Final Noise Abatement Design Report

495 Express Lanes Northern Extension (NEXT) Project

Fairfax County, Virginia

VDOT Project No. 0495-029-419; UPC 113414
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Executive Summary

This report describes the details of the noise impact assessment and final noise abatement design study performed for the 495 Express Lanes Northern Extension (495 NEXT) Project in Fairfax County, Virginia (UPC 113414). The noise analysis was conducted in accordance with Federal Highway Administration (FHWA) and Virginia Department of Transportation (VDOT) noise assessment regulations and guidelines, both of which were revised and updated significantly in 2011. The FHWA regulations are set forth in 23 CFR Part 772. This noise study was performed in accordance with VDOT's Highway Traffic Noise Impact Analysis Guidance Manual" (Version 8) updated on February 20, 2018. The final noise abatement design study reported herein builds upon previous studies, including the preliminary noise study performed by Whitman, Requardt & Associates, LLP, between 2019 and 2020, to support the February 2020 Environmental Assessment (EA), as well as the May 2021 Revised EA both of which were prepared to satisfy the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended.

The Project seeks to extend the 495 Express Lanes along I-495 from the Dulles Toll Road (DTR) / Route 267 Interchange northward to the George Washington Memorial Parkway (GWMP). The project includes access ramp improvements and lane reconfigurations along portions of the DTR and the Dulles Airport Access Road (DAAR) on either side of I-495, as well as access ramp improvements and lane reconfigurations at both the Georgetown Pike (Route 193) interchange and the GWMP interchange. The 495 NEXT Project does not include improvements to the American Legion Memorial Bridge (ALMB), which would be constructed by others as part of Maryland's separate proposed I-495 Managed Lanes project. The roadway design for the 495 NEXT project evaluated in this report ties into Maryland's I-495 Managed Lanes project at the bridge that carries the ramps to and from the GWMP over I-495. The 495 NEXT project also adds additional general purpose (GP) auxiliary lanes, reconfigures two overpasses at Live Oak Drive and Old Dominion Road (Route 738), and constructs a shared use path from one end of the corridor to the other. The 495 NEXT project will keep traffic moving at speeds of 45 mph, or more, by dynamically adjusting tolls, allowing transit, high-occupancy, and toll-paying vehicles to have a more reliable trip. The goals of the 495 NEXT project are to reduce congestion, provide additional travel choices, and improve travel reliability.

This final noise abatement study was undertaken using the latest roadway design plans and traffic data, which were provided as ENTRADA data sheets. The objective of this study is to reevaluate potential noise impact along the project corridor and determine the feasibility and reasonableness of noise abatement measures where noise impacts based on the final design of the project are predicted to occur for the worst noise hour in the design year. The modeling of existing (2018) and design year (2045) Build noise conditions in the study area accounted for the existing terrain and buildings, and for existing and proposed roadways with projected loudest-hour traffic. Noise impact was assessed for existing conditions and the proposed project design and is summarized by FHWA land use activity category in the table below. Traffic noise projections were performed using the FHWA Traffic Noise Model version 2.5 (TNM 2.5).

Alternative	Impact Type	Number of Impacted Units by Land Use and FHWA Activity Category				
		Residential Exterior (B)	Recreational Exterior (C)	Institutional Interior (D)	Commercial Exterior (E)	Total
2018 Existing	NAC	35	29	0	1	65
2045 Build	NAC	77	38	0	0	115

Source: HMMH, 2022.

There are six existing noise barrier systems along the project corridor. Given the nature of the proposed improvements, the existing noise barriers would be physically impacted by construction of the 495 NEXT project to varying degrees, requiring partial replacement in some cases, and full replacement in other cases.

In accordance with VDOT policy, sections of existing noise barriers that would not be physically impacted by the Project were evaluated to determine whether any noise impacts are predicted behind it. Where no impacts were predicted in the design year with the project, the existing noise barrier would remain and not be modified. However, where design year impacts were expected to occur, the feasibility and reasonableness of the existing noise barrier was evaluated with the proposed project. Where the existing noise barrier was determined to be feasible and reasonable, the analysis ended and no changes to the existing noise barrier were proposed.

Several existing noise barriers located within the project study area would not be physically impacted by the construction of the 495 NEXT project. These barriers include Noise Barrier 13B Ext./NSA 26, Barrier NSA 26, the southern section of Noise Barrier 13B and the northern section of Noise Barrier 13E. Since design year noise levels with the 495 NEXT project would be below the applicable FHWA Noise Abatement Criteria behind these section of noise barriers, these sections of noise barriers will remain in place without modification and no further analysis is required.

When an existing noise barrier is physically impacted and/or relocated as part of a Type I project, the new noise barrier must, at a minimum, provide the same level of protection as the existing noise barrier. Proposed modifications to an existing noise barrier shall not be subject to the reasonableness criterion if the site conditions require such modification. For example, if the replacement barrier is moved down a fill slope, the height of the new noise barrier must be increased to maintain the sound attenuation line (barrier top elevation). Similarly, if the replacement barrier would move upslope, the height above ground of the replacement barrier must be maintained. However, should additional modifications to the noise barrier be required to protect additional receptors impacted as a result of a Type I project, those additional modifications would be subject to the cost-effectiveness criterion, and only the additional benefited receptors would be subject to the reasonableness calculation. If the additional modifications are not reasonable for the additional benefited receptors, the new noise barrier would be constructed in a manner to provide the same level of protection as the existing noise barrier, by maintaining either the same sound attenuation line or the same height above ground, depending on the location of the relocated noise barrier.

The following table provides a summary of the noise barriers physically impacted by the final design of the 495 NEXT project and so replaced in-kind. In cases where a modification to the replacement noise barrier was required, the table summarizes the additional (incremental) surface area of material (in square feet), the number of additional residential and recreational units benefited, and the net surface area per benefited receptor (SF/BR). Further analyses of Noise Barrier 13D, 13E, and 12A2 are being conducted at this time and results will be provided within an addendum to this report.

Summary of Noise Barriers to be Replaced In-Kind										
Barrier ID	CNE*	Length (feet)	Height (feet)	Surface Area (sq ft)	Cost at $42/sq ft	No. of Benefits	SF/BR**	Add'l Surface Area (sq ft)	Add'l No. of Benefits	Net SF/BR**
8/9	F, W	4,149	15-37	107,410	$4.51M	49	2,192	n/a	n/a	n/a
10/10 Ext.	C, E	1,860	7-27	35,309	$1.48M	23	1,535	12,839	12	1,070

Summary of Noise Barriers to be Replaced In-Kind										
Barrier ID	CNE*	Length (feet)	Height (feet)	Surface Area (sq ft)	Cost at $42/sq ft	No. of Benefits	SF/BR**	Add'l Surface Area (sq ft)	Add'l No. of Benefits	Net SF/BR**
13A	H, Y	3,977	19-41	113,851	$4.78M	55	2,070	n/a	n/a	n/a
13B†	AA, J	2,273	16-32	62,207	$2.61M	25	2,488	2,462	3	821

Notes:
* CNE = Common Noise Environment
** "F & R" = Feasible and Reasonable; "F & NR" = Feasible and Not Reasonable.
† Includes only portion of noise barrier to be replaced in-kind

Source: HMMH, 2022

The feasibility and reasonableness of noise barriers were evaluated wherever noise impact was predicted to occur. The table below presents a summary of the acoustical design details for the noise barriers evaluated as part of this study in areas without existing noise barriers. These noise barriers were evaluated to mitigate project-related traffic noise impacts in areas that were not behind an existing noise barrier. The table provides each barrier's location, number of benefited receptors, length, height range, surface area, total cost, surface area per benefited receptor, and whether the barrier is considered reasonable. Figure 4 (sheets 1 to 10) presented in Section 3 of this report, shows the locations of the noise barriers on study area maps.

Based on the outcome of this study, there were three new areas for which potential noise barriers were evaluated (CNE C, CNE G, and CNE O). Noise abatement was found to be feasible and reasonable, pending the outcome of a public preference survey, for receptors located within CNE C and the western portion of CNE O. The following table summarizes the three potential noise barriers evaluated in this study.

Summary of Potential Noise Barriers								
Barrier ID	CNE*	Length (feet)	Height (feet)	Surface Area (sq ft)	Estimated Cost at $42/sq ft	Total Number of Benefited Units	Surface Area per Benefited Receptor	Status**
C	C	984	13 – 18	14,090	$591,780	9	1,566	F & R
G	G	1,165	30	34,983	$1,469,286	4	8,746	F & NR
O West	O	899	24	21,579	$906,318	9	1,541	F & R
O East	O	615	22	13,530	$568,260	4	3,383	F & NR

Notes:
* CNE = Common Noise Environment
** "F & R" = Feasible and Reasonable; "F & NR" = Feasible and Not Reasonable.
Source: HMMH, 2022

Construction activity may cause intermittent fluctuations in noise levels. During the construction phase of the project, all reasonable measures will be taken to minimize noise impact from these activities as detailed in this study (Section 7.0).

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1 Introduction

1.1 Background and Purpose

This report describes the details of the noise impact assessment and final noise abatement design study performed for the 495 Express Lanes Northern Extension (495 NEXT) Project in Fairfax County, Virginia (UPC 113414). The noise analysis was conducted in accordance with Federal Highway Administration (FHWA) and Virginia Department of Transportation (VDOT) noise assessment regulations and guidelines, both of which were revised and updated significantly in 2011. The FHWA regulations are set forth in 23 CFR Part 772. This noise study was performed in accordance with VDOT's Highway Traffic Noise Impact Analysis Guidance Manual" (Version 8) dated February 20, 2018. The final noise abatement design study reported herein builds upon previous studies, including the preliminary noise study performed by Whitman, Requardt & Associates, LLP, between 2019 and 2020,[i] to support the February 2020 Environmental Assessment (EA),[ii] as well as the May 2021 Revised EA,[iii] both of which were prepared to satisfy the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended.

1.2 Overview of the Project

The Project seeks to extend the 495 Express Lanes along I-495 from the Dulles Toll Road (DTR)/ Route 267 Interchange northward to the George Washington Memorial Parkway (GWMP) in the vicinity of the American Legion Memorial Bridge (ALMB). The project includes access ramp improvements and lane reconfigurations along portions of the DTR and the Dulles Airport Access Road (DAAR) on either side of I-495, as well as access ramp improvements and lane reconfigurations at both the Georgetown Pike (Route 193) interchange and the GWMP interchange. The 495 NEXT Project does not include improvements to the ALMB, which would be constructed by others as part of Maryland's separate proposed I-495 Managed Lanes Project. As a result, the roadway design evaluated in this report ties into the existing I-495 roadway alignment just south of the ALMB. The 495 NEXT project also adds additional general purpose (GP) auxiliary lanes, reconfigures two overpasses at Live Oak Drive and Old Dominion Road (Route 738), and constructs a shared use path from one end of the corridor to the other.[1]

The 495 NEXT project intends to keep traffic moving at speeds of 45 mph, or more, by dynamically adjusting tolls, allowing transit, high-occupancy, and toll-paying vehicles to have a more reliable trip. The goals of the 495 NEXT project are to reduce congestion, provide additional travel choices, and improve travel reliability.

1.3 Study Area – Common Noise Environments

The project limits are shown in Figure 4. The northern project limit along I-495 occurs at the bridge carrying the ramps from the GWMP to I-495 (see Sheet 1 of Figure 4). The project also extends along the GWMP for a distance of approximately 1,850 feet from the center of the I-495 corridor. The southern

[1] According to VDOT guidance, when shared use paths are identified within a project corridor, they are to be treated as transportation-related land uses. Shared use paths that are transportation-related are not considered noise-sensitive and are to be excluded from the noise analysis. The shared use path constructed as part of the 495 NEXT project fits this definition and so was excluded from this final noise abatement design study.

project limit along I-495 occurs approximately 145 feet north of the bridge carrying Old Springfield Road over I-495 (see Sheet 8 of Figure 4). Along the DTR, the project extends from approximately 0.57 miles east of the bridge over Route 684 along the eastbound lanes at the west project limit (see Sheet 10 of Figure 4), to the bridge deck that carries the DTR over Route 123 at the east project limit (see Sheet 9 of Figure 4).

Noise-sensitive land use in the project study area includes exterior activity areas associated with single-family residences along both sides of I-495, as well as the BASIS Independent School. In addition, recreational use along hiking trails, the Langley Swim & Tennis Club, and exterior use associated with office space are also located within the project study area. Existing noise-sensitive properties also include several facilities with interior use. Following VDOT and FHWA policies and procedures, the receptors used in the model to represent exterior activity areas at noise-sensitive land uses were grouped into Common Noise Environments (CNEs). Receptors in a CNE are exposed to similar noise sources and levels, and generally occur between secondary noise sources, such as traffic on cross-streets. The following paragraphs describe how the modeled receptors were grouped into CNEs, following the naming conventions used for the 495 NEXT Project.

CNE AA is located on the southbound side of I-495 between Old Dominion Drive and the southern terminus of Dominion Court. This CNE is composed of 14 receptors all of which are single-family residences (Activity Category B) and is located behind the northern end of existing Noise Barrier 13B. CNE AA is shown in Figure 4 on Sheets 5 and 6.

CNE AB is located on the northbound side of I-495 along Dead Run Drive, south of Georgetown Pike. This CNE contains 11 receptors, all of which are single-family residences (Activity Category B). CNE AB is shown in Figure 4 on Sheet 4.

CNE C is located on the southbound side of I-495 between Rivercrest Drive and the ramp connecting George Washington Memorial Parkway westbound to I-495 southbound. This CNE contains 57 receptors including 35 single-family residences (Activity Category B) and another part of the Potomac Heritage Trail, represented by 22 Activity Category C receptors. CNE C is shown in Figure 4 on Sheets 1 and 2.

CNE D is located on the northbound side of I-495 along Lupine Lane, south of the GWMP. This CNE is composed of 26 receptors, all of which are single-family residences (Activity Category B). CNE D is shown in Figure 4 on Sheets 1 and 2.

CNE E is located on the southbound side of I-495 along Live Oak Drive. This CNE contains 47 receptors, mainly representing recreational land uses as well as three single-family residences (Activity Category B). The recreational land uses (Activity Category C) include a third part of the Potomac Heritage Trail, Scott's Run Nature Preserve Trail, Oak Trail, Laurel Ridge Trail, and the Langley Swim and Tennis Club. CNE E is located behind existing Barrier 10 and is shown in Figure 4 on Sheets 2 and 3.

CNE F is located on the northbound side of I-495 between Lawton Street and Holyrood Drive. This CNE is located behind existing Noise Barrier System 8/9/9-1 and is comprised of 58 receptors, including 57 single-family residences (Activity Category B) and one place of worship (Activity Category D). CNE F is shown in Figure 4 on Sheets 2 to 4.

CNE G is located on the southbound side of I-495 along Linganore Drive, north of Georgetown Pike. This CNE contains nine receptors, all of which are single-family residences (Activity Category B). CNE G is shown in Figure 4 on Sheets 3 and 4.

CNE H is located on the southbound side of I-495 between Georgetown Pike and Old Dominion Drive and is located behind existing Noise Barrier 13A. It is composed of 51 receptors, including 41 single-family residences (Activity Category B) and part of Scott's Run Nature Preserve Trail, represented by 10 receptors (Activity Category C). CNE H is shown in Figure 4 on Sheets 3 to 6.

CNE I is located on the northbound side of I-495 between Georgetown Pike and Westerly Lane. This CNE is located behind existing Noise Barrier 13E and contains 64 receptors, including 60 single-family residences (Activity Category B), two places of worship represented by three receptors (I-033, I-045, and I-046), and one receptor at the Cooper Middle School (Activity Category C).[2] CNE I is shown in Figure 4 on Sheets 4 and 5.

CNE J is located on the southbound side of I-495 between Huntmaster Lane and Lewinsville Road. This CNE is located behind existing Noise Barrier 13B and is comprised of 55 receptors all of which are single-family residences (Activity Category B). CNE J is shown in Figure 4 on Sheets 6 and 7.

CNE K is located on the northbound side of I-495 along Scotts Run Road, north of Lewinsville Road. This CNE extends more than 500 feet from I-495 and is located behind existing Noise Barrier 13D. CNE K contains 98 receptors including 70 single-family residences (Activity Category B), 27 recreational receptors along a hiking trail in Scott's Run Preserve (Activity Category I, and one church (Activity Category D). CNE K is shown on Sheets 6 and 7 in Figure 4.

CNE L is located in the northwest quadrant of the I-495/Dulles Access and Toll Road interchange just south of Lewinsville Road. CNE L consists entirely of single family residences (Activity Category B) located on Snow Meadow Lane and Lewinsville Road. CNE L is located behind the north end of an existing noise barrier identified as Noise Barrier 13B Ext./NSA26 in the 2020 Preliminary Noise Study. CNE L is shown in Figure 4 on Sheets 7 and 8.

