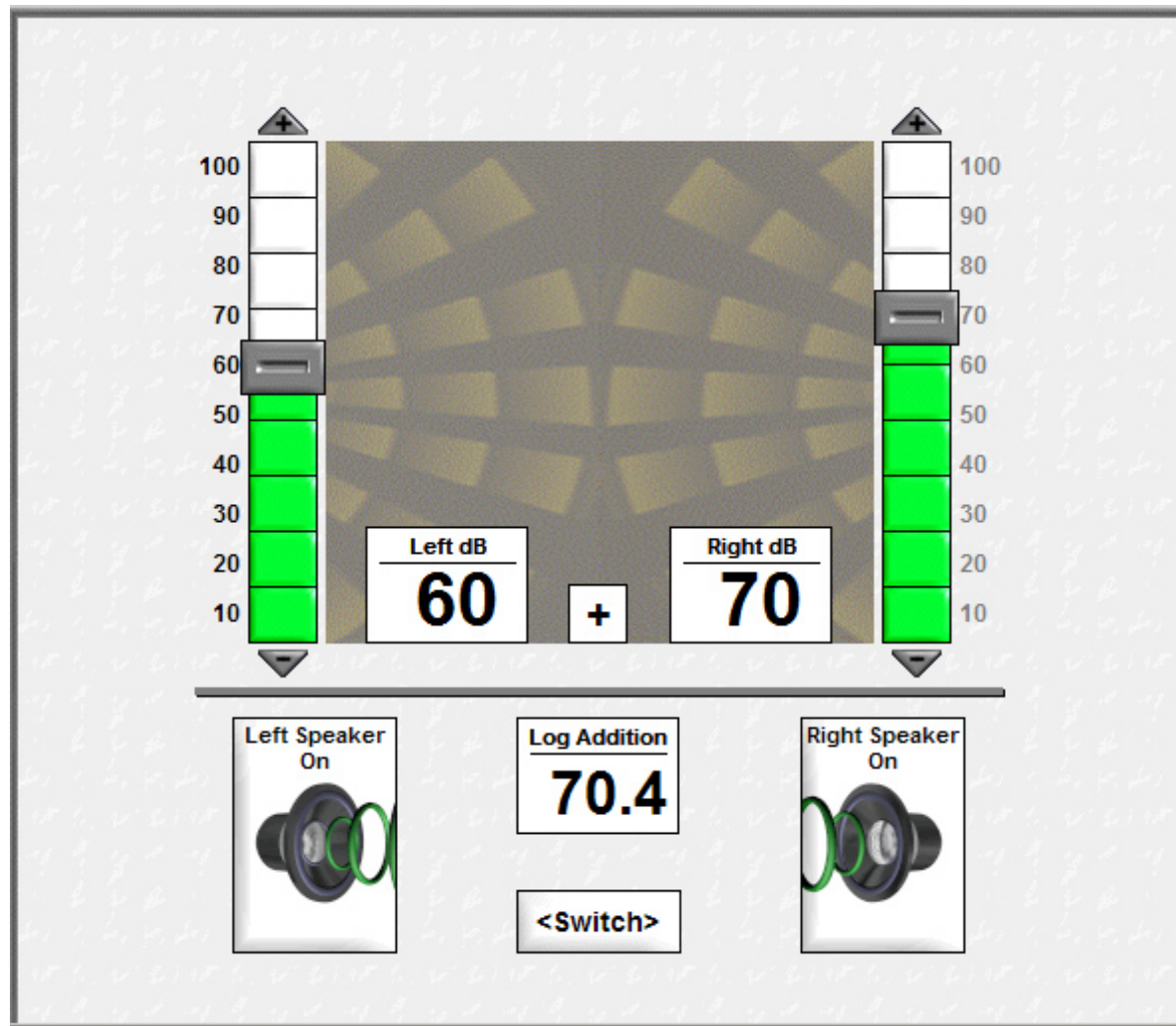


“Sound of Transit”

- Demonstrates various noise levels in an easy format
- Contains a library of common transit sound samples
- Provide “real” noise examples
- Easy tool to deliver answers to “What if? Scenario”
- Replicates transit modes at several distances
- Provide opportunity to experience the sound in outdoor and indoor environment
- Engages the public and enables them to hear and see an depiction of transit alternatives



Real Audio Comparison of Sound Levels



Real Audio from Transit on Elevated Structures

Sound Source:
Bus Rapid Transit

Radio Volume
60

Radio On/Off

Exterior dBA
70

dBA
-10

dBA
-20

dBA
-25

dBA
-30

dBA
-35

Receiver:
Int./Ext.

