



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, VIRGINIA 23219 2000

Charles A. Kilpatrick, P.E.
Commissioner

October 5, 2017

To: File

From: T. Ross Hudnall

Subject: UPC 93077; Project Number: 0064-121-195, B635, C501, P101, R201;
Denbigh Boulevard Bridge over I-64 and CSX RR Replacement

The purpose of this memorandum is to summarize the results of the noise analysis conducted to determine the impacts of the subject project on modifications to an existing noise barrier wall. While UPC 93077 is considered a Type III project, the alignment of the replacement bridge conflicts with an adjacent, existing noise barrier located along I-64.

When existing noise barriers are present within a project corridor, in accordance with Title 23 of the United States Code, Section 116 Maintenance: *(a) It shall be the duty of the State transportation department to maintain, or cause to be maintained, any project constructed under the provisions of this chapter or constructed under the provisions of prior Acts. The State's obligation to the United States to maintain any such project shall cease when it no longer constitutes a part of a Federal-aid system.* Therefore, VDOT requires the right-of-way to be maintained in perpetuity should the barriers be physically impacted by the proposed project.

The proposed project would replace the existing Denbigh Boulevard four-lane bridge over Interstate 64 and the CSX Railroad with a new four-lane bridge that meets current geometric and design standards. The existing bridge has a sufficiency rating of 42 and is becoming structurally unsafe due to excessive settlement. The new bridge design is being developed to accommodate the current and future planned widening of I-64, additional rail, as well as a potential future interchange with I-64.

The bridge deck will be widened to the south by approximately 25 feet necessitating the removal of 40 linear feet of noise wall. To accommodate for the planned widening of I-64, the Denbigh Boulevard bridge deck will extend approximately 30 feet east of the current abutment. The existing noise wall along I-64 currently terminates at the abutment of the eastern end of the bridge. Because the new alignment of the bridge opens the line of sight between I-64 and multiple residential receptors categorized under Noise Abatement Criteria (NAC) B, the effectiveness of the noise barrier will be reduced.

The noise analysis incorporated detailed hourly Environmental Traffic Data (ENTRADA) for Design Year 2040 developed for the I-64 Segment I Design Noise Report dated April, 2016 (UPC 104905). Noise modeling was performed to determine effectiveness of two barrier scenarios for the future design year (2040):

- **Scenario 1:** A shortened noise barrier with the existing alignment with open line of sight, and
- **Scenario 2:** A revised barrier alignment that ties into the abutment of the replacement bridge to break line of sight. This barrier maintains the existing attenuation line with a level top elevation of approximately 50 feet.

Noise levels from the above scenarios were compared to the unabated (no barrier) noise levels to determine the insertion losses provided by both noise barrier configurations. The noise level results from the existing, no-barrier, Scenario 1, and Scenario 2 models are shown in **Table 1** at the end of this report.

The results of the noise analysis for **Scenario 1** show that the shortening of the noise barrier and opening a line of sight is predicted to result in one noise impact at one residential receptor (site 5-1) with noise levels predicted to be 66 dB(A) which approaches or exceeds the NAC. Two residential receptors (sites 5-4 and 5-5) will no longer be considered to be benefited by the barrier (Insertion loss less than 5 dB(A)). Noise levels at the nearest ten receptors (5-1 through 5-10) are predicted to increase by an average of 2 dB(A) with noise level increases ranging from 1 dB(A) to 4 dB(A) over the No-Build noise levels. Locations of these noise receptors are shown in **Figures 1 and 14** at the end of this report.

The results of the noise analysis for **Scenario 2** show that tying the noise barrier into the eastern abutment of the proposed bridge and closing the line of sight is predicted eliminate the noise impact at one residential receptor (site 5-1) with noise levels predicted to be 63 dB(A) which is below the NAC. One residential receptors (site 5-5) will no longer be considered to be benefited by the barrier (Insertion loss less than 5 dB(A)), however the degradation of insertion loss at this site is only predicted to decrease by 0.2 dB(A). Noise levels at the nearest ten receptors (5-1 through 5-10) are predicted to increase by an average of 0.4 dB(A) with noise level increases ranging from 0 dB(A) to 1 dB(A) over the No-Build noise levels. Locations of these noise receptors are shown in **Figures 1 and 14** at the end of this report.