CNE M is located on the westbound side of the Dulles Access Road / Dulles Toll Road (267) west of the interchange at I-495 and consists of residential land use (Activity Category B) in the McLean Hamlet and Wilshyre neighborhoods. The east end of CNE M is located behind an existing noise barrier identified as Noise Barrier 13B Ext./NSA26 in the 2020 Preliminary Noise Study Report, while the west end of CNE M is located behind Noise Barrier NSA26 of the same report. CNE M is shown in Figure 4 on Sheets 7, 8, and 10.

CNE N is located in the northeast quadrant of the I-495/Dulles Access and Toll Road interchange, south of Lewinsville Road. This CNE is comprised of one receptor that represents the National Center for Plastic Surgery (Category D) and shown on Sheets 7 in Figure 4.

CNE O is located on the southbound side of I-495 between Dulles Access Road / Dulles Toll Road (267) and Jones Branch Drive. This CNE is composed of 49 receptors, predominantly Activity Category C including the Valo Lake jogging path, BASIS Independent McLean, Valo Lake rooftop basketball and tennis courts, a hiking trail, the Valo Park Terrace, and outdoor areas associated with the Valo Park office buildings (Activity Category E). CNE O is shown in Figure 4 on Sheets 8 and 10.

[2] The 2020 Preliminary Noise Study had one Activity Category C receptor and one Activity Category D receptor at the front of the Cooper Middle School. Based on the latest aerial imagery and the observations of field staff during the monitoring program, the school was under construction. So, while an Activity Category D receptor was modeled at the school for the current study, an exterior activity area with frequent human use could not be identified and so no Activity Category C receptor was modeled for the Cooper Middle School.

CNE P is located on the southbound side of I-495 at 7930 Jones Branch Drive. This CNE is comprised of four recreational receptors along a hiking trail adjacent to the Hilton McLean (Activity Category C) and of three receptors at the Hilton Corporate office building outdoor courtyard (Activity Category E). CNE P is shown in Figure 4 on Sheets 8 and 10.

CNE Q is located in the southeast quadrant of the I-495/Dulles Toll and Access Road interchange. This CNE is entirely comprised of the Gates of McLean apartment complex (Activity Category B) and is shown in Figure 4 on Sheets 8 and 9. CNE Q is located behind an existing noise barrier 12A2, which will be partially impacted by the 495 NEXT project.

CNE S is located behind existing Noise Barrier 13D on the northbound side of I-495 between Old Dominion Drive and Dulany Drive. This CNE extends more than 500 feet from I-495 and is comprised of 30 receptors all of which are single-family residences (Activity Category B). CNE S is shown in Figure 4 on Sheets 5 and 6.

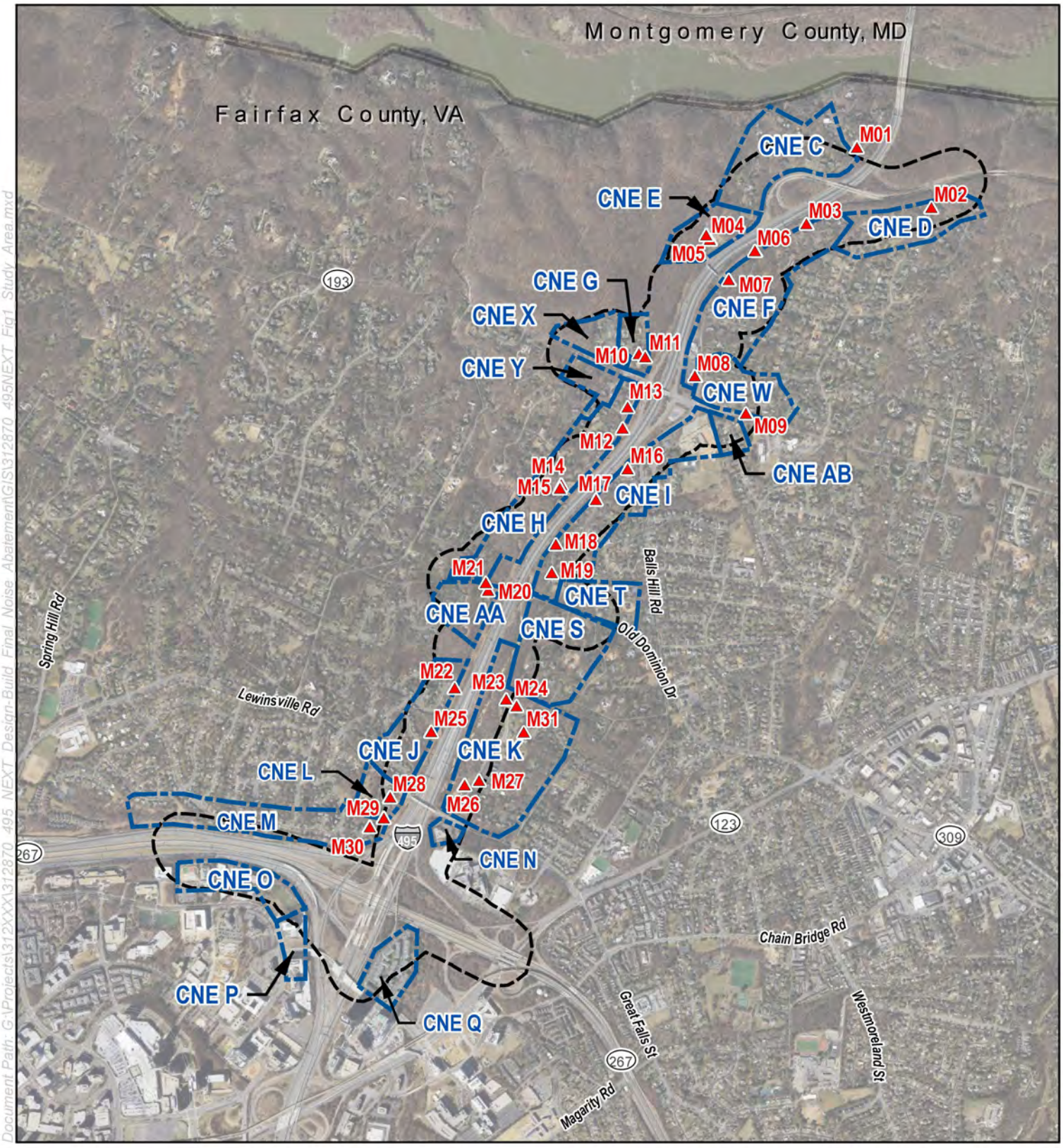
CNE T is located behind existing Noise Barrier 13E on the northbound side of I-495 between Westerly Lane and Old Dominion Drive. This CNE contains 22 receptors, all of which are single-family residences (Activity Category B). CNE T is shown in Figure 4 on Sheet 5.

CNE W is located on the northbound side of I-495 between Holyrood Drive and Georgetown Pike. This CNE is located behind existing Noise Barrier 8 and is composed of 33 receptors, all of which are single-family residences (Activity Category B). CNE W is shown in Figure 4 on Sheet 4.

CNE X is located on the southbound side of I-495 between Linganore Drive and Georgetown Pike. This CNE contains 21 receptors including eight single-family residences (Activity Category B) and the Stubblefield Falls Overlook Trail, which is represented by 13 receptors (Activity Category C). CNE X is shown in Figure 4 on Sheet 3.

CNE Y is located on the southbound side of I-495 between Georgetown Pike and Helga Place, behind existing Noise Barrier 13A. This CNE is comprised of eight receptors, all of which are single-family residences (Activity Category B). CNE Y is shown in Figure 4 on Sheet 3.

Figure 1 provides an overview of the study area and the locations of the CNEs.



0 1,500 3,000 Feet

▲ M# Measurement Site

CNE Boundary

500' Noise Study Area

State Boundary

Figure 1
Locations of Common Noise Environments and Noise Monitoring Sites

I-495 Express Lanes Northern Extension Project

Fairfax County, Virginia

VDOT Virginia Department of Transportation

1.4 Existing Noise Barriers

There are six existing noise barrier systems along the project corridor. Given the nature of the proposed improvements, the existing noise barriers would be physically impacted by construction of the 495 NEXT project to varying degrees, requiring partial replacement in some cases, and full replacement in other cases. This section describes VDOT's policy requirements for addressing existing noise barriers, and the project impacts to all existing barriers along the project corridor.

VDOT policy requires that where an existing noise barrier is not physically impacted by a Type I project, it must be evaluated to determine whether any noise impacts are predicted behind it. If no impacts are predicted in the design year with the project, the existing noise barrier remains in place without modification. However, if design year impacts are expected to occur, the feasibility and reasonableness of the existing noise barrier is to be evaluated with the proposed project in the design year. If the existing noise barrier is determined to be feasible and reasonable, the analysis is complete and no changes to the existing noise barrier would be required. If the existing noise barrier is determined to be not feasible or reasonable, then a new barrier is evaluated. If the new barrier is not feasible and reasonable, the existing noise barrier is to be left in place without modification. Should the new barrier be found to be feasible and reasonable, the new barrier shall be recommended for construction.

When an existing noise barrier is physically impacted and/or relocated as part of a Type I project, the new noise barrier must, at a minimum, provide the same level of protection as the existing noise barrier. Proposed modifications to an existing noise barrier shall not be subject to the reasonableness criterion if the site conditions require such modification. For example, if the replacement barrier is moved down a fill slope, the height of the new noise barrier must be increased to maintain the sound attenuation line (barrier top elevation). Similarly, if the replacement barrier would move upslope, the height above ground of the replacement barrier must be maintained. However, should additional modifications to the noise barrier be required to protect additional receptors impacted as a result of a Type I project, those additional modifications would be subject to the cost-effectiveness criterion, and only the additional benefited receptors would be subject to the reasonableness calculation. If the additional modifications are not reasonable for the additional benefited receptors, the new noise barrier would be constructed in a manner to provide the same level of protection as the existing noise barrier, by maintaining either the same sound attenuation line or the same height above ground, depending on the location of the relocated noise barrier.

The existing noise barriers along the project corridor are identified below. The results of the feasibility and reasonableness determinations for these existing noise barriers are presented in Section 4. Figure 4 in Section 3 shows the locations of existing noise barriers to remain in place, existing noise barrier replaced in kind, as well as the potential noise barriers that were evaluated for this study.

- **Noise Barrier System 8/9** is an existing system comprised of four noise barriers located on the northbound side of I-495. Barrier 8 extends from Georgetown Pike (Route 193) to Live Oak Drive and will be physically impacted by the project, resulting in a partial replacement in kind. Barriers 9-1, 9-2, and 9-3 are three separate, overlapping barriers and extend from Live Oak Drive and along the ramp to GWMP. These barriers will be physically impacted along their entire length by the project and will be replaced in kind. While these noise barriers were evaluated as stand-alone noise barriers in the preliminary study, they were evaluated as a system of noise barriers for this study. Noise Barrier System 8/9 is shown in Figure 4 on Sheets 1 to 4.
- **Noise Barrier 10** is an existing noise barrier located on the southbound side of I-495 and along the ramp from GWMP westbound to I-495 southbound. Noise Barrier 10 will be physically impacted by

the 495 NEXT project along its entire length and will be replaced in kind. Noise Barrier 10 is shown in Figure 4 on Sheet 2.

- **Noise Barrier 12A2** is an existing noise barrier for the Gates of McLean apartment complex and located in the southeastern quadrant of the I-495/Dulles Toll and Access Road interchange. The northern portion of the barrier will be physically impacted by the 495 NEXT project and therefore was analyzed as a partial replacement in kind. Noise Barrier 12A2 is shown in Figure 4 on Sheets 8 and 9.
- **Noise Barrier 13A** is an existing noise barrier located on the southbound side of I-495 between Georgetown Pike (Route 193) and Old Dominion Drive. Noise Barrier 13A will be physically impacted by the 495 NEXT project along its entire length and will be replaced in kind. Noise Barrier 13A is shown in Figure 4 on Sheets 3 to 5.
- **Noise Barrier 13B** is an existing noise barrier located on the southbound side of I-495 between Old Dominion Drive and Lewinsville Road. Approximately 2,270 linear feet at the north end of Noise Barrier 13B will be physically impacted by the 495 NEXT project and will be replaced in kind. Approximately feet at the south end of the project is expected to remain in place without modification. Barrier 13B is shown in Figure 4 on Sheets 5 to 7.
- **Noise Barrier 13B Ext./NSA26** is located along the northwest quadrant of the I-495/Dulles Toll and Access Road interchange, extending from Lewinsville Road to the south along the ramp from 495 southbound to the Dulles Toll Road westbound, where it ties into the eastern end of Noise Barrier NSA26. Noise Barrier 13B Ext/NSA26 is shown in Figure 4 on Sheets 7 and 8.
- **Noise Barrier NSA26** is located along the westbound lanes of the Dulles Toll Road west of I-495. The east end of Noise Barrier NSA26 ties into Noise Barrier 13B Ext./NSA26. Noise Barrier NSA26 is expected to remain in place without modification as a result of the 495 NEXT project. Noise Barrier NSA26 is shown in Figure 4 on Sheets 8 and 10.
- **Noise Barrier 13D** is an existing noise barrier located on the northbound side of I-495 between Lewinsville Road and Old Dominion Drive. Noise Barrier 13D will be physically impacted by the 495 NEXT project along its entire length and will be replaced in kind. Barrier 13D is shown in Figure 4 on Sheets 5 to 7.
- **Noise Barrier 13E** is an existing noise barrier located on the northbound side of I-495 between Old Dominion Drive and Georgetown Pike (Route 193). The replacement of Noise Barrier 13E begins at the southern end of the barrier and would extend northward for approximately 2,413 feet, where it would then tie in with the existing section of Noise Barrier 13E that is to remain in place. Certain sections of Noise Barrier 13E will be physically impacted by the 495 NEXT project and will be replaced in kind. Other sections of Noise Barrier 13E are expected to remain in place without modification. Barrier 13E is shown in Figure 4 on Sheets 4 and 5.

Existing noise barrier heights and locations were based on survey data collected in 2013 and LiDAR (i.e., light detection and ranging) data obtained through the U.S. Geological Survey (USGS) web site.[iv]

1.5 Date of Public Knowledge

To be eligible for noise abatement consideration, developed and undeveloped lands must have been "permitted" by the Date of Public Knowledge. A property is eligible for noise abatement if there is a definite commitment to develop land with an approved specific design of noise-sensitive land use activities as evidenced by the issuance of a building permit. The Date of Public Knowledge is the date of approval of the Categorical Exclusion (CE), the Finding of No Significant Impact (FONSI), or the Record of Decision (ROD), as defined in 23 CFR 772. FHWA issued a Finding of No Significant Impact (FONSI) for the 495 NEXT project on June 29, 2021.[v]

The Design team reviewed information available from Fairfax County to determine whether there have been any buildings permits issued for undeveloped properties within the study area since the date of the preliminary noise study and the Date of Public Knowledge. Based on observations made during the noise monitoring program, field staff documented evidence of home construction vis-à-vis disturbed ground and a poured concrete foundation on the parcel of land at 1151 Dominion Court, McLean. Consequently, this parcel of land was included in the noise analysis as Receptor AA-013 in CNE AA.

Appendix I contains a list of undeveloped parcels in the study area. A review of the County's data indicates that only two of those properties have active building permits for residences at 1150 Dominion Court and 1151 Dominion Court – these properties have been accounted for in the noise model.

VDOT is under no obligation to provide noise abatement for any noise-sensitive properties that were permitted after the Date of Public Knowledge.

2 Noise Abatement Criteria and Design Goals

2.1 Regulations and Criteria

The noise impact of the proposed Project was assessed in accordance with FHWA and VDOT noise assessment regulations and guidelines. The FHWA regulations are set forth in 23 CFR Part 772.[vi] On July 13, 2010, FHWA published revised noise regulations which became effective on July 13, 2011. FHWA has also published a guidance document to support the new regulations.[vii] This noise study was performed in accordance with VDOT's Highway Traffic Noise Impact Analysis Guidance Manual" (Version 8) dated February 20, 2018.[viii]

2.2 FHWA Noise Abatement Criteria

To assess the degree of impact of highway traffic and noise on human activity, the FHWA established Noise Abatement Criteria (NAC) for different categories of land use activity (see Table 1). The NAC are given in terms of the hourly, A-weighted, equivalent sound level in decibels (dBA). The A-weighted sound level is a single number measure of sound intensity with weighted frequency characteristics that corresponds to human subjective response to noise. Most environmental noise (and the A-weighted sound level) fluctuates from moment to moment, and it is common practice to characterize the fluctuating level by a single number called the equivalent sound level (L_{eq}). The L_{eq} is the value or level of a steady, non-fluctuating sound that represents the same sound energy as the actual time-varying sound evaluated over the same time period. For traffic noise assessment, L_{eq} is typically evaluated over a one-hour period and may be denoted as $L_{eq}(h)$.