Sound

Real Audio from Vehicles on Elevated Structures

Sound Source:
Medium Truck

Radio Volume
60

Radio On/Off

Exterior dBA
61

dBA
-10 -20 -25 -30 -35

Receiver: Int./Ext.
[House icon selected]

Sound

Transit Inside/Outside Settings

Sound Source:
Cars on the Freeway

Receiver to Source
100'

Brick Barrier

No Barrier

Trees

Distance Doubler

Receiver: Inside/Outside

Topography: Soft/Hard

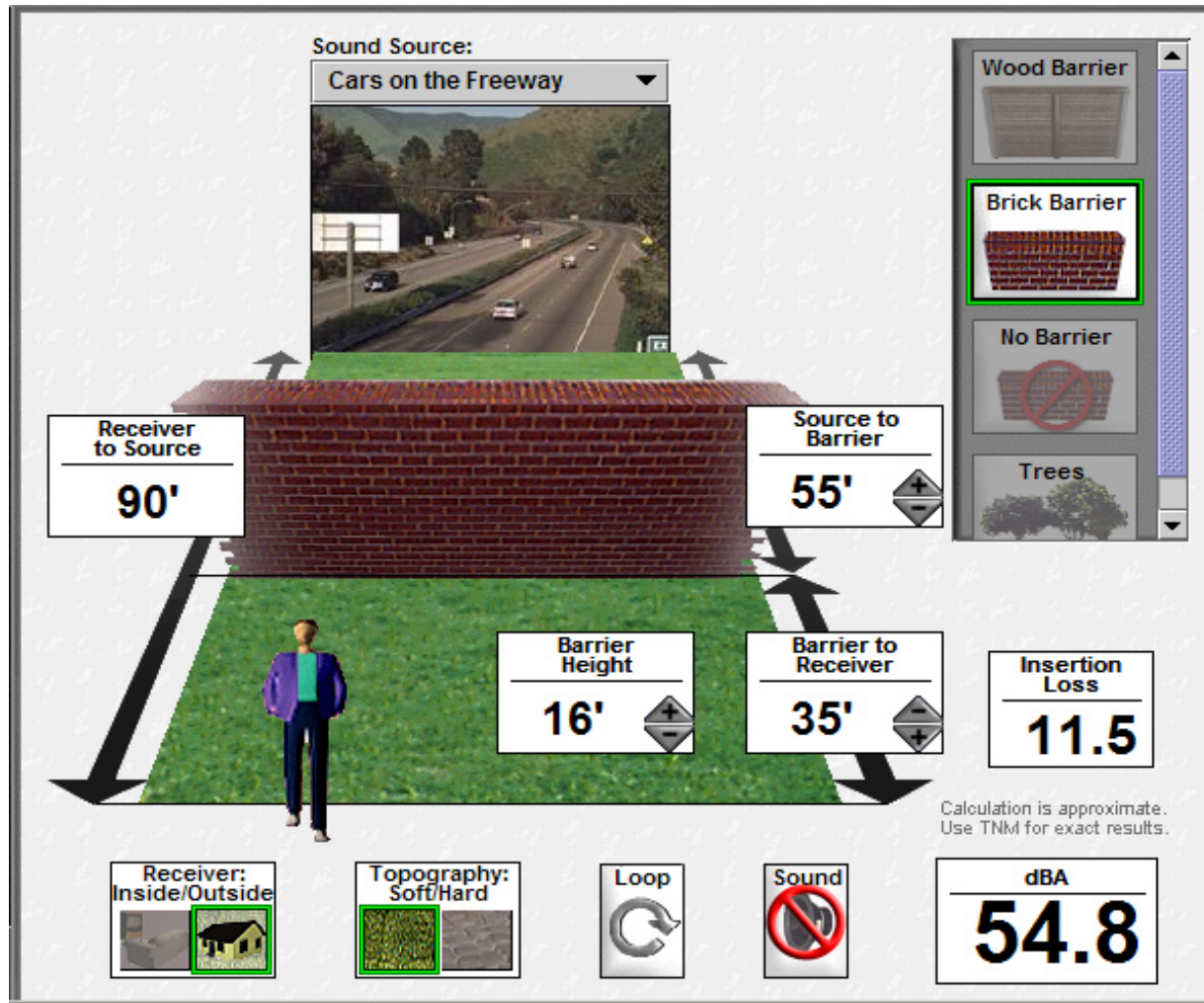
Loop

Sound

dBa
45.9


Calculation is approximate.
Use TNM for exact results.

Vehicles Sound Level with and without Noise Barrier



Real Train Audio at Different Distances

Sound Source:
Intercity Diesel - Amtrak FL



Receiver to Source
100'

No trees

Trees

Distance Doubler

Receiver: Inside/Outside

Topography: Soft/Hard

Loop

Sound


dBa
77.8

Calculation is approximate.
Use TNM for exact results.

