Presentation to Begin at 7:00PM
I-66 EASTBOUND WIDENING INSIDE THE BELTWAY
From the Dulles Connector Road (Route 267) to Fairfax Drive (Route 237)

NOISE WALL VOTE INFORMATION MEETING
February 26, 2019

Mark Gibney, PE, PMP (VDOT – Design-Build Project Manager)
Paul Kohler (Jacobs Engineering Group – Noise Abatement Manager)
Andrew Kuchta (Michael Baker International – Project Noise Analyst)
Tonight’s Meeting

- Project Overview
- Fundamentals of Traffic Noise
- VDOT Policy on Noise Abatement
- Noise Wall Voting Process
- Results of Final Noise Analysis
- Overall Project Update
- Questions and Answers
Project Overview
Fundamentals of Traffic Noise – What is Noise?

- **Noise** is unwanted sound
- Perceived differently – what is irritating to one person may be tolerable to another
- Sound is transmitted by pressure variations in the air from its source
- Most sound sources are characterized as a point or lines source
  - Point source example: stationary horn
  - Line source example: highway facility
# Fundamentals of Traffic Noise – Calculating Decibel Level

## Noise from 5 Sources

<table>
<thead>
<tr>
<th>Source</th>
<th>Decibel Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>45dB(A)</td>
<td></td>
</tr>
<tr>
<td>52dB(A)</td>
<td></td>
</tr>
<tr>
<td>58dB(A)</td>
<td></td>
</tr>
<tr>
<td>59dB(A)</td>
<td></td>
</tr>
<tr>
<td>65dB(A)</td>
<td></td>
</tr>
</tbody>
</table>

**Calculation:**

- Add 1 to 45dB(A): 46dB(A)
- Add 1 to 52dB(A): 53dB(A)
- Add 1 to 53dB(A): 59dB(A)
- Add 3 to 58dB(A): 62dB(A)
- Add 2 to 59dB(A): 61dB(A)

**Result:** 61dB(A)

## When two decibel values differ by:

<table>
<thead>
<tr>
<th>Difference</th>
<th>Add the following amount to the higher value:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 or 1 dB(A)</td>
<td>3 dB(A)</td>
</tr>
<tr>
<td>2 or 3 dB(A)</td>
<td>2 dB(A)</td>
</tr>
<tr>
<td>4 to 9 dB(A)</td>
<td>1 dB(A)</td>
</tr>
<tr>
<td>≥10</td>
<td>0 dB(A)</td>
</tr>
</tbody>
</table>
Fundamentals of Traffic Noise – The Decibel

- Sound that humans can hear is measured in dB(A)
- An increase in 10 dB(A) is considered twice as loud to the average listener
- A decrease in 10 decibels is considered half as loud

<table>
<thead>
<tr>
<th>Actual Sound Level Change</th>
<th>Perceived Sound Level Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>+20 dB(A)</td>
<td>Four times as loud</td>
</tr>
<tr>
<td>+10 dB(A)</td>
<td>Twice as loud</td>
</tr>
<tr>
<td>+5 dB(A)</td>
<td>Readily perceptible</td>
</tr>
<tr>
<td>+3 dB(A)</td>
<td>Barely perceptible</td>
</tr>
<tr>
<td>0 dB(A)</td>
<td>Reference level</td>
</tr>
<tr>
<td>-3 dB(A)</td>
<td>Barely perceptible</td>
</tr>
<tr>
<td>-5 dB(A)</td>
<td>Readily perceptible</td>
</tr>
<tr>
<td>-10 dB(A)</td>
<td>Half as loud</td>
</tr>
<tr>
<td>-20 dB(A)</td>
<td>One quarter as loud</td>
</tr>
</tbody>
</table>
Fundamentals of Traffic Noise – The Decibel

Doubling of the sound source increases noise levels by 3 decibels, which is barely perceptible.

4,000 vehicles per hour do not sound twice as loud as...

2,000 vehicles per hour
Fundamentals of Traffic Noise – The Decibel

Traffic at 65 mph sounds twice as loud as...