Noise-sensitive land use along the project corridor consists of residential properties (Activity Category B) and recreational areas (Activity Category C); institutional land use, such as a performance center and a university for which the interior noise levels were assessed (Activity Category D); and recreation areas on commercial properties such as hotel pools and outdoor dining at restaurants (Activity Category E). For Categories B and C, noise impact would occur when predicted exterior noise levels, due to the project, approach or exceed 67 dBA in terms of $L_{eq}(h)$ during the loudest hour of the day. VDOT defines the word "approach" in "approach or exceed" as within 1 decibel. Therefore, the threshold for noise impact is where exterior noise levels are within 1 decibel of 67 dBA $L_{eq}(h)$, or 66 dBA. For Activity Category D, the threshold for noise impact is where interior noise levels are within 1 decibel of 52 dBA $L_{eq}(h)$, or 51 dBA. For Activity Category E, noise impact would occur where exterior noise levels are within 1 decibel of 72 dBA $L_{eq}(h)$, or 71 dBA. Noise impact also would occur wherever project noise causes a substantial increase over existing noise levels. VDOT defines a substantial increase as an increase of 10 decibels, or more, in the design year, above existing noise levels.

Table 1 FHWA Noise Abatement Criteria (NAC)

Activity Category	$L_{eq}(h)$[1]	Description of Activity Category
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[2]	67 (Exterior)	Residential
C[2]	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E[2]	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F
F	-	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	-	Undeveloped lands that are not permitted (without building permits)

Notes:
1. Hourly equivalent A-weighted sound level (dBA)
2. Includes undeveloped lands permitted for this activity category

Source: 23 CFR Part 772.

When the predicted traffic noise levels due to the Project approach or exceed the NAC during the loudest hour of the day or cause a substantial increase over existing noise levels, consideration of traffic noise reduction measures is necessary. If it is found that such mitigation measures will cause adverse social, economic or environmental effects that outweigh the benefits received, they may be dismissed from consideration. For this study, noise levels throughout the study area were determined for the Existing conditions (2018) and the design year (2045).

For Category D land uses, indoor (interior) noise levels are based on the TNM-computed outdoor (exterior) traffic noise level along that façade closest to the highway and an estimated outdoor-to-indoor noise level reduction (OINLR) for the building. The OINLR is based on the values in Table 6 of the FHWA "Highway Traffic Noise: Analysis and Abatement Guidance"[ix] for the construction of the building and the condition of the windows. Activity Category D land use in the study area is masonry construction and assumed to have single-glazed windows. The corresponding OINLR for this type of building with single-glazed windows is 25 dB, which is an appropriately conservative assumption, since FHWA guidance suggests that masonry construction with double-glazed windows provides an OILR of 35 dB, which would yield lower interior sound levels.

All noise-sensitive land uses potentially affected by the project are near roads for which traffic data were provided as ENTRADA data sheets. Therefore, all noise levels were computed from the appropriate loudest-hour traffic data. Refer to Section 3.4 for details of the loudest hour analysis and determination.

2.3 Noise Abatement Measures, Goals and Processes

FHWA has identified certain noise abatement measures that may be incorporated in projects to reduce traffic noise impact. In general, mitigation measures can include alternative measures (traffic

management, the alteration of horizontal and vertical alignment, and low-noise pavement), in addition to the construction of noise barriers.

2.3.1 Alternative noise abatement measures

Traffic management measures normally considered for noise abatement include reduced speeds and truck restrictions. Reduced speeds would not be an effective noise mitigation measure since a substantial decrease in speed is necessary to provide a significant noise reduction. A 10-mph reduction in speed would result in only a two decibel decrease in noise level. Restricting truck usage on I-495 is not practical as the facility is an interstate highway and a primary truck route. The alteration of the horizontal or vertical alignment of I-495 also would not be practical because the roadway would have to undergo a significant shift in the horizontal alignment to make the measure effective. Such shifts would require extensive right-of-way acquisitions and would likely create new noise impact.

Additionally, the Noise Policy Code of Virginia (HB 2577, as amended by HB 2025) states:

> *"Requires that whenever the Commonwealth Transportation Board or the Department plan for or undertake any highway construction or improvement project and such project includes or may include the requirement for the mitigation of traffic noise impacts, first consideration should be given to the use of noise reducing design and low noise pavement materials and techniques in lieu of construction of noise walls or sound barriers. Vegetative screening, such as the planting of appropriate conifers, in such a design would be utilized to act as a visual screen if visual screening is required."*

Consideration was given to these measures during the final design process, where feasible. However, per VDOT's "Highway Traffic Noise Impact Guidance Manual," Version 8, dated February 20, 2018, VDOT is not authorized by the FHWA to use quiet pavement as a form of noise mitigation. Furthermore, 23 CFR 772 does not allow for the use of pavement type or surface texture (i.e., "quiet pavement") as a noise abatement measure. The response from project management is included in Appendix F.

2.3.2 Noise barrier feasibility and reasonableness criteria and design goals

The only remaining abatement measure investigated was the construction of noise barriers. The feasibility of noise barriers was evaluated in locations where noise impact is predicted to occur within the project area. Where the construction of noise barriers was found to be physically practical, barrier noise reduction was estimated based on roadway, barrier, and receiver geometry as described below.

FHWA and VDOT require that noise barriers be both "feasible" and "reasonable" to be recommended for construction. State DOTs have established individual feasibility and reasonableness criteria within federally mandated guidelines. VDOT's criteria are summarized here.

To be feasible, a barrier must be acoustically effective, that is it must reduce design year noise levels at noise sensitive locations by at least 5 dBA, thereby "benefiting" the property. VDOT requires that at least fifty percent (50%) of the impacted receptors receive 5 dBA or more of insertion loss from the proposed barrier for it to be feasible.

A second feasibility criterion is that it must be possible to design and construct the barrier. Factors that enter into constructability include safety, barrier height, topography, drainage, utilities, maintenance of

the barrier, and access to adjacent properties. VDOT has a maximum allowable height of 30 feet above ground level for all newly proposed noise barriers.

Barrier reasonableness is based on three factors: cost-effectiveness, ability to achieve VDOT's insertion loss design goal, and views of the benefited receptors. To be "cost-effective," a barrier cannot require more than 1600 square feet per benefited receptor. VDOT's maximum barrier height of 30 feet figures into the assessment of benefited receptors. Where multi-family housing includes balconies at elevations above that of a 30-ft high barrier, or terrain lifts ground-based receptors above the elevation of a 30-ft barrier, these receptors will not be assessed for barrier benefits and are thereby not included in the computation of the barrier's reasonableness.

The second reasonableness criterion is VDOT's noise reduction design goal of 7 dBA. This goal must be achieved for at least one of the impacted receptors for the barrier to be considered reasonable.

The third reasonableness criterion relates to the views of the owners and residents of the potentially benefited properties. A majority of the benefited receptors must favor the barrier for it to be considered reasonable to construct. As needed, community viewpoints will be surveyed in the latter half of 2022 once the feasibility and reasonableness determinations are complete and will be documented in an addendum to this report.

2.3.3 Acoustical design process

The acoustical design process involves locating barriers in cost-efficient locations initially, such as at the top of slope where a roadway is in cut, and near the edge of the roadway where it is on fill and above the elevation of affected receivers. Barriers are always located within the project right of way, unless extenuating circumstances require locating a portion of a barrier on private or municipal property. Initially in the design, barriers are evaluated at several heights to determine the heights necessary to achieve sufficient noise reduction. Where sound levels are relatively high (mid-70s dBA or higher), barriers are designed to achieve notably greater noise reduction than 5 dBA, so that where possible, the resulting noise levels are below the impact threshold of 66 dBA. Achieving this goal is not always possible, if the reasonableness criterion of 1,600 square feet of barrier per benefited receptor (SF/BR) is exceeded as a result of the increased barrier height.

For projects that meet FHWA's and VDOT's definition of a Type I project, highway traffic noise levels are assessed for all receptors in the *project area.* For the purpose of a traffic noise study, the project area is the area located within 500 feet from the proposed edge of pavement of the roadway improvements as defined by the roadway construction limits.

3 Predicted Noise Levels and Impact Assessment

In a noise abatement design study, the noise analysis involves development of a refined model for highway traffic noise prediction and design of the barriers. That refined model is used first to determine areas where noise impact would occur in the future Design Year, then to evaluate whether noise barriers to mitigate noise impacts are both feasible and reasonable. Barriers found to be feasible and reasonable are then taken through a detailed acoustical design process to establish location, length and height appropriate for structural design and construction.

3.1 Noise Modeling Methodology

All traffic noise calculations for this study were performed using the FHWA-mandated Traffic Noise Model (TNM) first released by FHWA in April 1998 for use on Federal-aid highway noise projects.[x] TNM version 2.5 (TNM 2.5) was used for all traffic noise level computations and noise barrier design.

TNM 2.5 separately calculates the noise contribution of each roadway segment at a given receiver. For each roadway segment, the noise from each vehicle type is computed from the reference energy-mean emission level, and adjusted for vehicle volume, speed, grade, roadway segment length, and source-to-receiver distance. Further adjustments needed to accurately model the sound propagation from source to receiver include shielding provided by rows of buildings, the effects of different ground types, source and receiver elevations, and the effects of any intervening noise barriers or trees. The program sums the noise contributions of each vehicle type for a given roadway segment at the receiver. TNM then repeats this process for all roadway segments, summing their contributions to generate the predicted noise level at each receiver.

TNM 2.5 incorporates sound emissions and sound-propagation algorithms based on well-established theory or on accepted international standards. The acoustical algorithms contained within the FHWA TNM have been validated with respect to carefully conducted noise measurement programs and show excellent agreement in most cases for sites with and without noise barriers. TNM 2.5 takes into account:

- Vehicle classifications, volumes, and speeds.
- Attenuation due to ground reflections off a large selection of ground types.
- Effects of roadway edges and other edges between ground of different types.
- Attenuation over noise walls, including their interaction with reflections from the ground.
- Attenuation over earth berms and similar intervening hills/terrain.
- Attenuation over/through rows of buildings.
- Attenuation through dense foliage.

The modeling of roadway segments, terrain geometry, structural shielding, residential receivers, and location of existing and proposed noise barrier locations was based on: 1) the latest roadway design files for the I-495 NEXT Project that also included the limits of disturbance;[xi] 2) aerial photography, revised elevation and GIS data provided by and/or obtained from third-party sources;[xii] and 3) TNM 2.5 files from the preliminary noise study (for the parameters of the existing noise barriers).[xiii]

To fully characterize design year traffic noise levels in the study area, TNM 2.5 was used to compute noise levels for more than 700 receivers (also called “receptors” and/or “sites”), representing all of the

noise-sensitive land use in the study area that would be eligible for noise abatement based on the Date of Public Knowledge (see Section 1.5). All TNM files (TNM runs) developed for this study will be submitted to VDOT in their native electronic format at the conclusion of the study.

3.2 Measurement of Existing Traffic Noise Levels

A noise measurement program in the Project study area was carried out to provide current and sufficient information for a model validation exercise. Short-term noise measurements of 20- and 30-minutes duration were obtained at 30 sites from November 30 to December 3, 2021. Measurement sites were generally located in areas with the highest noise exposures, mostly adjacent to first row and some second-row homes. A follow-up measurement was performed in the Hooking Road area within CNE K on June 2, 2022.

The short-term data collection procedure involved continuous monitoring and logging of the one-second sound levels and noting the contributing noise sources and the times they occurred during the period. Periods that included events that were not representative of the ambient noise environment, or were not traffic-related, were noted so that they could be later separated or excluded. The total measurement period L_{eq} was determined both with and without the periods that included these events. By comparing the two totals, the significance of non-traffic events to the overall noise level can be determined for the measurement period. Traffic data were collected simultaneously during each noise measurement by remotely recording the live stream from specific traffic cameras along I-495 from VDOT's 511 website.[xiv] Vehicle counts, and classifications were performed after the completion of noise measurements, and the normalized traffic count data was used as input to the TNM model for model validation.

Short-term noise monitoring is not a process to determine design year noise impacts or barrier locations. Short-term noise monitoring provides a level of consistency between what is present in real-world situations and how that is represented in the computer noise model. Short-term monitoring does not need to occur within every CNE to validate the computer noise model.

Short-term noise measurements were conducted using a Brüel & Kjær 2245 (ANSI Type I, "Precision") integrating sound level meter with a 1/3 octave band real-time analyzer. The noise measurement instrumentation was field calibrated at regular intervals during the measurement program. In addition, all instruments are calibrated annually at a certification laboratory, with calibrations traceable to the National Institute of Standards and Technology. A copy of the calibration certificate for the instrument used for the measurements is included in Appendix E.

Table 2 provides a summary of the noise measurement sites and locations, along with measurement date, time, duration and the measured L_{eq} from traffic on I-495. As shown in the table, the measured Traffic-only L_{eq} is very nearly the same as the Total L_{eq} at the majority of the measurement sites, indicating that traffic noise from I-495 was the dominant source of noise at these locations. The measurement site locations are shown in the study area maps in Figure 4.

The noise measurement field data sheets with site sketches, measured noise levels and traffic counts, along with site photographs and noise monitor sound levels and calibration output are provided in Appendix E.

Table 2 Noise Measurement Summary

Site No.	Address/ Location	Date	Time Start (hh:mm)	Duration (minutes)	Measured Total L_{eq} (dBA)	Measured Traffic-only L_{eq} (dBA)
M01	640 Live Oak Dr on Rivercrest Dr	11/30/2021	12:20 PM	30	61	60
M02	6708 Lupine Lane	11/30/2021	10:55 AM	30	56	56
M03	4926 Butternut Court	12/1/2021	11:10 AM	20	65	64
M04	Scotts Run Trail Head	12/2/2021	8:05 AM	20	66	66
M05	Scotts Run Trail Head	12/2/2021	8:05 AM	20	64	64
M06	7048 Arbor Lane	12/1/2021	12:10 PM	20	65	65
M07	809 Balls Hill Road	11/30/2021	9:50 AM	30	64	64
M08	850 Balls Hill Road	11/30/2021	9:50 AM	30	59	59
M09	East of the Georgetown Pike & Dead Run Drive	12/2/2021	4:55 PM	30	64	62
M10	897 Linganore Drive	12/2/2021	9:20 AM	20	59	59
M11	897 Linganore Drive	12/2/2021	9:20 AM	20	65	65
M12	Helga Place Tennis Court	12/3/2021	7:50 AM	30	56	56
M13	Corner of Peter Pl & Helga Pl	12/3/2021	7:50 AM	30	56	56
M14	Spencer Road & Spencer Court	12/1/2021	2:45 PM	30	59	56
M15	Spencer Road & Spencer Court	12/1/2021	2:45 PM	30	59	55
M16	1020 Balls Hill Road	12/1/2021	8:05 AM	20	65	65
M17	1032 Delf Drive	12/1/2021	9:05 AM	20	65	65
M18	7412 / 7408 Churchill Road	12/1/2021	10:00 AM	20	63	63
M19	7428 Old Dominion Drive	12/3/2021	9:15 AM	30	66	66
M20	7515 Old Dominion Drive	12/2/2021	11:35 AM	30	65	64
M21	7513 / 7515 Old Dominion Drive	12/2/2021	11:35 AM	30	66	66
M22	7627 Huntmaster Lane	11/30/2021	3:45 PM	30	62	62
M23	1294 Scotts Run Road	12/2/2021	1:45 PM	30	64	64
M24	Scotts Run Road Cul-de-sac	12/2/2021	1:45 PM	30	61	61
M25	7600 Timberly Court	12/3/2021	10:40 AM	30	61	61
M26	1310 Scotts Run Road	12/2/2021	3:15 PM	30	64	63
M27	Corner of Box Elder Court & Scotts Run Road	12/2/2021	3:15 PM	30	62	61
M28	1357 / 1359 Snow Meadow Lane	12/1/2021	4:45 PM	30	58	58
M29	Lear Road Trail Head	12/3/2021	12:55 PM	30	55	55
M30	Lear Road Cul-de-sac	12/3/2021	12:55 PM	30	56	56
M31	Hooking Road	6/2/2022	12:25 PM	30	56	56

Source: HMMH, 2022.

3.3 Noise Model Validation

During the noise measurement program, simultaneous vehicle classification counts were obtained from a recording of the live video stream from cameras on VDOT's 511 web page. By entering normalized traffic data into the noise model developed for the study area and locating the measurement sites accurately, the accuracy of the noise model representation can be validated.

There are many factors that influence the measured noise levels that may cause differences with computed noise levels of up to several decibels. Such factors include atmospheric conditions (upwind, neutral or downwind), shielding by structures that may be difficult to model, and the representativeness of louder vehicles passing during the measurement period. Factors in the model that may cause differences with the measured noise levels include level of detail in terrain modeling, and the degree of inclusion of smaller elements such as hard ground zones, tree zones and sparse rows of buildings.

The purpose of a validation exercise is to evaluate the success of the model in representing the important acoustical characteristics of the study area. This is determined by examining the overall trend of the differences between measured and computed values. The individual site to site differences will vary more significantly, depending on the factors mentioned in the previous paragraph. The FHWA does not allow the model to be "calibrated" or adjusted to make the measurements match the computed values. The reasons for this are 1) the TNM has been sufficiently validated through FHWA-funded research projects and it has been found to be highly accurate, and 2) the FHWA recognizes that many factors are present both in the measurement of noise and in developing an accurate model that can lead to variability.