The interface shows a 3D perspective of a grassy field between a train and a person. A double-headed arrow indicates a distance of 100 feet. On the right, there are two options for terrain: 'No trees' (with a red prohibition sign) and 'Trees'. Below that is a 'Distance Doubler' control with up and down arrows. At the bottom, there are four settings: 'Receiver: Inside/Outside' (with a house icon), 'Topography: Soft/Hard' (with a field icon), 'Loop' (with a circular arrow icon), and 'Sound' (with a red prohibition sign). A large display shows the resulting sound level as 77.8 dBA. A disclaimer at the bottom right states 'Calculation is approximate. Use TNM for exact results.'

Real Train Audio at Different Distances

Sound Source:
High Speed Electric -Acela



Receiver to Source
100'

No trees
Trees

Distance Doubler

Receiver: Inside/Outside
Topography: Soft/Hard
Loop
Sound


Calculation is approximate.
Use TNM for exact results.

dBA
81.8


The image shows a simulation interface for calculating sound levels from a train. At the top, a dropdown menu is set to 'High Speed Electric -Acela' with a corresponding image of an Acela train. Below this is a perspective view of a green field with a person standing in the foreground, representing the receiver. A box on the left indicates a distance of '100'' between the receiver and the source. To the right, there are two options for vegetation: 'No trees' (with a red prohibition sign over a tree image) and 'Trees'. Below that is a 'Distance Doubler' control with plus and minus arrows. At the bottom, there are several settings: 'Receiver: Inside/Outside' (with a house icon selected), 'Topography: Soft/Hard' (with a grass icon selected), a 'Loop' button, and a 'Sound' button with a red prohibition sign. A large box on the right displays the final result: 'dBA 81.8'. A disclaimer at the bottom right states 'Calculation is approximate. Use TNM for exact results.'

Transit Inside/Outside Settings

Sound Source:
Lt. Rail Electric - San Diego



Receiver to Source
50'



No trees
Trees

Distance Doubler

Receiver: Inside/Outside

Topography: Soft/Hard

Loop

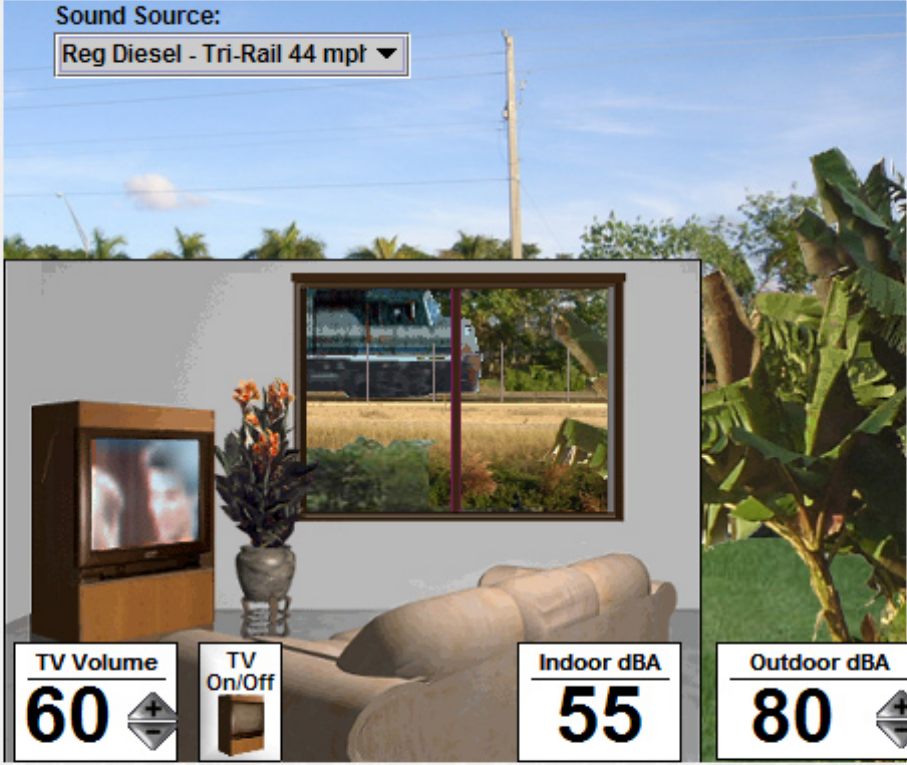
Sound


Calculation is approximate.
Use TNM for exact results.


dBA
44.9

Inside Perception While Watching TV


Sound Source:
Reg Diesel - Tri-Rail 44 mph ▾





TV Volume: **60** 


TV On/Off 

Indoor dBA: **55**

Outdoor dBA: **80** 

dBA: -10 dBA: -20 **dBA: -25** dBA: -30 dBA: -35

Receiver: Inside/Outside  

Sound 

Powerful Tool for Public Involvement





Gannett Fleming

100 *Years*

of Excellence Delivered As Promised

Thank You!

www.gannettfleming.com