

HIGHWAY NOISE STUDY ANALYSIS

**Route 58
City of Norfolk**

**Project: 0058-122-104, C501
PPMS#: 17546**

**From: Jett Street
To: Briar Hill Road**



Prepared By:

**Lloyd B. Arnold
Environmental Engineer Senior**

**Environmental Division
Virginia Department of Transportation**

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1. SUMMARY

The Virginia Department of Transportation has performed a noise study to assess impacts created by the proposed highway project on Route 58 Virginia Beach Boulevard in the City of Norfolk. The project limits extend from Jett Street to Briar Hill Road. The proposed project involves widening from 4 to 6 lanes with median, and intersection improvements at Raby Road & Round Bay Road. A location map is shown on page 6, Figure 1. The corridor is mixed residential and commercial.

The noise study analysis predicts there will be 36 impacted properties in Design Year 2025. The Design Year (2025) sound levels ranged from 56 to 75 dBA, Existing Year (2000) from 54 to 74, and No-Build Year (2025) 54 to 72 dBA. The change in sound levels from Existing to Build ranges from no-change to 3 dBA, from No-build to Build is no change to 3 dBA. The only public use facility is the Salvation Army. There were no churches or schools facilities within the project limits. All noise abatement measures were deemed infeasible due to access constraints and/or sight distance limitations. Construction noise impacts, which also must be considered, are discussed on page 5. The corridor is mixed residential and commercial.

2. GUIDELINES

The Federal Highway Administration (FHWA) has published guidelines for determining traffic noise impacts in Federal Aid Policy Guide Part 772 (FAPG Part 772). Specifically, a noise impact occurs when either of the following criteria is satisfied:

1. The predicted traffic noise level approaches or exceeds the NAC in Table 1.
2. The predicted traffic noise level substantially exceeds the existing sound level.

The Noise Abatement Criteria (NAC) in Table 1 developed by FHWA describe activities and sound level thresholds to determine "approach or exceed" impacts. "Approach" has been defined by VDOT as one decibel less than the applicable NAC.

Table 1
FHWA NOISE ABATEMENT CRITERIA

Activity Category	L_{eq} (h) dBA	Description of Activity
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary 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)	Picnic areas, recreational areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72 (Exterior)	Developed land, properties or activities not included in Categories A or B above
D	----	Undeveloped lands
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

For example, using NAC Category B (67 dBA) for example, 66 dBA is considered an impact in the State of Virginia. Further, the Virginia State Noise Abatement Policy defines "substantially exceeds" as 10 dB(A) or more. The Decibel (dB) is the unit used to describe the sound level. For highway noise impact assessments, the sound level is expressed as an average hourly equivalent L_{eq(h)} dB, that has been A-weighted, where A-weighting reflects the noise spectral energy distribution most like the hearing response of the human ear. Therefore, L_{eq(h)} dBA is a single number descriptor of sound that is an average of the time-varying sound level over all frequencies sensitive to humans. For a given highway geometry, traffic volume, speed, and mix respective to noise sensitive areas along the project corridor, L_{eq(h)} dBA represents the noisiest traffic hour.

The viability of noise abatement measures identified in FAPG 772 must be evaluated if either impact definition is met.

3. METHODS

The primary task in determining noise impacts is to identify noise sensitive land uses (study sites) along the project corridor. The land use is usually a portion of property nearest the roadway that would experience the greatest noise impact. This site is chosen to represent noise sensitive properties that experience uniform noise conditions. Figure 1 identifies representative site locations. Table 2 Column 1 & 2 provides a description of each representative site. Noise sensitive areas are land-uses where frequent human activity occurs or where serenity and quiet serve an important public need.

The assessment of traffic noise impacts involves three comparisons:

- The noise level under existing conditions versus design year build. This comparison shows the change in noise level that will occur between the present time and the design year if the project is constructed. Substantial increases are determined from this comparison.
- The noise level under design year no-build conditions versus design year build. This comparison shows how much of the change in noise level can actually be attributed to the proposed project.
- The noise level under design year build conditions to the applicable NAC. This comparison determines the compatibility of noise levels under design year build conditions and the present land use. "Approach or Exceed" impacts are determined from this comparison.