The validation process compares monitored sound levels at each measurement site to the noise levels calculated with TNM using the existing site geometry and normalized traffic count data as input to the model. The modeling assumptions are refined, as necessary, until the agreement between monitored and calculated noise levels are within an acceptable range of ± 3 dBA, in accordance with VDOT policy.

As previously discussed, the I-495 NEXT project corridor includes many existing noise barriers – the majority of which will be physically impacted by the proposed project and so replaced in kind according to VDOT guidance and policies. Since existing noise barriers have the potential to reflect sound from their surface to the other side of the highway, the effects of reflected sound were considered during model validation. Consequently, the results of the model validation are shown in Table 3 with and without the effects of reflected sound. Without accounting for the effects of reflected sound from existing noise barriers, the Project-wide difference between calculated and monitored noise levels was -1.3 dBA (over all 31 sites) on average, which shows good agreement between monitored and modeled sound levels and suggests confidence in the modeling assumptions. When reflected noise is accounted for in the model, the Project-wide average difference between calculated and monitored noise levels saw a slight improvement to -1.1 dBA (over all 31 sites). Section 3.4 provides further details on the issues of reflected sound.

Differences between the calculated and monitored levels were outside of the acceptable range at six of the measurement sites, five of which are located behind existing noise barriers. Therefore, further investigation was conducted to determine the cause of these differences. Upon completion of the noise measurement program, data sheets and other field notes contained within the data files were reviewed. In some cases, traffic on local roads adjacent to the measurement site was not accounted for in the model, which most likely resulted in lower predicted than measured noise levels. Other factors contributing to the calculated noise levels being lower than measured include potential influences from

HVAC systems near the site and ground zones. However, the largest contributor to the higher measured levels was related to atmospheric conditions in the study area during a portion of the monitoring program. According to the field notes, favorable atmospheric conditions prevailed for most of the monitoring program, however periods of higher wind speeds were observed producing moderate wind speeds in limited cases. For sites that were exposed to downwind or crosswind (which can have a downwind component) conditions relative to I-495, the sound levels in the community can be increased and the effectiveness of the noise barriers can be affected. Since such windy conditions can affect measured levels they can influence comparisons made to computed noise levels from TNM 2.5, which is based on a neutral atmosphere and cannot be adjusted. Since these wind conditions were present during the measurements, and the calculated noise levels were consistent with what would be expected under neutral atmospheric conditions, the model was determined to be appropriate and accurate for use on this project. Table 3 summarizes the results of the validation exercise. Additional information about the conditions at these six sites is provided in the following paragraphs.

- Site M03 at 4926 Butternut Court: During the measurement, light winds from the southwest at 0.0 to 0.5 m/s with gusts up to 1.1 m/s, created a crosswind condition. An outdoor heating, ventilation, and air conditioning (HVAC) unit came on at the end of the measurement. While the HVAC unit was audible, it did not appear to affect the measured level. The TNM file for the validation at Site M03 did not include traffic on the ramp from GWMP westbound to I-495 southbound, nor did it include traffic on the ramp from I-495 northbound to GWMP eastbound.
- Site M06 at 7048 Arbor Lane: During the measurement, light winds from the south-southwest at 0.4 to 1.0 m/s with gusts up to 1.8 m/s, may have contributed to a slight downwind condition, yielding higher traffic noise levels than would be expected under neutral wind conditions.
- Site M07 at 809 Balls Hill Road: During the measurement, moderate winds were observed from the south at 0.4 to 1.2 m/s with gusts up to 2.8 m/s, creating a crosswind condition. Traffic on Balls Hill Road also may have contributed to the measured noise levels but was not included in the model validation run.
- Site M09 east of the intersection of Georgetown Pike & Dead Run Drive: During the measurement, moderate winds were observed from the west-southwest at 0.5 to 1.1 m/s with gusts up to 3.3 m/s, creating a downwind condition that could have increased traffic noise from I-495. If the contribution from I-495 was within 10 decibels of the noise levels due to traffic on Georgetown Pike, it is plausible that the contribution from I-495 might have been as much as 0.3 to 0.4 dBA. Traffic noise from I-495 was not included in the model validation for Site M09.
- Site M16 at 1020 Balls Hill Road: This measurement site was located in the playground behind the McLean Presbyterian Church. The playground was effectively surrounded by a paved parking lot, which had not been included in the validation run. The presence of acoustically “hard” ground along the sound propagation path would tend to increase noise levels relative to propagation over acoustically “soft” ground that had been assumed in the model.
- Site M17 at 1032 Delf Drive: While the microphone was located to minimize potential contributions from an HVAC unit located under the deck of 1032 Delf Drive, it is plausible that the HVAC may have contributed to measured sound levels.

Appendix E provides tables with further detail on the validation exercise, including counted traffic data normalized to one hour and the coordinates of the measurement sites.

Table 3 Summary of Model Validation by Comparison of Computed and Measured Traffic Noise Levels

Site No.	Address/ Location	CNE	Behind Existing Barrier?	Measured Traffic-only L_{eq} (dBA)	Computed L_{eq} (dBA) (Without Reflections)	Difference (dBA) (Without Reflections)	Possible Reflected Sound?[1]	Computed L_{eq} (dBA) (With Reflections)[2]	Difference (dBA) (With Reflections)[3]	Outcome of Validation With Reflections
M01	640 Live Oak Dr on Rivercrest Dr	C	No	60.4	59.9	-0.5	No	n/a	-0.5	n/a
M02	6708 Lupine Lane	D	No	55.7	54.5	-1.2	No	n/a	-1.2	n/a
M03	4926 Butternut Court	F	**Yes**	64.3	59.4	**-4.9**	No	n/a	**-4.9**	n/a
M04	Scotts Run Trail Head	E	Yes	66.0	63.5	-2.5	Parallel	63.5	-2.5	No change
M05	Scotts Run Trail Head	E	Yes	63.6	61.8	-1.8	Parallel	61.8	-1.8	No change
M06	7048 Arbor Lane	F	**Yes**	64.9	60.6	**-4.3**	Parallel	60.6	**-4.3**	No change
M07	809 Balls Hill Road	F	**Yes**	64.1	57.8	**-6.3**	No	n/a	**-6.3**	n/a
M08	850 Balls Hill Road	F	Yes	58.8	56.7	-2.1	No	n/a	-2.1	n/a
M09	Dead Run Drive	W	**No**	61.7	58.4	**-3.3**	No	n/a	**-3.3**	n/a
M10	897 Linganore Drive	G	No	59.2	61.9	2.7	Single[4]	n/a	2.7	n/a
M11	897 Linganore Drive	G	No	64.8	65.6	0.8	Single[4]	n/a	0.8	n/a
M12	Helga Place Tennis Court	H	Yes	56.3	56.2	-0.1	Parallel	56.2	-0.1	No change
M13	Corner of Peter Pl & Helga Pl	H	Yes	56.3	54.5	-1.8	Parallel	54.5	-1.8	No change
M14	Spencer Road & Spencer Court	H	Yes	56.4	54.5	-1.9	Parallel	54.5	-1.9	No change
M15	Spencer Road & Spencer Court	H	Yes	54.9	56.8	1.9	Parallel	56.8	1.9	No change
M16	1020 Balls Hill Road	I	**Yes**	65.1	61.8	**-3.3**	Parallel	61.8	**-3.3**	No change
M17	1032 Delf Drive	I	**Yes**	65.3	61.4	**-3.9**	Parallel	61.6	**-3.7**	Still outside
M18	7412 / 7408 Churchill Road	I	Yes	63.0	61.3	-1.7	Parallel	61.3	-1.7	No change
M19	7428 Old Dominion Drive	I	Yes	66.2	64.0	-2.2	Parallel	64.6	-1.6	Still in range
M20	7515 Old Dominion Drive	AA	Yes	64.5	64.5	0.0	Parallel	65.2	0.7	Still in range
M21	7513 / 7515 Old Dominion Drive	AA	Yes	66.0	64.2	-1.8	Parallel	65.6	-0.4	Still in range
M22	7627 Huntmaster Lane	J	Yes	62.0	60.6	-1.4	Parallel	61.7	-0.3	Still in range
M23	1294 Scotts Run Road	K	Yes	63.9	62.6	-1.3	Parallel	62.6	-1.3	No change
M24	Scotts Run Road Cul-de-sac	K	Yes	60.7	61.7	1.0	Parallel	61.7	1.0	No change

Site No.	Address/ Location	CNE	Behind Existing Barrier?	Measured Traffic-only L_{eq} (dBA)	Computed L_{eq} (dBA) (Without Reflections)	Difference (dBA) (Without Reflections)	Possible Reflected Sound?[1]	Computed L_{eq} (dBA) (With Reflections)[2]	Difference (dBA) (With Reflections)[3]	Outcome of Validation With Reflections
M25	7600 Timberly Court	J	Yes	60.9	58.3	-2.6	Parallel	58.9	-2.0	Still in range
M26	1310 Scotts Run Road	K	Yes	63.3	62.1	-1.2	Parallel	62.1	-1.2	No change
M27	Box Elder Ct & Scotts Run Rd	K	Yes	61.0	59.5	-1.5	Parallel	59.5	-1.5	No change
M28	1357 / 1359 Snow Meadow Lane	L	Yes	57.9	57.6	-0.3	No	n/a	-0.3	n/a
M29	Lear Road Trail Head	M	Yes	54.7	56.8	2.1	No	n/a	2.1	n/a
M30	Lear Road Cul-de-sac	M	Yes	55.8	57.0	1.2	No	n/a	1.2	n/a
M31	Hooking Road	K	Yes	56.3	57.9	1.6	Single[5]	59.2	2.9	Still in range
Average Difference / Standard Deviation of the Differences =						-1.3 / 2.1			-1.1 / 2.2	

Notes:

1. "Parallel" = the measurement site was located adjacent to a section of I495 with parallel barriers. The effects of multiple reflections between parallel barrier was modeled with TNM 2.5's parallel barrier module, assuming the existing noise barriers were constructed with a Noise Reduction Coefficient (NRC) of 0.7; "Single" = the measurement site was not located behind an existing noise barrier, but across from an existing noise barrier on the opposite side of the highway; "No" = the measurement site was not located in the vicinity of a noise barrier that might be a source of reflected sound.

2. The TNM-computed Leq taking into account the effect of reflected sound from existing noise barriers with NRC values of 0.7.

3. The difference between the TNM-computed Leq taking into account the effect of reflected sound from existing noise barriers and the measured level. In every case, taking reflected sound into account had no effect on the results of the validations. In some cases, the effect of reflected sound was negligible and so there was no change in the outcome of the validation. In other cases, the effect of reflected noise was small, but not negligible – yet each of these sites was within the acceptable range of accuracy prior to accounting for reflected sound, and then remained within the acceptable range after accounting for it. In one case, Site M06 was outside the acceptable range before accounting for reflected sound and remained outside the accepted range after taking reflected sound into account.

4. Sites M10 and M11 were located in the vicinity of an existing noise barrier on the opposite side of the highway. The validations suggested a slight overprediction without taking into account the effect of reflected sound. As a result, no effort was made to account for reflected sound in the validation of Sites M10 and M11 since the existing noise barriers are considered absorptive.

5. At VDOT 's request, reflected sound from existing Barrier 13B was considered at Site M31 using the method of image roadways, which is described in Section 3.4. It should be noted that the parallel barrier module within TNM 2.5 predicted an increase of 0.0 dBA at Site M31.

Source: HMMH, 2022.

3.4 Reflected Sound

The 495 NEXT corridor includes existing noise barriers along much of its length. In many cases, existing noise barriers are located on both sides of the highway. Sound levels behind a noise barrier have the potential to increase as a result of multiple reflections of sound between it and a noise barrier located on the opposite side of the highway. The increases in sound behind a noise barrier due to multiple reflections effectively reduce the noise reduction provided by the barrier or degrade its acoustical performance. The magnitude of the effect of multiple reflections of sound between parallel barriers is a function of the ratio of the width of the highway (distance between barriers) and the average height of the walls. For narrow roadways with tall reflective noise barriers, the effects of multiple reflections between parallel barriers can be significant.

National Cooperative Highway Research Program (NCHRP) Report 791[xv] provides supplemental guidance on the application of the FHWA TNM. Guidance on the use of the FHWA TNM's Parallel Barriers Module states that the effects of multiple reflections of sound should be analyzed if the width-to-height ratio of the highway's cross-section is less than 10:1. When the width-to-height ratio is between 10:1 and 20:1, FHWA guidance suggests that the effects of multiple reflections may be considered. At width-to-height ratios that are greater than 20:1, the effects of multiple reflections of sound between parallel barriers do not need to be analyzed.

Section 519.01 (a) 2 of the VDOT Road and Bridge Specifications states that absorptive sound barrier walls shall be designed so that the absorptive portion on the highway side has a minimum noise reduction coefficient (NRC) of 0.70 when measured in accordance with ASTM C423.[xvi] While the results of the validation assumed that all of the existing noise barriers had an NRC value of 0.7, TNM 2.5's parallel barrier analysis module also was run assuming as a worst-case scenario that the existing noise barriers were completely reflective (with an NRC of 0.0).

NCHRP Report 791 suggests that care should be taken before accepting computed increases of 0.0 dB using the parallel barrier module within TNM, especially in cases where reflections of sound would be expected. In cases where the z-coordinate of the analysis location (receptor) is below that of the roadway's z-coordinate, the value of the parallel barrier increase may be 0.0 dB. This situation appears to occur on a random basis and NCHRP Report 791 suggests increasing the height of the analysis location when the height is lower than that of the roadway, especially for a reflective case (e.g., noise barriers with an NRC of 0.0. While the results of the parallel barrier analysis with NRC = 0.0 is not reported herein, this guidance was followed. If a receptor (analysis location) was located at an elevation below that of the highway, the receptor elevation was set to be 5 feet above the maximum elevation of the highway in the cross-section.

Using TNM 2.5's parallel barrier module, the effect of multiple reflections at measurement sites adjacent to parallel barriers ranged from 0.0 to 1.4 dBA, or 0.2 dBA on average, when the noise barriers were modeled with an NRC of 0.7. When the noise barriers were modeled with an NRC of 0.0 (perfectly reflective), the effect of multiple reflections of sound at the measurement sites ranged from 0.0 to 4.7 dBA, or 1.1 dBA on average.

Because there are potential noise impacts that extend beyond 500 feet, reflective noise was evaluated for receptors behind Barrier 13D using the method of "image" roadways. Since TNM 2.5 cannot account for reflected sound from surfaces directly in its normal three-dimensional calculations, this method involves the modeling of "image" roadways as they would be reflected from a noise barrier or retaining

wall. The sound reflections from a wall are analogous to light reflections from a mirror, hence the term "image." Image roadways are placed the same distance away from the reflecting surface as the real source, but on the opposite side of the wall. The reflecting wall is not coded into TNM 2.5, so the modeled sound from the image roadways travels unimpeded over the same distance and at the same angle as the actual reflected sound travels. Of course, only receptors on the opposite side of the highway from the reflecting wall can be included in TNM runs with image roadways.

Figure 2 illustrates the method as employed on another VDOT project and shows a "skew section" (cross section) from TNM 2.5 for an area along I-66 inside the Beltway.[xvii] The cross-section includes a reflecting retaining wall that is on the opposite side of the highway from potential barrier 3 and the receptor behind it. The figure shows the locations of the "true" roadways, the reflecting surface, and the image roadways as modeled in TNM 2.5. The figure also shows true and image sound paths from one source location and its image to the receptor over the top of the potential noise barrier.

For the 495 NEXT project, the traffic used on the image roadways to account for the reflection from Barrier 13B was 30 percent of the volumes used on the corresponding true roadways. Barrier 13B (on the opposite side of the highway from Barrier 13D) was assumed to have been constructed according to VDOT specifications with an NRC of 0.7. If 70-percent of the sound incident upon the noise barrier is absorbed by the surface, it follows that 30 percent of the incident sound would be reflected – and so 30 percent of the traffic was used on the image roadways.

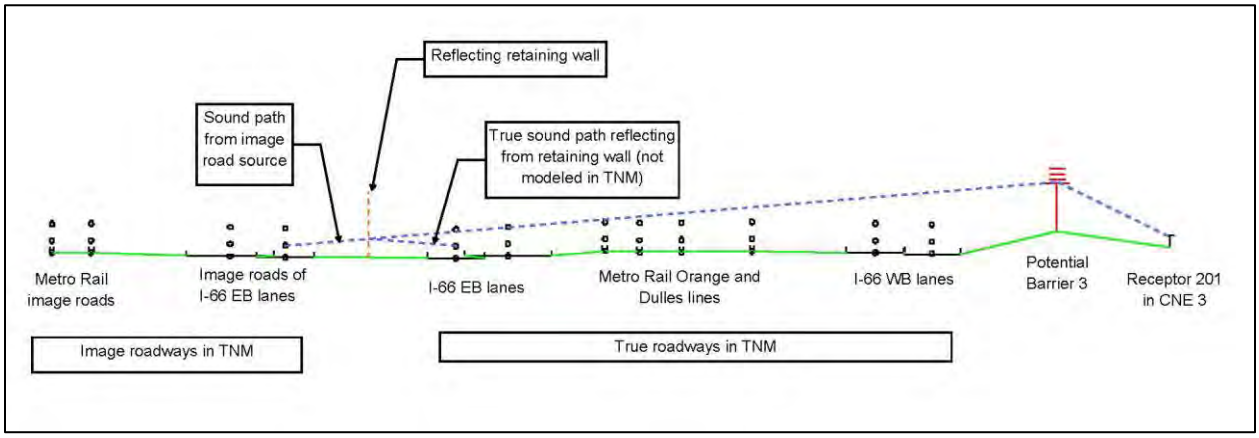


Figure 2 Cross-section of a highway that illustrates the "image" roadway method for modeling reflected sound

Source: HMMH, 2013.