Traffic at 30 mph
Fundamentals of Traffic Noise – The Decibel

![Chart showing decibel levels for different noises.]

- Quiet Urban Nighttime: 40 dB
- Normal Speech at 3 Feet: 66 dB
- Vacuum Cleaner at 10 Feet: 71 dB
- Diesel Truck at 50 Feet: 88 dB
- Rock Band: 105 dB

**How Loud Is It?**
Fundamentals of Traffic Noise – Mitigation

Sound wall between the source and the receiver

Maximum height 30’

Each additional 2 feet height = approximately 1 dBA additional noise reduction

Line of Site blockage 5 dBA Noise Reduction
Fundamentals of Traffic Noise – Mitigation

Location selected has to take into consideration the terrain, existing utilities, and structures (bridges, signs, culverts, and retaining walls)
Fundamentals of Traffic Noise – Mitigation

How high should we design the wall?
– That depends on where noise impacts occur
– Was the line of sight broken?

Sound walls will not totally eliminate traffic noise
VDOT Policy on Noise Abatement

• **Warranted**
  • Do noise impacts occur?

• **Feasible**
  • Does it work acoustically?
  • Can it be feasibly constructed?

• **Reasonable**
  • Is it less than 1,600 SF maximum per benefited receptor?
  • Does it reduce noise levels by at least 7 dBA at 1 impacted receptor?
  • Do the benefited receptors desire construction?
Noise Wall Voting

• Who can vote: only the owners and residents (including renters) of benefitted receptor units

• 50% or more of received ballots must be in favor of a proposed noise wall for it to be built
  – Votes will be tallied on a per noise wall basis
  – A non-response will not be included in the tally
Noise Wall Voting – Special Circumstances

• Staff will assess the number and location of any opposing votes which may result in partial highway traffic noise abatement

• For HOA’s, only those receptor units owned and benefited by the proposed noise wall will have a vote (i.e. community pool)

• If a benefited property changes ownership after the vote and before construction of the noise wall, only the original owner’s vote is considered
Voting Timeline

- Mailings were sent on February 8, 2019
  - Second mailing, if needed
- Ballots are due March 8, 2019
  - By mail in the pre-addressed, stamped envelope provided
  - Scanned PDF of ballot by e-mail to TDean@RDAcivil.com
  - In person at tonight’s meeting
### Table 2 - Public Opinion Survey Weighting System

<table>
<thead>
<tr>
<th>Impact and benefit category</th>
<th>Activity Category</th>
<th>Owner and Resident</th>
<th>Non-Resident Owner</th>
<th>Renter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacted &amp; Benefited</td>
<td>A</td>
<td></td>
<td>See note below</td>
<td></td>
</tr>
<tr>
<td>Not Impacted &amp; Benefited</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impacted &amp; Benefited</td>
<td>B¹</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Not Impacted &amp; Benefited</td>
<td>B¹</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Impacted &amp; Benefited</td>
<td>C²</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Not Impacted &amp; Benefited</td>
<td>C²</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Impacted &amp; Benefited</td>
<td>D</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Not Impacted &amp; Benefited</td>
<td>D</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Impacted &amp; Benefited</td>
<td>E</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Not Impacted &amp; Benefited</td>
<td>E</td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

1 For activity Category B Receptors only one vote per single family unit will be counted. However the owner of a multiple-family dwelling unit will be granted one vote per benefited unit. Additionally the developer of permitted lands will be granted one vote per benefited lot of the permitted phase where construction has not occurred.

2 For activity Category C Receptors only 1 vote per facility will be granted.

3 For activity Category G Receptors the votes will depend on the future land use. The example provided above assumes a residential development.