Noise levels have been assessed for existing (2000) and design year (2025) Build & No-build conditions using an FHWA-approved highway noise prediction model ("Traffic Noise Model (FHWA TNM) Lookup Program - Version 1.0) . Computer modeling can accurately determine the noise level of highway traffic within ± 2 dBA. The model accounts for such factors as ground absorption, roadway geometry, relative receptor location, vehicle volumes and speeds, and percentages of cars, medium and heavy trucks.

4. DISCUSSION OF FINDINGS

The noise study analysis predicts there will be 36 noise impacts in design year 2025 as a result of this construction project. All impacts occur due to “approaching” or “exceeding” the FHWA criteria of 67 dBA exterior. There were no substantial increase impacts. This assessment represents 118 residential and public use properties along the project corridor. The only public use facility was the Salvation Army. There were no churches or school facilities within the project limits. Table 2 provides an impact assessment consistent with the aforementioned guidelines and methods outlined in Sections 3 & 4.

Design Year (2025) sound levels are predicted to increase from no-change to 3 decibels above Existing Year (2000) and No-Build, respectively. For purposes of reference, a sound level increase of 3 decibels is considered barely perceivable. A 10-decibel increase is considered doubling the loudness. Those sites adjacent the corridor were considered to be “hard sites”, especially when distance from road was less than 15 meters (50 feet). The data is based on peak pm traffic. Sites 5 - 7 had no outside activities and were evaluated based on NAC Category E (52 dBA). These sites can maintain year-round closed windows as they are air-conditioned

5. POTENTIAL NOISE ABATEMENT MEASURES

No noise abatement measures are feasible. Abatement measures such as sound walls were not feasible due to access constraints and/or sight distance requirements, re-alignment is not feasible as this project proposes to widen the existing road and geometry does not allow for re-alignment, and traffic management such as diverting trucks. Impacts would still occur without heavy truck traffic. Reduction in speed is not considered reasonable as would have to be reduced on the order of 10 - 20 mph hour to achieve any significant noise reduction as the impacted properties are in close proximity with the roadway.

TABLE 2
ROUTE 58 - SUMMARY OF SOUND LEVELS

Site	Location	No. Rep.	No. of Impacts	Worst Case Hourly Equivalent Sound Level L_{eq} (h) dB(A)				Impact Type	Comments
				FHWA NAC	2000 Existing	2025 No Build	2025 Build		
1	Round Bay Apartments Southside	28	8	67	73	71	74	NAC	Represents 1 st & 2 nd Floor Unshielded Properties. Balconies and patios
2	Round Bay Apts Swimming Pool Round Bay Road	1	0	67	54	54	56	None	Shielded by 1 st row apartments
3	Crystal Lake Apartments Southside	36	27	67	74	72	75	NAC	Represents 1 st , 2 nd , & 3 rd Floor Unshielded Properties. Balconies and patios
4	Crown Townhomes Northside	6	0	67	61	61	63	None	Patios
5	Salvation Army Main Building Raby Road	1	0	Ext. 67 Int. 52	71 46	70 45	71 46	None	No outside activities
6	Salvation Army Satellite Buildings Raby Road	1	0	Ext. 67 Int. 52	65 40	66 41	66 41	None	No outside activities
7	Arcadia Apartments Northside	42	0	Ext. 67 Int. 52	74 44	72 42	75 45	None	No outside activities
8	Residence Southside	1	1	67	73	71	74	NAC	Frontyard

6. CONSTRUCTION NOISE

An additional feature of the project design is to place a limit on construction noise. Land uses that would be sensitive to traffic noise would also be sensitive to construction noise. A method of controlling construction noise is to establish the maximum level of noise that construction operations can generate. In view of this, the Department has developed and the FHWA has approved a specification that establishes construction noise limits. This specification can be found in VDOT's January 1997 Metric Road and Bridge Specifications, Section 107.14(b.3), "Noise". The contractor will be required to conform to this specification to reduce the impact of construction noise on the surrounding community.