A supplemental noise measurement was performed at a residence on Hooking Road in June 2022. Site M30 was subsequently validated using the traffic counted simultaneously with the noise measurement both with and without the effect of reflected sound using the image roadway method. Without reflected sound, the TNM-computed noise level was 57.9 dBA Leq compared to a measured value of 56.3 dBA Leq, for a difference of +1.6 dBA, representing a slight overprediction. If reflected sound is included in the model using the image roadway method, the TNM-computed noise level was 59.2 dBA Leq, for a difference of +2.9 dBA relative to the measured level, for a slightly larger overprediction, albeit still within the acceptable range of accuracy.

While the results of the image roadway method suggest that reflected sound may have the potential to increase noise levels by up to 1.3 dBA in the community behind Barrier 13D (i.e., CNE K), the image roadway method likely overestimates the effect in this case. The outcome of the image roadway method contrasts with the results of the parallel barrier module, which demonstrated that the effect of

multiple reflection between parallel barriers (Barrier 13B and 13D) was 0.0 dBA. The image roadway method in TNM 2.5 likely overestimates the effect of reflected sound for receptors in CNE K because Noise Barrier 13B is located at the top of a slope, several feet above the southbound lanes of I-495. Given this orientation, the sound path from the image road to a receptor does not "pass through" Noise Barrier 13B – an indication that this reflected sound path is not present under neutral weather conditions. Figure 3 illustrates how the sound path from an image roadway to Receptor K-075 in CNE K passes below the surface at which the reflection would occur (Noise Barrier 13B) – effectively "missing" the reflective surface. Contrast the scenario shown in Figure 3 with that shown in Figure 2, in which the sound path from the image road "passes through" the reflecting surface.

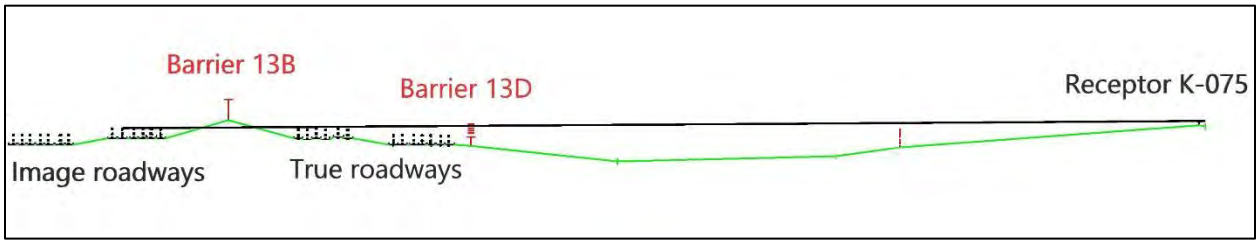


Figure 3 Cross-section at Receptor K-075 showing sound path from image roadway "misses" the reflecting surface

Source: HMMH, 2022.

Additional analysis for Noise Barrier 13D is being performed at this time. Therefore, the results of the barrier analysis for Noise Barrier 13D will be discussed within an addendum to this report.

3.5 Traffic Data for Noise Prediction

The traffic data used in the noise analysis must produce sound levels representative of the loudest hour of the day in the future design year, per FHWA and VDOT policy. Traffic data was used for the design year of 2045 as well as for the 2018 Existing case for all of the mainline roadways and ramps associated with I-495, as well as the major crossroads (i.e., Dulles Toll Road, George Washington Highway, Georgetown Pike, Old Dominion Drive and Lewisville Road). The traffic data were provided as hourly volumes in VDOT's Environmental Traffic Data (ENTRADA) spreadsheets.[xviii] A determination of the loudest hour of the day was conducted consistent with VDOT's current methodology. The loudest-hour evaluation began by using a basic TNM model of highway noise to compute the overall traffic noise level at a reference distance from I-495 for each hour of the day. In the 2045 design year, the analysis demonstrated that traffic conditions along I-495 for the two hours starting 11:00 AM and 7:00 AM generated the highest noise levels. Therefore, the full TNM implementation of the model developed for the project was run at representative receptors throughout the corridor for both of these hours. The results from this full TNM model demonstrated the hours starting at 11:00 AM generated consistently higher noise levels throughout the corridor for the 2045 Build alternative. So, those data for 11:00 AM were used for the impact assessment and noise barrier evaluations for the 2045 Build alternative. For the 2018 Existing case, the hour starting at 17:00 was consistently the loudest. Therefore, the traffic data for those hours were used for all roadways in the separate analyses for the 2045 Build and 2018 Existing cases.

Following VDOT guidance, ENTRADA interrupted speeds shall be used to represent operating speeds for the purpose of a noise study, unless the posted speed limit is higher than the interrupted speed. There were several instances, mostly along the southbound side of I-495, in which the interrupted speed from

ENTRADA was lower than the posted speed limit of 55 mph. In such cases, following VDOT guidance, the posted speed limit of 55 mph was used as the operating speed along applicable sections of I-495 for the purpose of the impact assessment and noise barrier evaluations.

Appendix C provides documentation of the loudest hour determination, while Appendix D provides the traffic data used as input to the TNM model for this project.

3.6 Predicted Noise Levels and Impact Assessment

The study area includes residential, recreational, commercial, and institutional land use along the project corridor. Over 700 receptors were included in the model to either represent exterior activity areas with frequent human use for Activity Categories B, C, and E, or located along a building façade to be used to represent interior spaces for Activity Category D land use.[3]

All noise levels computed were the A-weighted equivalent sound level, or L_{eq}, in dBA. Loudest-hour noise levels were computed for the 2018 Existing case and the design-year 2045 Build alternative. Table 4 summarizes the noise impact and ranges of predicted noise levels by CNE. Table 5 provides the total number of impacted receptors by FHWA Activity Category. Noise abatement is required to be considered whenever a noise impact is expected to occur. The project corridor contains several existing noise barriers. The impact counts in the following table include the effects of the noise barriers.

Appendix A provides a table that lists the computed 2018 and 2045 noise levels for all the modeled receptors. Section 5 includes narratives of the noise barriers evaluated in this study, as well as tables of predicted noise levels without and with-a barrier, and values of the noise barrier insertion loss.

Each receptor location in Figure 4 is shown with a color-coded symbol that indicates the status of each receptor according to its 2045 Build noise level with and without a noise barrier. The color code and corresponding receptor status for receptors behind proposed or existing noise barriers to be replaced are as follows:

- Light blue – impacted (without noise barrier) and 5 or 6 dBA of insertion loss (with noise barrier)
- Dark blue – impacted (without noise barrier) and 7 dBA of insertion loss (with noise barrier)
- Red – impacted (without noise barrier) and not benefited, i.e., less than 5 dBA of insertion loss (with noise barrier)
- Green – not impacted (without noise barrier) and benefited (with noise barrier)
- Yellow – not impacted (without noise barrier) or benefited (with noise barrier)
- Gray – receptor used to determine the extent of noise impact, but not used in the feasibility and reasonableness determination
- White – Not impacted, benefit not determined.

[3] As discussed in Section 2.2, Activity Category D land use in the study area is masonry construction and assumed to have single glazed windows. The outdoor to indoor noise level reduction for this type of building is 25 dB.

Table 4 Summary of Noise Impact and Ranges of Predicted Noise Levels by CNE

CNE	Existing Noise Barrier Present?	FHWA Activity Category	Number of Units Exposed to Noise Impact[1]		Range of Predicted Traffic Noise Levels, dBA L_{eq}[1]	
			2018 Existing	2045 with Project	2018 Existing	2045 with Project
AA	Yes	B and C	0	6	56 – 64	60 – 69
AB	No	B	0	0	45 – 56	49 – 57
C	No	B and C	9	10	42 – 74	46 – 75
D	No	B	0	0	45 – 62	49 – 65
E	Yes	B and C	3	15	52 – 67	55 – 71
F	Yes	B, C and D	0	0	34 – 60	38 – 64
G	No	B	0	1	58 – 63	61 – 67
H	Yes	B and C	0	1	45 – 62	49 – 64
I	Yes	B, C and D	0	6	30 – 63	33 – 67
J	Yes	B and C	4	4	47 – 67	46 – 66
K	Yes	B and D	3	6	38 – 67	37 – 67
L	Yes	B	1	0	54 – 69	54 – 61
M	Yes	B	0	0	52 – 60	51 – 60
N	No	D	0	0	46	48
O	No	C and E	18	14	54 – 74	56 – 70
P	No	E	0	0	44 – 60	44 – 58
Q[2]	Yes	B	26	42	49 – 70	50 – 73
S	Yes	B and C	1	10	55 – 68	55 – 66
T	No	B	0	0	50 – 59	52 – 63
W	Yes	B and C	0	0	47 – 60	48 – 59
X	No	B and C	0	0	50 – 60	54 – 62
Y	Yes	B	0	0	51 – 59	53 – 58
TOTAL			65	115		

Notes:
1.) Ranges of sound levels and impact number reflect the presences of exiting and replacement noise barriers.
2.) Most of the predicted noise impact in CNE Q is associated with 4th floor apartments in the Gates of McLean. While potential noise impacts are predicted for these units, only those units that would be below the point of intersection of a 30-foot-tall noise barrier projected onto the façade of the building would be considered in the feasibility and reasonableness determination for a noise barrier, as discussed in Section 4.7.
Source: HMMH, 2022.

Table 5 Number of Impacted Units by FHWA Activity Category

Alternative	Type of Noise Impact[1]	Number of Impacted Units by Land Use and FHWA Activity Category[1]				
		Residential Exterior (B)	Recreational Exterior €	Institutional Interior (D)	Commercial (E)	Total
2018 Existing	NAC	35	29	0	1	65
2045 Build	NAC	77	38	0	0	115

Notes:
1.) "NAC" = noise levels that approach or exceed the relevant FHWA Noise Abatement Criteria (NAC) for a given Activity Category.
Source: HMMH, 2022.

Note that the impact numbers shown in Tables 4 and 5 reflect the presence of both existing noise barriers that will remain in place and noise barriers that will be replaced in-kind. As shown in Table 4 and in Figure 4, some CNEs do not have an existing noise barrier. In such cases, wherever noise impact is predicted to occur due to the 495 NEXT project in the design year, the feasibility and reasonableness of noise barriers were evaluated. In some cases, such as that of CNE D, which is located near the project limit along the GWMP, noise abatement considerations were not warranted since no noise impacts

were found. Likewise, since noise impacts are not expected to occur in CNE P in the design year with the 495 NEXT project, noise abatement would not be warranted for CNE P.

VDOT policy requires that where an existing noise barrier is not physically impacted by a Type I project, it must be evaluated to determine whether any noise impacts are predicted behind it. If no impacts are predicted in the design year with the project, the existing noise barrier remains in place without modification. As indicated in Table 4 and shown on sheets 7 and 8 in Figure 4, with existing Noise Barriers 13B Ext./NSA26 and Noise Barrier NSA26 in place, noise levels with the 495 NEXT project in the design year are expected to be below the applicable FHWA NAC in CNEs L and M, and so noise impacts are not predicted to occur. Consequently, no further analysis of existing Noise Barrier 13B Ext./NSA26 or existing Noise Barrier NSA26 is required. In a similar fashion, noise levels with the 495 NEXT project in the design year are expected to be below the applicable FHWA NAC for receptors in CNE J that are behind the section of Noise Barrier 13B that will remain in place. Therefore, no further analysis of the section of Noise Barrier 13B that is to remain in place is required. Finally, the northern section of Noise Barrier 13E, approximately 1,576 feet, is expected to remain in place without modification. Based on the results of the analysis, none of the receptors in CNE I that are located behind this section of Barrier 13E would be exposed to design year noise levels that would approach or exceed the applicable NAC. Therefore, no further analysis of the section of Noise Barrier 13E that is to remain in place is required.

Appendix A includes tables of TNM-computed traffic noise levels at each of the receptors modeled in this noise analysis.

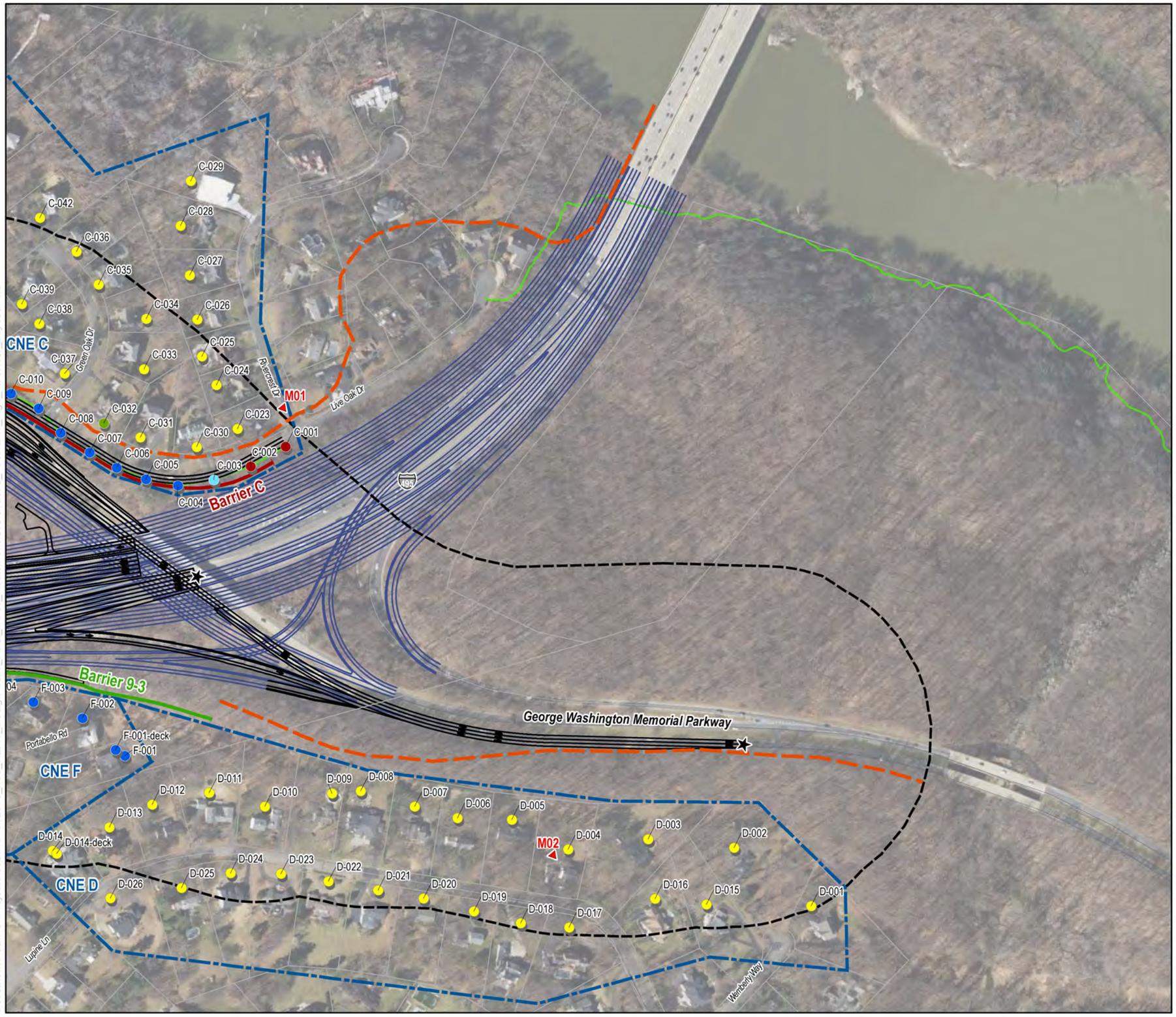


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Figure 4
Location Map for Common Noise Environments, Receptors, Build Contours and Barriers

I-495 Express Lanes Northern Extension Project

Fairfax County, Virginia

Receiver Site and Number
- Impacted and 5 or 6 dBA Insertion Loss
- Impacted and 7 dBA or more Insertion Loss
- Impacted but Not Benefited
- Benefited but Not Impacted
- Not Benefited or Impacted
- Not Impacted, Benefit Not Determined
- To Be Addressed in Addendum
- Top Floor Noise Prediction Result
- Bottom Floor Noise Prediction Result

Note: Grouped Receiver Labels are in order of Leader Occurrence.