4 For permitted land uses defer to the appropriate land use category.
Example of Weighting System

- 2 impacted and benefitted vote yes = 10 weighted
- 3 not impacted but benefitted vote no = 9 weighted
Results of Final Noise Analysis

The Analysis Area was divided into 18 Common Noise Environments (CNE’s), labeled as CNE B through CNE S

Proposed, Relocated & Modified Noise Walls will be presented tonight

Noise Walls to remain “As-is” and CNE’s with No Proposed Noise Walls will not be presented

• 1,448 locations were modeled to represent 2,565 noise-sensitive receptors

• Existing exterior sound levels range from 40-78 dB(A)

• Design Year sound levels are predicted to range from 41-80 dB(A)
Results of Final Noise Analysis

377 of the 2,565 receptors are predicted to experience noise impacts, including:

- 290 single and multi-family dwelling unit receptors
- 85 recreational receptors (2 parks, 2 playgrounds, 3 pools, 72 trails, 2 soccer fields, 2 baseball fields, 1 basketball court and 1 volleyball court)
- 2 cemetery receptors
Results of Final Noise Analysis – CNE Index Map
Results of Final Noise Analysis - CNE B (Haycock to Great Falls)

Existing Impacts: 15
Design Year Impacts: 16
Length: 1,232 ft.
Height: 10-16 ft.
Benefited Receptors: 11
Sound Level Reduction: 5-12 dB(A)
Results of Final Noise Analysis - CNE C (Great Falls to Westmoreland)

Existing Impacts: 10
Design Year Impacts: 59
Length: 4,176 ft.
Height: 13-14 ft.
Benefited Receptors: 125
Sound Level Reduction: 5-12 dB(A)
Results of Final Noise Analysis - CNE D (Fairfax to N. Washington)

- Existing Impacts: 24
- Design Year Impacts: 51
- Length: 988 ft.
- Height: 30 ft.
- Benefited Receptors: 27
- Sound Level Reduction: 5-9 dB(A)
Results of Final Noise Analysis - CNE E (N. Washington to N. Sycamore)

Existing Impacts: 33
Design Year Impacts: 65
Length: 1,552 ft.
Height: 10-29 ft.
Benefited Receptors: 40
Sound Level Reduction: 5-14 dB(A)
Results of Final Noise Analysis - CNE H (Patrick Henry to N. Harrison)

Existing Impacts: 30
Design Year Impacts: 35
Length: 976 ft.
Height: 14 ft.
Benefited Receptors: 18
Sound Level Reduction: 5-13 dB(A)
Results of Final Noise Analysis - CNE N (N. Harrison to Patrick Henry)

Existing Impacts: 7
Design Year Impacts: 7
Length: 2,707 ft.
Height: 14 ft.
Benefited Receptors: 182
Sound Level Reduction: 5-18 dB(A)
Results of Final Noise Analysis - CNE O (Patrick Henry to N. Ohio)

Existing Impacts: 8
Design Year Impacts: 14
Length: 1,083 ft.
Height: 6-12 ft.
Benefited Receptors: 11
Sound Level Reduction: 5-10 dB(A)
Results of Final Noise Analysis - CNE P (N. Ohio to N. Sycamore)

Existing Impacts: 3
Design Year Impacts: 10
Length: 704 ft.
Height: 10 ft.
Benefited Receptors: 18
Sound Level Reduction: 5-8 dB(A)
Proposed Sound Wall

Simulated Stacked Stone (Tan)
Next Steps

- Geotechnical Borings, Design, Shop Drawings, Manufacturing
- Construction:
  - Westbound: Summer 2019 – Spring 2020
  - Eastbound: Summer 2020 – Fall 2020

1) Clear trees and brush
2) Grade area
3) Drill foundations for noise wall posts
4) Install noise wall posts and panels *
5) Remove existing noise walls in some locations *

* In some instances, these activities may occur simultaneously.
  There will not be any period greater than 90 days without protection.
Eastbound Widening Project Update

- Noise walls: anticipated construction Summer 2019 – Fall 2020
- W&OD Trail Bridge over Lee Hwy: March 2019 – Summer 2020
- I-66 Eastbound Direct Access to Metro: anticipated construction Fall 2019 – Fall 2020
- Additional lane on Eastbound I-66 to open Fall 2020
Project Updates and Information

http://inside.transform66.org
Find project information and sign up for updates and lane closure alerts

Contact Information
Email: Transform66@VDOT.Virginia.gov
Phone (toll-free): 1-888-806-5812