Due to the noise impact associated with the removal of the noise barrier panels, the VDOT Noise Abatement Section recommends revising the barrier alignment to tie into the abutment of the replacement bridge. The height of the sound barrier walls shall meet or minimally exceed the elevation of the existing sound barrier which will be extended as may be minimally necessary to “step” panels due to changes in grade at wall locations. A proposed modification to an existing noise barrier is not subject to the reasonableness criterion since this is an in-kind barrier replacement as described in Section 6.3.6 of the VDOT Noise Guidance Manual.

Feel free to contact the VDOT noise section with any questions.

TABLE 1: SOUND LEVELS

Receptor Site Number	# of Dwelling Units	2040 PM Peak Predicted No-Build Noise Levels (dBA)			2040 PM Peak Predicted Build Noise Levels (dBA)			
		No Barrier	With Barrier	Insertion Loss (dBA)	Barrier Scenario 1	Insertion Loss (dBA)	Barrier Scenario 2	Insertion Loss (dBA)
5-1	1	73.9	62.4	11.5	66.3	7.6	63.4	10.5
5-2	1	70.6	62.3	8.3	64.4	6.2	62.5	8.1
5-3	1	68.0	61.7	6.3	63.1	4.9	61.9	6.1
5-4	1	66.0	60.9	5.1	61.8	4.2	61.1	4.9
5-5	1	65.0	60.5	4.5	61.3	3.7	60.7	4.3
5-6	1	64.2	58.2	6.0	59.3	4.9	58.7	5.5
5-7	1	65.8	59.1	6.7	60.3	5.5	59.5	6.3
5-8	1	68.3	60.4	7.9	61.8	6.5	60.9	7.4
5-9	1	70.6	61.1	9.5	62.8	7.8	61.7	8.9
5-10	1	75.3	63.4	11.9	64.1	11.2	63.5	11.8
5-11	1	78.5	62.0	16.5	62.1	16.4	62.1	16.4
5-12	1	71.8	61.9	9.9	62.0	9.8	61.9	9.9
5-13	1	70.1	61.0	9.1	61.3	8.8	61.1	9.0
5-14	1	67.1	59.4	7.7	59.6	7.5	59.5	7.6
5-15	1	65.4	58.1	7.3	58.3	7.1	58.2	7.2
5-16	1	64.6	57.3	7.3	57.6	7.0	57.5	7.1
5-17	1	65.5	58.3	7.2	58.7	6.8	58.5	7.0
5-18	1	64.7	56.9	7.8	57.1	7.6	57.0	7.7
5-19	1	67.7	59.0	8.7	59.2	8.5	59.1	8.6
5-20	1	70.3	60.8	9.5	61.2	9.1	60.9	9.4
5-21	1	75.4	62.7	12.7	62.9	12.5	62.8	12.6
5-22	1	76.1	63.3	12.8	63.4	12.7	63.4	12.7
5-23	1	73.6	63.1	10.5	63.2	10.4	63.1	10.5
5-24	1	67.6	60.0	7.6	60.1	7.5	60.0	7.6
5-25	1	64.7	57.9	6.8	58.0	6.7	58.0	6.7
5-26	1	66.0	58.0	8.0	58.2	7.8	58.1	7.9
5-27	1	62.7	56.1	6.6	56.2	6.5	56.1	6.6

Sound levels in this analysis are reported to the tenth of a dB(A) to illustrate the minor changes in the acoustic environment.

	Indicates Noise Impact
	Indicates Benefit (greater than or equal to 4.5 dB(A) IL)