- M# Measurement Site
- CNE Boundary
- 500' Noise Study Area
- Project Limit
- 66 dBA Noise Contour
- Trails

Noise Barriers
- Feasible and Reasonable
- Feasible and Not Reasonable
- Not Feasible
- Not Reasonable
- Existing Barrier to Remain
- Existing Barrier to be Replaced
- To Be Addressed in Addendum

Sheet 1 of 10

0 150 300 Feet

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Figure 4
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I-495 Express Lanes Northern Extension Project

Fairfax County, Virginia

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- Benefited but Not Impacted
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- Not Impacted, Benefit Not Determined
- To Be Addressed in Addendum
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- Bottom Floor Noise Prediction Result

Note: Grouped Receiver Labels are in order of Leader Occurrence.

- M# Measurement Site
- CNE Boundary
- 500' Noise Study Area
- Project Limit
- 66 dBA Noise Contour
- Trails

Noise Barriers
- Feasible and Reasonable
- Feasible and Not Reasonable
- Not Feasible
- Not Reasonable
- Existing Barrier to Remain
- Existing Barrier to be Replaced
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Sheet 2 of 10

0 150 300 Feet

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Figure 4
Location Map for Common Noise Environments, Receptors, Build Contours and Barriers

I-495 Express Lanes Northern Extension Project

Fairfax County, Virginia

Receiver Site and Number
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- Not Benefited or Impacted
- Not Impacted, Benefit Not Determined
- To Be Addressed in Addendum

Top Floor Noise Prediction Result
Bottom Floor Noise Prediction Result

Note: Grouped Receiver Labels are in order of Leader Occurrence.

- M# Measurement Site
- CNE Boundary
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- Project Limit
- 66 dBA Noise Contour
- Trails

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- Not Reasonable
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- To Be Addressed in Addendum

Sheet 3 of 10

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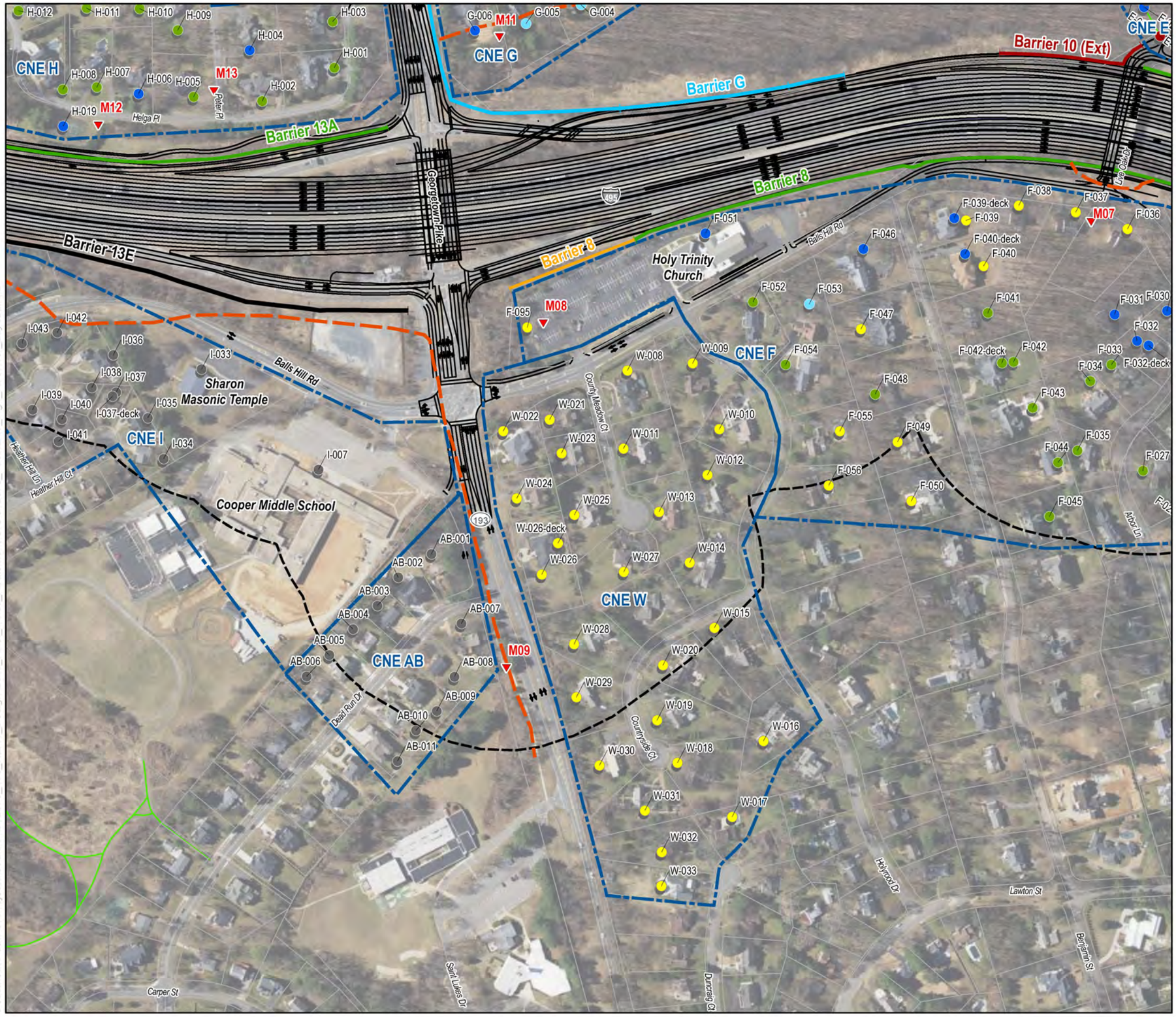

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Figure 4
Location Map for Common Noise Environments, Receptors, Build Contours and Barriers

I-495 Express Lanes Northern Extension Project

Fairfax County, Virginia

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Note: Grouped Receiver Labels are in order of Leader Occurrence.

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- Trails

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- To Be Addressed in Addendum

Sheet 4 of 10

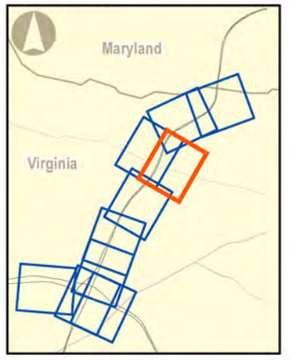

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Figure 4
Location Map for Common Noise Environments, Receptors, Build Contours and Barriers

I-495 Express Lanes Northern Extension Project

Fairfax County, Virginia

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- Trails

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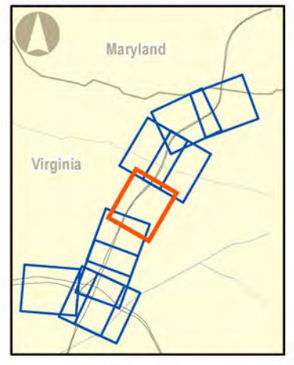
- Existing Barrier to Remain
- Existing Barrier to be Replaced
- To Be Addressed in Addendum

Sheet 5 of 10



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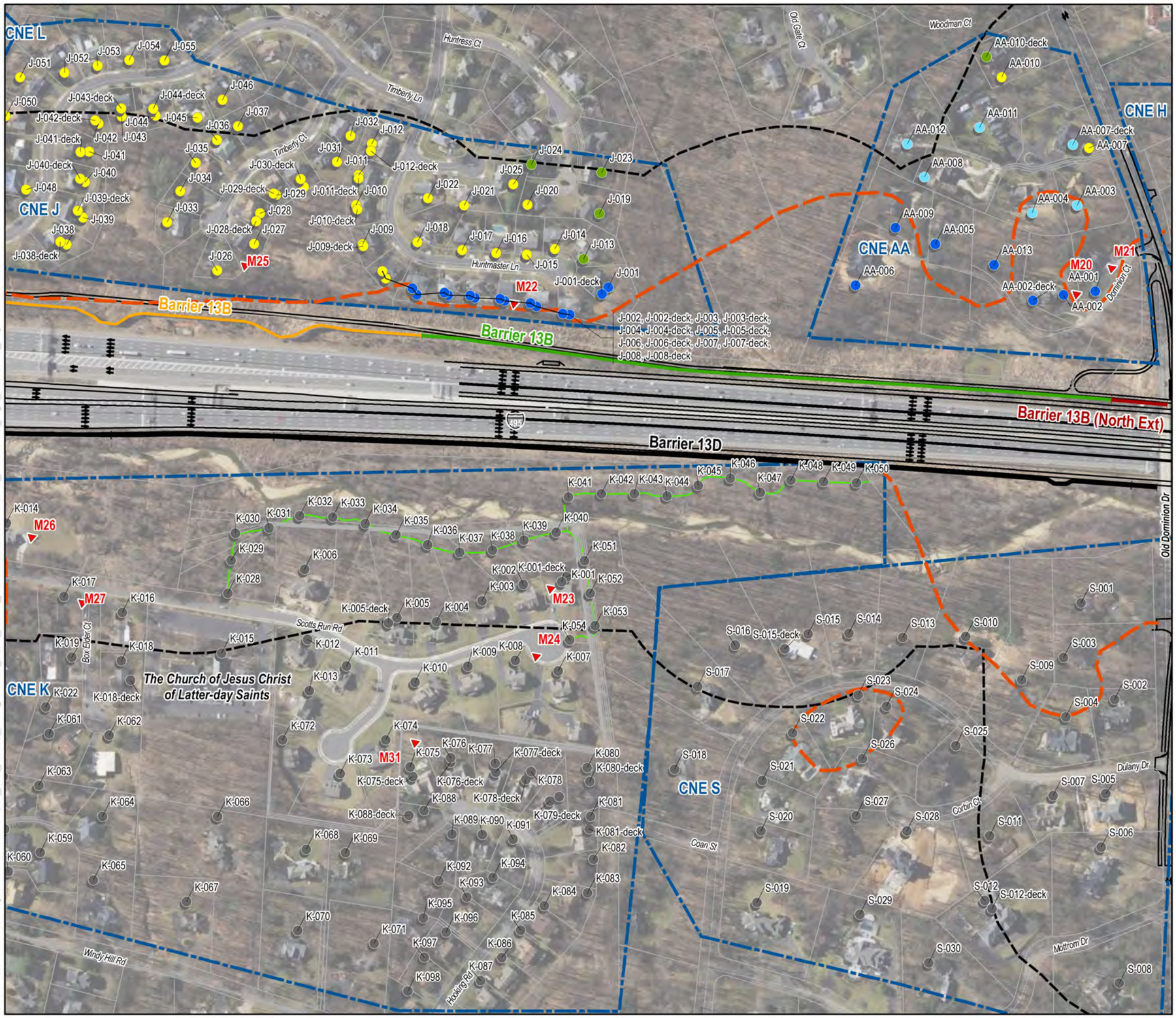

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Figure 4
Location Map for Common Noise Environments, Receptors, Build Contours and Barriers

I-495 Express Lanes Northern Extension Project

Fairfax County, Virginia

Receiver Site and Number
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- Benefited but Not Impacted
- Not Benefited or Impacted
- Not Impacted, Benefit Not Determined
- To Be Addressed in Addendum

Top Floor Noise Prediction Result
Bottom Floor Noise Prediction Result

Note: Grouped Receiver Labels are in order of Leader Occurrence.

- M# Measurement Site
- CNE Boundary
- 500' Noise Study Area
- Project Limit
- 66 dBA Noise Contour
- Trails

Noise Barriers
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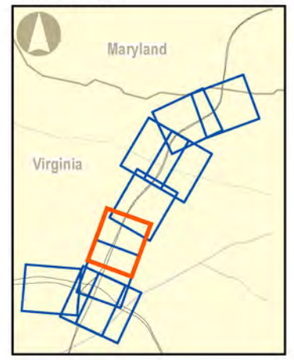
Sheet 6 of 10



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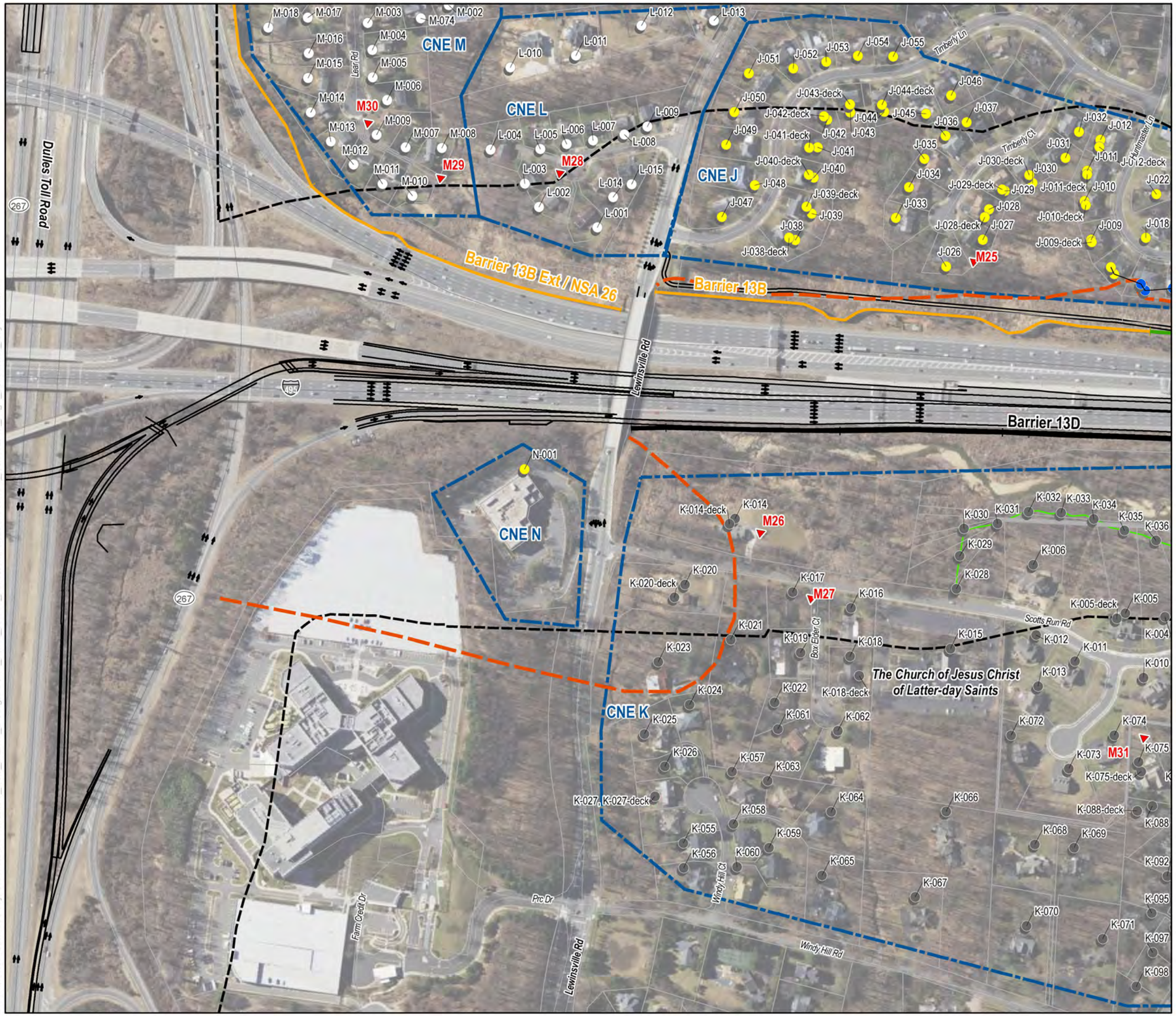

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Figure 4
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I-495 Express Lanes Northern Extension Project

Fairfax County, Virginia

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- Not Benefited or Impacted
- Not Impacted, Benefit Not Determined
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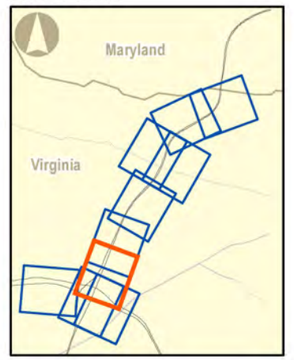
Top Floor Noise Prediction Result
Bottom Floor Noise Prediction Result

Note: Grouped Receiver Labels are in order of Leader Occurrence.

- M# Measurement Site
- CNE Boundary
- 500' Noise Study Area
- Project Limit
- 66 dBA Noise Contour
- Trails

Noise Barriers
- Feasible and Reasonable
- Feasible and Not Reasonable
- Not Feasible
- Not Reasonable
- Existing Barrier to Remain
- Existing Barrier to be Replaced
- To Be Addressed in Addendum



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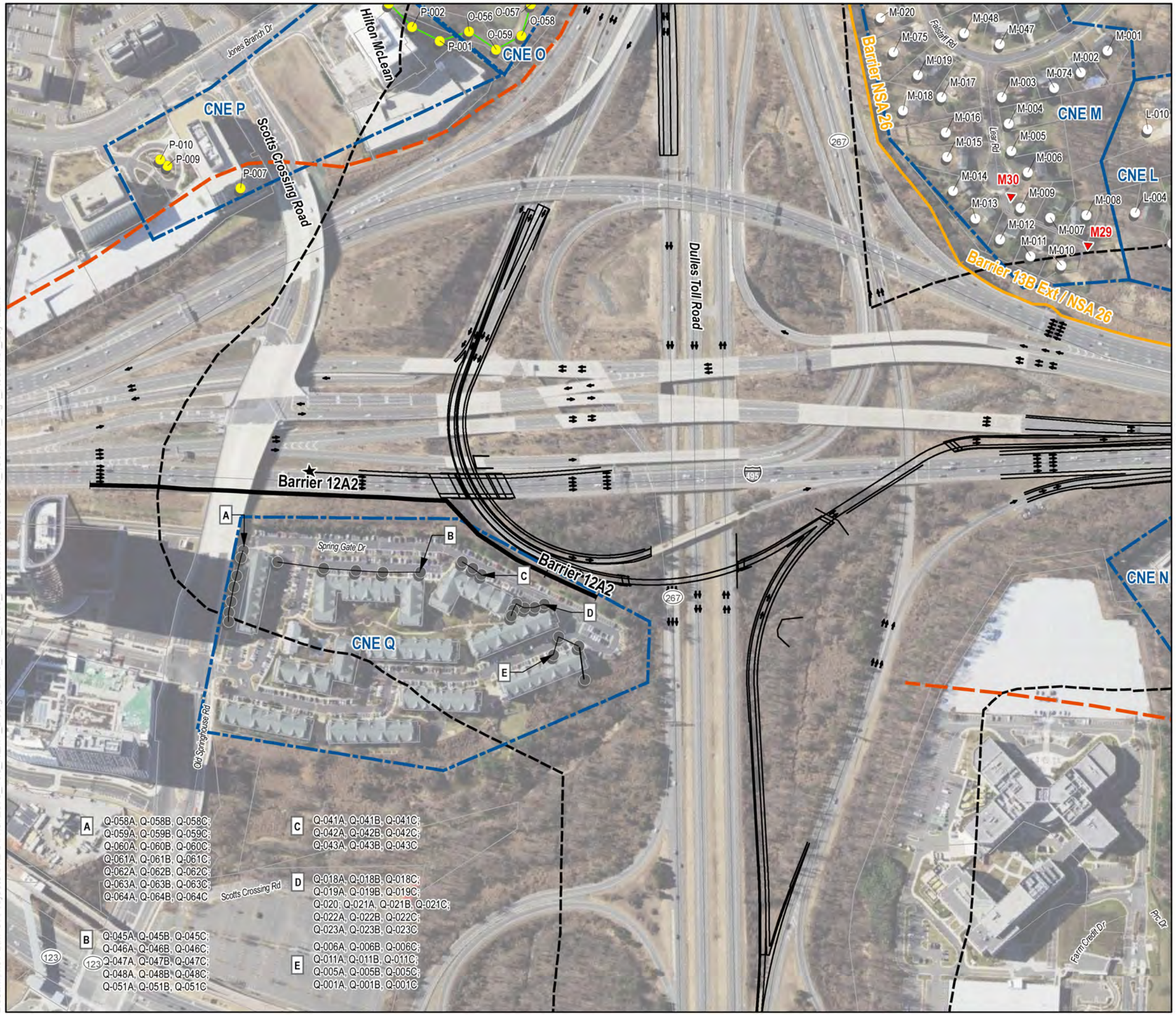

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Virginia Department of Transportation

Figure 4
Location Map for Common Noise Environments, Receptors, Build Contours and Barriers

I-495 Express Lanes Northern Extension Project

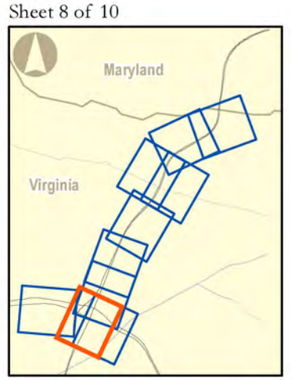
Fairfax County, Virginia

Receiver Site and Number
- Impacted and 5 or 6 dBA Insertion Loss
- Impacted and 7 dBA or more Insertion Loss
- Impacted but Not Benefited
- Benefited but Not Impacted
- Not Benefited or Impacted
- Not Impacted, Benefit Not Determined
- To Be Addressed in Addendum
- Top Floor Noise Prediction Result
- Bottom Floor Noise Prediction Result

Note: Grouped Receiver Labels are in order of Leader Occurrence.

- M# Measurement Site
- CNE Boundary
- 500' Noise Study Area
- Project Limit
- 66 dBA Noise Contour
- Trails

Noise Barriers
- Feasible and Reasonable
- Feasible and Not Reasonable
- Not Feasible
- Not Reasonable
- Existing Barrier to Remain
- Existing Barrier to be Replaced
- To Be Addressed in Addendum



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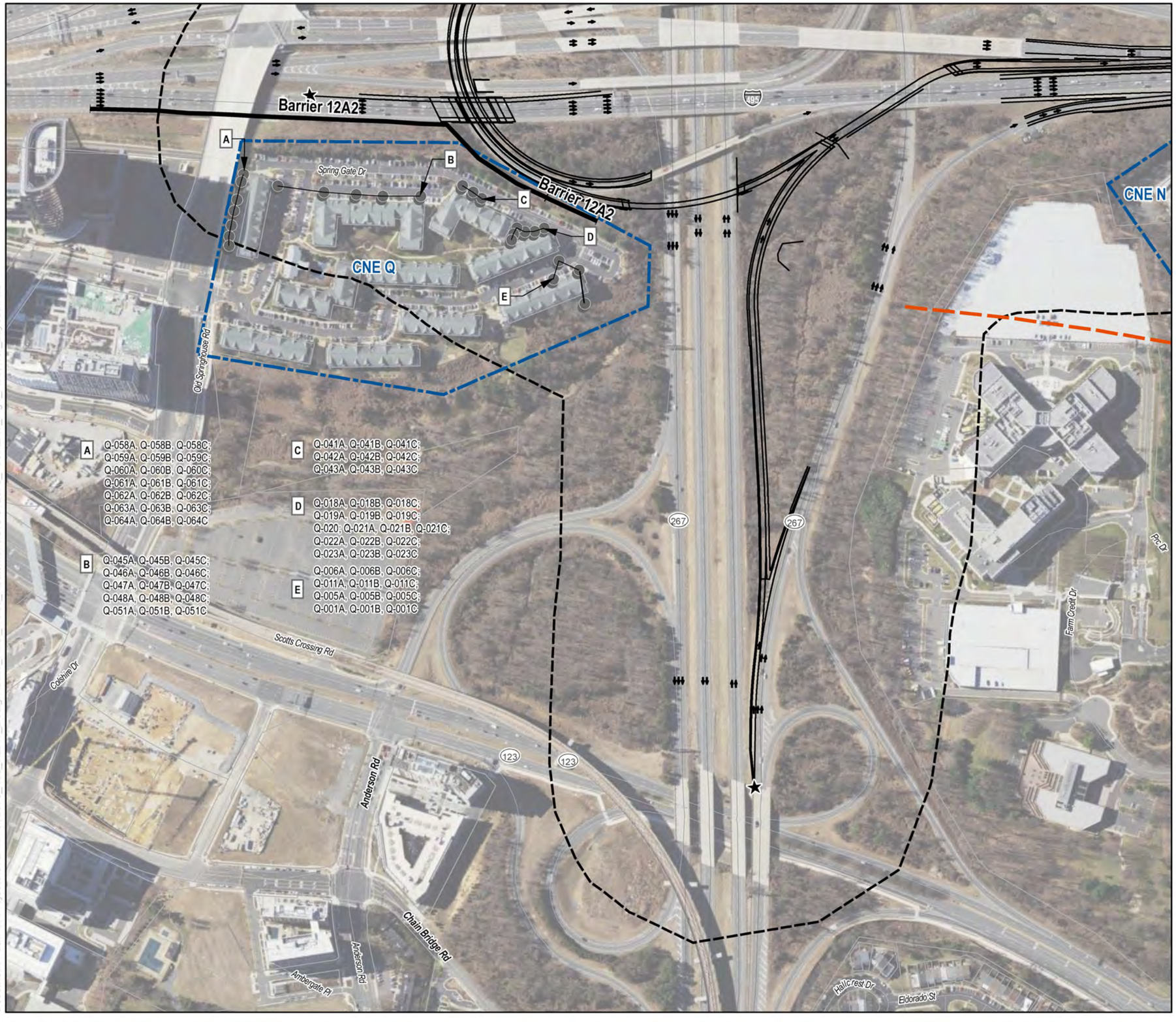

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VDOT Virginia Department of Transportation

Figure 4
Location Map for Common Noise Environments, Receptors, Build Contours and Barriers

I-495 Express Lanes Northern Extension Project

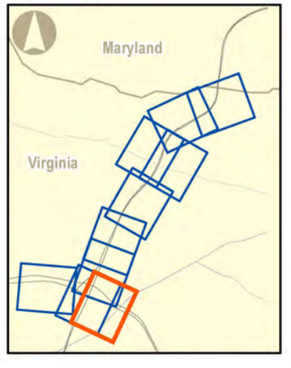
Fairfax County, Virginia

Receiver Site and Number
- Impacted and 5 or 6 dBA Insertion Loss
- Impacted and 7 dBA or more Insertion Loss
- Impacted but Not Benefited
- Benefited but Not Impacted
- Not Benefited or Impacted
- Not Impacted, Benefit Not Determined
- To Be Addressed in Addendum
- Top Floor Noise Prediction Result
- Bottom Floor Noise Prediction Result

Note: Grouped Receiver Labels are in order of Leader Occurrence.

- M# Measurement Site
- CNE Boundary
- 500' Noise Study Area
- Project Limit
- 66 dBA Noise Contour
- Trails

Noise Barriers
- Feasible and Reasonable
- Feasible and Not Reasonable
- Not Feasible
- Not Reasonable
- Existing Barrier to Remain
- Existing Barrier to be Replaced
- To Be Addressed in Addendum



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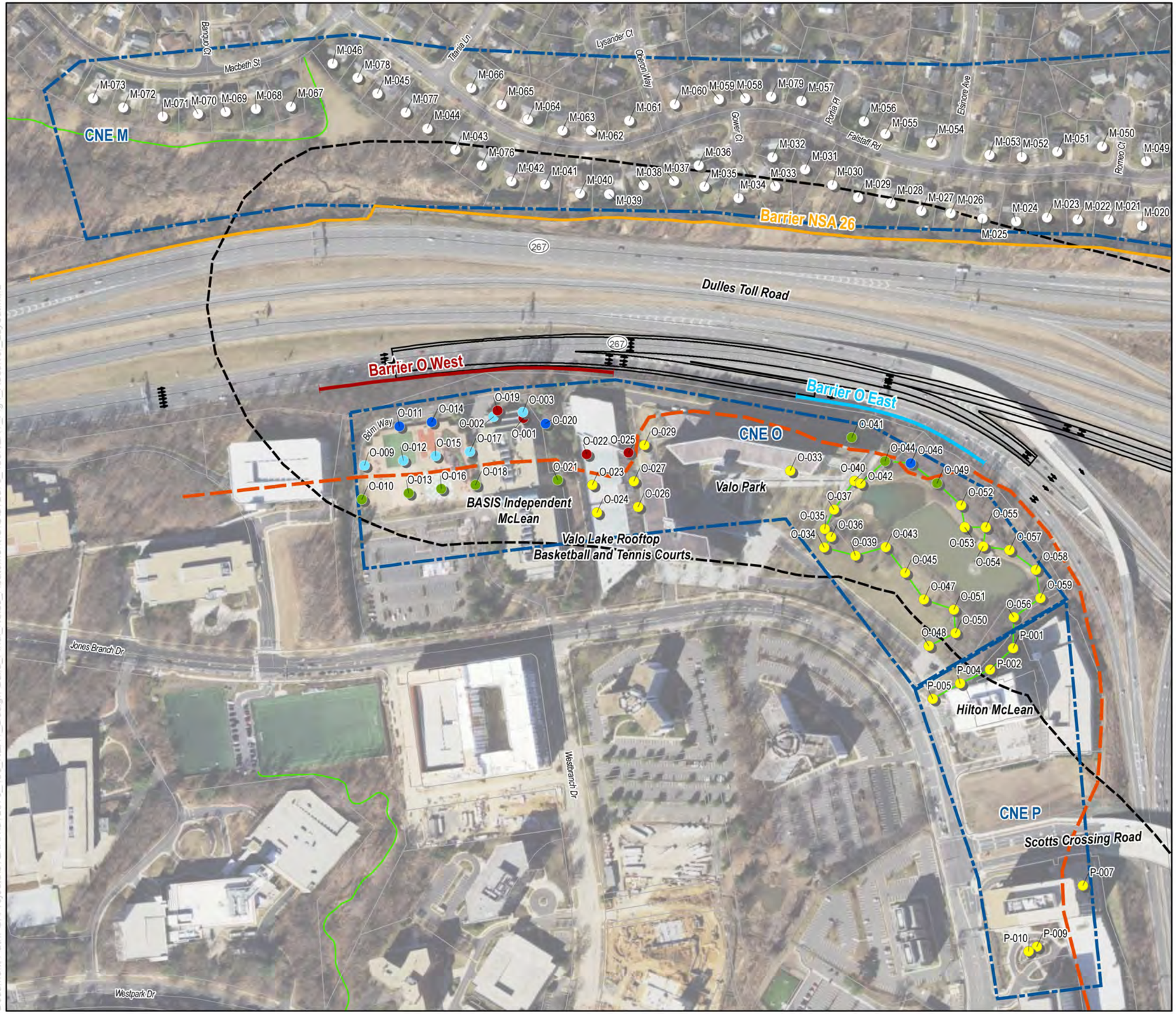

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VDOT
Virginia Department of Transportation

Figure 4
Location Map for Common Noise Environments, Receptors, Build Contours and Barriers

I-495 Express Lanes Northern Extension Project

Fairfax County, Virginia

Receiver Site and Number
- Impacted and 5 or 6 dBA Insertion Loss
- Impacted and 7 dBA or more Insertion Loss
- Impacted but Not Benefited
- Benefited but Not Impacted
- Not Benefited or Impacted
- Not Impacted, Benefit Not Determined
- To Be Addressed in Addendum

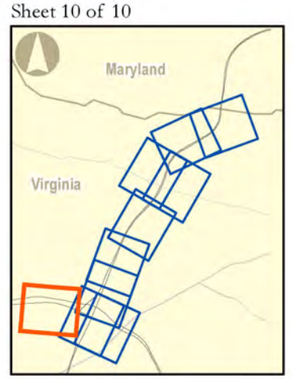
Top Floor Noise Prediction Result
Bottom Floor Noise Prediction Result

Note: Grouped Receiver Labels are in order of Leader Occurrence.

- M# Measurement Site
- CNE Boundary
- 500' Noise Study Area
- Project Limit
- 66 dBA Noise Contour
- Trails

Noise Barriers
- Feasible and Reasonable
- Feasible and Not Reasonable
- Not Feasible
- Not Reasonable
- Existing Barrier to Remain
- Existing Barrier to be Replaced
- To Be Addressed in Addendum

Sheet 10 of 10



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4 Replacement of Existing Noise Barriers

There are six existing noise barrier systems along the project corridor. Given the nature of the proposed improvements, the existing noise barriers would be physically impacted to varying degrees by construction of the 495 NEXT project, requiring partial replacement in some cases, and full replacement in other cases.

Table 6 Summary of Noise Barriers to be Replaced In-kind

Barrier ID	Noise Reduction (dBA)		Noise Barrier Dimensions and Cost				Impacted Units	Impact and Benefit Units	Non-Impact and Benefit Units	Total Benefit Units	Total SF/BR	Add'l Surface Area (sq ft)	Add'l Benefit Units	Net SF/BR
	Range	Avg.	Length (feet)	Range of Heights (feet)	Surface Area (sq ft)	Cost at $42/sq ft*								
8***/9	5-14	10	4,149	15-37	107,410	$4.51M	31	31	18	49	2,192	n/a	n/a	n/a
10** & 10 Ext.	5-13	7	1,860	7-27	35,309	$1.48M	23	22	1	23	1,535	12,839	12	1,070
13A	5-14	8	3,977	19-41	113,851	$4.78M	23	23	32	55	2,070	n/a	n/a	n/a
13B**	5-12	7	2,273	16-32	62,207	$2.61M	20	20	5	25	2,488	2,462	3	821
13D**	5-11	8	3,815	20-32	109,522	$4.60M	82	78	12	90	1,217	43,790	58	755
13E***	5-14	9	2,411	18-32	55,388	$2.32M	31	30	15	45	1,231	934	3	311
12A2***	5-14	10	1,635	15-25	33,413	$1.40M	69‡	67‡	35‡	102‡	328	n/a	n/a	n/a

Notes:
* The estimated cost is based on a unit cost of $42 per square foot. While cost does not factor into the reasonableness determination, it is presented for planning and/or informational purposes. The unit cost of $42 per square foot is based on a statewide average of historical cost data. Actual construction costs may vary. Refer to VDOT memorandum dated February 23, 2017, with subject "Average Noise Barrier Material and Installation Costs." This memorandum is available at the following web page hosted by VDOT (accessed on May 7, 2020): http://virginiadot.org/projects/resources/noisewalls/Statewide_average_barrier_cost_.pdf
** Modified replacement.
*** Partial replacement.
‡ Impacts and benefit counts for Noise Barrier 12A2 reflect receptors below the 4th floor.
Source: HMMH, 2022

4.1 Modified Replacement of Noise Barrier System 8/9

Noise Barrier System 8/9 is an existing noise barrier system located along the northbound side of I-495 and provides noise abatement to receptors located within CNE F and CNE W and is shown in Figure 4 on Sheets 1 to 4. A portion of the barrier system would be physically impacted by the Project due to the proposed horizontal alteration to I-495 northbound, as well as the on-ramp from Georgetown Pike and the off-ramp to GWMP, and therefore would be partially replaced in kind. In such cases, the relocated barrier must, at a minimum, provide the same level of protection as the existing barrier. Proposed modifications to the barrier are not subject to the reasonableness criterion if site conditions require the modifications. For example, if the replacement barrier is moved down a fill slope, the height of the new noise barrier must be increased to maintain the sound attenuation line (barrier top elevation). Similarly, if the replacement barrier would move upslope, the height above ground of the replacement barrier, at a minimum, must be maintained. However, should additional modifications to the noise barrier be required to protect additional receptors impacted as a result of a Type I project, those additional modifications would be subject to the cost-effectiveness criterion, and only the additional benefited receptors would be subject to the reasonableness calculation. To evaluate an in-kind replacement of Noise Barrier System 8/9, heights were increased to maintain the existing sound attenuation line in locations where the barrier moved downslope and maintained the same height above ground in locations where the barrier moved upslope from its existing location.