Figure 1
Barrier Alignments and Design Plans

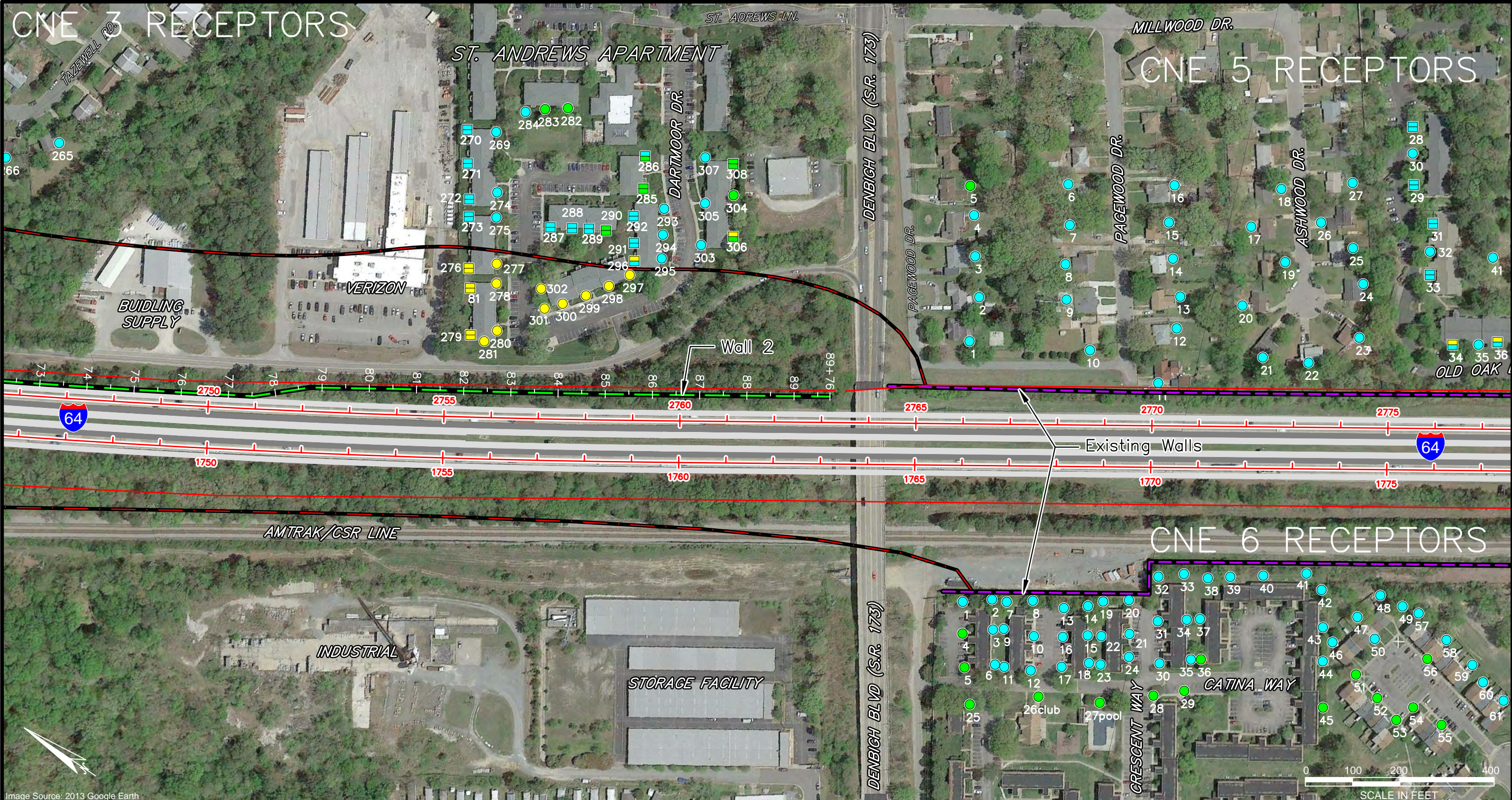
Scenario 1

Scenario 2

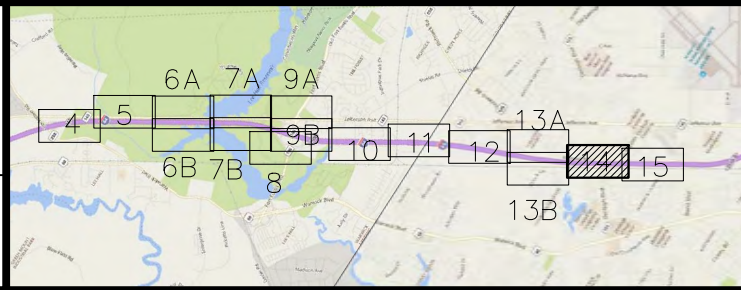


0 50 100 200 Feet





I-64 Capacity Improvements - UPC# 104905
 State Project: 0064-965-264, P101, R201, C501,
 B616, B617, B618, B619, B620, B621, D601, D602



- Existing Barrier
- Proposed Barrier (Design/Build)
- Existing Right of Way
- Proposed Lane
- Proposed Shoulder
- Proposed Bridge
- Impacted, Benefited
- Impacted, Not Benefited
- Not Impacted, Benefited
- Not Impacted, Not Benefited
- 66dBA Line

I-64 Capacity Improvements
 Segment I
 UPC# 104905
 Newport News, Virginia
 Noise Analysis Summary

Figure 14
 I-64 Capacity Improvements - UPC# 104905