The effects of reflected sound between parallel barriers 8/9 and 10 was evaluated using the TNM's Parallel Barrier module. Because both barriers are absorptive and very far apart, the potential increases due to reflected sound were typically 0 dB, and less than 1 dB. Therefore, since the effects were negligible, they were not directly accounted for in the analysis.

A 408-foot section of Noise Barrier 8 would remain in its existing location when measured from the south end near Georgetown Pike. The existing portion would then tie into the replacement barrier. The partial replacement of Noise Barrier 8 would begin just south of Holy Trinity Church, along the on-ramp from Georgetown Pike, extend northward along I-495 northbound, and terminate south of the Live Oak Drive overpass, for a length of 1,454 feet. The replacement Noise Barrier 9 consists of three separate walls identified as Barrier 9-1, Barrier 9-2, and Barrier 9-3 on Sheets 1 and 2 of Figure 4 and described as follows:

- Replacement Barrier 9-1 would begin north of the Live Oak Drive overpass, extend along the northbound lanes for a distance of approximately 1,370 feet, and be mounted on a retaining wall;
- Replacement Barrier 9-2 would be ground-mounted, continuing along I-495 northbound on the west side of the proposed shared use path (SUP), for a distance of approximately 633 feet; and
- Replacement Barrier 9-3 would be ground-mounted and would overlap the northern end of Barrier 9-2, providing access for the SUP to, for a distance of approximately 693 feet.

[Notes: In the narrative that follows, the system of four replacement noise barriers will be simply referred to as Noise Barrier System 8/9. If the narrative presents specific information about one the sections, the section identifier (i.e., 8, 9-1, 9-2, or 9-3) will be used. It should also be noted that the overlap between Barrier 9-2 and Barrier 9-3 has a gap to length ratio of 3:1.]

Without Noise Barrier System 8/9, a total of 31 residential receptors would be exposed to noise impact in 2045 because of the Project. While maintaining the existing sound attenuation line or the height of the existing wall based on site conditions, the replacement noise barriers would range in heights

between 15 and 37 feet (average height of 25) and have a combined length of 4,149 feet. It should be noted that heights between approximately Station 677+14 and 677+24 were lowered six feet, compared to the existing sound attenuation line, to accommodate overhead utilities. The barrier system would provide a benefit of 5 to 14 dBA of noise reduction (10 dBA average noise reduction), benefiting all 31 impacted receptors. The replacement of Noise Barrier System 8/9 would therefore meet the acoustical feasibility goal, since more than 50% of the impacted residences would receive noise reductions of 5 dBA or more. This barrier also meets the noise reduction design goal, since 31 of the impacted receptors receive noise reductions of 7 dBA or more. The replacement of Noise Barrier System 8/9 has a total surface area of 107,410 square feet and benefits a total of 31 impacted and 18 non-impacted receptors, resulting in a surface area per benefited receptor value of 2,192 SF/BR, which exceeds VDOT's allowable surface area per benefited receptor value of 1,600 SF/BR.

As described previously, a replacement noise barrier must, at a minimum, provide the same level of protection as the existing noise barrier. Proposed modifications to the barrier are not subject to the reasonableness criterion if site conditions require the modifications. While adhering to VDOT's in-kind barrier replacement requirements noted above, replacement Noise Barrier System 8/9 benefits all 31 impacted receptors behind it. Since there are no additional impacts for which modifications to the noise barrier would be justified, the replacement noise barrier system is recommended for construction without further modification. There are no design options by which the replacement noise barrier could be made cost-effective.

Table 7 provides the predicted 2045 noise levels with and without a noise barrier, along with the predicted insertion loss and the benefit/impact status for receptors behind Noise Barrier 8/9. Note that there is a gap in numbering between receptors F-056 and F-094. Noise modeling conducted at the beginning of the project included receptors along the project-related shared use path (SUP) at 100-foot intervals. However, per VDOT guidance, when a SUP is included within a project corridor, it is treated as a transportation-related land use and are therefore not considered noise sensitive and are to be excluded from the noise analysis. Appendix A provides the predicted noise levels for the 2018 Existing conditions and the 2045 Design Year with the Project for all the receptors in CNE F and CNE W. Appendix B contains a figure and table summarizing barrier information, including stationing, sound attenuation line (barrier top profile), and proposed barrier heights. The Warranted/Feasibility/Reasonableness worksheet for Noise Barrier System 8/9 is in Appendix G.

Table 7 Predicted Traffic Noise Levels for the Modified Replacement of Noise Barrier System 8/9

Rec. ID	Address/ Location[1]	No. of Units[3]	FHWA NAC	Floor	2045 Noise Levels, dBA Leq[4]			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
F-001	6900 Portobello Rd	0	B	1	68	59	9	Impact/Benefit
F-001 deck	6900 Portobello Rd	1	B	1	70	60	10	Impact/Benefit
F-002	6911 Portobello Rd	1	B	1	72	60	12	Impact/Benefit
F-003	721 Lawton St	1	B	1	75	63	12	Impact/Benefit
F-004	720 Lawton St	1	B	1	77	63	13	Impact/Benefit
F-005	722 Lawton St	0	B	1	76	62	13	Impact/Benefit
F-005 deck	722 Lawton St	1	B	1	77	64	12	Impact/Benefit

Rec. ID	Address/ Location[1]	No. of Units[3]	FHWA NAC	Floor	2045 Noise Levels, dBA Leq[4]			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
F-006	6926 Butternut Ct	1	B	1	**76**	62	**14**	Impact/Benefit
F-007	6928 Butternut Ct	0	B	1	**76**	63	**13**	Impact/Benefit
F-007 deck	6928 Butternut Ct	1	B	1	**77**	64	**13**	Impact/Benefit
F-008	6927 Butternut Ct	0	B	1	**71**	59	**13**	Impact/Benefit
F-008 deck	6927 Butternut Ct	1	B	1	**72**	60	**12**	Impact/Benefit
F-009	723 Lawton St	1	B	1	**70**	62	**8**	Impact/Benefit
F-010	725 Lawton St	1	B	1	**69**	62	**7**	Impact/Benefit
F-011	729 Lawton St	1	B	1	**67**	61	**7**	Impact/Benefit
F-012	6925 Butternut Ct	1	B	1	**66**	57	**10**	Impact/Benefit
F-013	726 Lawton St	1	B	1	65	58	**8**	No Impact/Benefit
F-014	730 Lawton St	0	B	1	63	54	**9**	No Impact/Benefit
F-014 deck	730 Lawton St	1	B	1	**66**	58	**8**	Impact/Benefit
F-015	7002 River Oaks Dr	0	B	1	**67**	56	**11**	Impact/Benefit
F-015 deck	7002 River Oaks Dr	1	B	1	**67**	57	**10**	Impact/Benefit
F-016	7004 River Oaks Dr	0	B	1	**66**	55	**11**	Impact/Benefit
F-016 deck 1	7004 River Oaks Dr	0	B	1	**67**	56	**11**	Impact/Benefit
F-016 deck 2	7004 River Oaks Dr	0	B	1	**70**	57	**13**	Impact/Benefit
F-016 deck 3	7004 River Oaks Dr	1	B	1	**71**	58	**13**	Impact/Benefit
F-017	7006 River Oaks Dr	1	B	1	**70**	58	**11**	Impact/Benefit
F-018	7007 River Oaks Dr	0	B	1	**73**	59	**13**	Impact/Benefit
F-018 deck	7007 River Oaks Dr	1	B	1	**73**	59	**13**	Impact/Benefit
F-019	7005 River Oaks Dr	1	B	1	65	54	**12**	No Impact/Benefit
F-020	7003 River Oaks Dr	1	B	1	65	54	**12**	Impact/Benefit
F-021	7048 Arbor Ln	0	B	1	**74**	61	**13**	Impact/Benefit
F-021 deck	7048 Arbor Ln	1	B	1	**76**	63	**13**	Impact/Benefit
F-022	7040 Arbor Ln	0	B	1	**70**	58	**12**	Impact/Benefit
F-022 deck	7040 Arbor Ln	1	B	1	**71**	59	**12**	Impact/Benefit
F-023	7036 Arbor Ln	0	B	1	**68**	56	**11**	Impact/Benefit
F-023 deck	7036 Arbor Ln	1	B	1	**69**	57	**11**	Impact/Benefit

Rec. ID	Address/ Location[1]	No. of Units[3]	FHWA NAC	Floor	2045 Noise Levels, dBA Leq[4]			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
F-024	7032 Arbor Ln	0	B	1	**66**	56	**11**	Impact/Benefit
F-024 deck	7032 Arbor Ln	1	B	1	**68**	57	**11**	Impact/Benefit
F-025	7028 Arbor Ln	1	B	1	65	54	**11**	No Impact/Benefit
F-026	7024 Arbor Ln	1	B	1	65	55	**10**	No Impact/Benefit
F-027	7018 Arbor Ln	1	B	1	64	55	**8**	No Impact/Benefit
F-028	7012 Arbor Ln	0	B	1	60	52	**8**	No Impact/Benefit
F-028 deck	7012 Arbor Ln	1	B	1	63	53	**9**	No Impact/Benefit
F-029	7050 Arbor Ln	1	B	1	**75**	62	**13**	Impact/Benefit
F-030	801 Balls Hill Rd	1	B	1	**68**	58	**10**	Benefited/Impact
F-031	803 Balls Hill Rd	1	B	1	**66**	57	**8**	No Impact/Benefit
F-032	7029 Arbor Ln	0	B	1	**67**	57	**9**	Impact/Benefit
F-032 deck	7029 Arbor Ln	1	B	1	**69**	59	**9**	Impact/Benefit
F-033	7025 Arbor Ln	1	B	1	65	57	**8**	No Impact/Benefit
F-034	7021 Arbor Ln	1	B	1	64	56	**8**	No Impact/Benefit
F-035	7017 Arbor Ln	1	B	1	37	30	**7**	No Impact/Benefit
F-036	805 Balls Hill Rd	1	B	1	59	55.4	3	No Impact/No Benefit
F-037	809 Balls Hill Rd	1	B	1	61	59	2	No Impact/No Benefit
F-038	811 Balls Hill Rd	1	B	1	59	57	2	No Impact/No Benefit
F-039	7112 Benjamin St	0	B	1	60	57	3	No Impact/No Benefit
F-039 deck	7112 Benjamin St	1	B	1	**68**	59	**9**	Impact/Benefit
F-040	7108 Benjamin St	0	B	1	60	56	4	No Impact/No Benefit
F-040 deck	7108 Benjamin St	1	B	1	**68**	60	**8**	Impact/Benefit
F-041	7104 Benjamin St	1	B	1	61	55	**5**	No Impact/Benefit
F-042	7100 Benjamin St	0	B	1	61	55	**6**	No Impact/Benefit
F-042 deck	7100 Benjamin St	1	B	1	64	57	**7**	No Impact/Benefit
F-043	7032 Benjamin St	1	B	1	60	54	**6**	No Impact/Benefit
F-044	7028 Benjamin St	1	B	1	61	55	**7**	No Impact/Benefit

Rec. ID	Address/ Location[1]	No. of Units[3]	FHWA NAC	Floor	2045 Noise Levels, dBA Leq[4]			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
F-045	7024 Benjamin St	1	B	1	57	51	**6**	No Impact/Benefit
F-046	7109 Benjamin St	1	B	1	**70**	61	**9**	Impact/Benefit
F-047	7105 Benjamin St	1	B	1	56	53	3	No Impact/No Benefit
F-048	7101 Benjamin St	1	B	1	59	54	**5**	No Impact/Benefit
F-049	7033 Benjamin St	1	B	1	56	53	4	No Impact/No Benefit
F-050	7029 Benjamin St	1	B	1	55	52	4	No Impact/No Benefit
F-051	850 Balls Hill Rd	1	D	1	**76 (Ext.) 51 (Int.)**	63 (Ext.) 38 (Int.)	**13**	Impact/Benefit
F-052	7112 Holyrood Dr	1	B	1	64	58	**6**	No Impact/Benefit
F-053	7110 Holyrood Dr	1	B	1	**67**	61	**6**	Impact/Benefit
F-054	7108 Holyrood Dr	1	B	1	61	56	**5**	No Impact/Benefit
F-055	7106 Holyrood Dr	1	B	1	60	56	4	No Impact/No Benefit
F-056	7104 Holyrood Dr	1	B	1	57	54	3	No Impact/No Benefit
F-094	6924 Butternut Ct	1	B	1	**73**	62	**11**	Impact/Benefit

Notes:
1.) All receptors are located in McLean, VA.
2.) Rounding of decibels may make some subtractions appear incorrect.
3.) For locations where multiple receptors were analyzed, the receptor with the loudest "No Barrier" noise levels were used when determining feasibility and reasonableness.
4.) For Category D receptors, exterior noise levels are provided for informational purposes only. Predicted interior noise levels were used for determining noise impact and benefit from noise barrier.

Source: HMMH, 2022.

4.2 Modified Replacement of Noise Barrier 10 with an Extension to the South

Per Section 3.3.7.C in "Part 2 – Technical Requirements" (rev. 4 – 6-Apr-21) of the Request for Proposal, potential Noise Barriers C and 10 identified in the NEXT Environmental Assessment Noise Technical Report (February 2020) were to be evaluated as one continuous noise barrier to minimize the effects of flanking due to the presence of noise-sensitive sites located between the two noise barriers. Given the extent of predicted noise impact in CNE C and CNE E, noise abatement measures are not warranted along the west side of the I-495/GWMP Interchange. Furthermore, a design option that considered one continuous noise barrier along the west side of the I-495/GWMP Interchange was found to be not reasonable. As a result, the feasibility and reasonableness determinations for replacement Noise Barrier 10 and Noise Barrier C considered each noise barrier independently. The evaluation of replacement Noise Barrier 10 is discussed below. See Section 5.1 for the evaluation of potential Noise Barrier C and further details about the evaluation of continuous noise barrier between CNE C and CNE E.

Noise Barrier 10 is an existing noise barrier located on the southbound side of I-495 and along the ramp from GWMP westbound to I-495 southbound. Noise Barrier 10 will be physically impacted by the 495 NEXT project along its entire length and will be replaced in kind. In such cases, the relocated barrier must, at a minimum, provide the same level of protection as the existing barrier. Proposed modifications to the barrier are not subject to the reasonableness criterion if site conditions require the modifications. For example, if the replacement barrier is moved down a fill slope, the height of the new noise barrier must be increased to maintain the sound attenuation line (barrier top elevation). Similarly, if the replacement barrier would move upslope, the height above ground of the replacement barrier, at a minimum, must be maintained. To evaluate an in-kind replacement of Noise Barrier 10, heights were increased to maintain the existing sound attenuation line in locations where the barrier moved downslope and maintained the same height above ground in locations where the barrier moved upslope from its existing location. However, should additional modifications to the noise barrier be required to protect additional receptors impacted as a result of a Type I project, those additional modifications would be subject to the cost-effectiveness criterion, and only the additional benefited receptors would be subject to the reasonableness calculation. The effects of reflected sound between parallel barriers 10 and 8/9 was evaluated using the TNM's Parallel Barrier module. Because both barriers are absorptive and very far apart, the potential increases due to reflected sound were typically 0 dB, and less than 1 dB. Therefore, since the effects were negligible, they were not directly accounted for in the analysis.

Without Noise Barrier 10, a total of 23 residential and recreational receptors in CNE E and the southern portion of CNE C would be exposed to noise impact in 2045 due to the Project. At heights ranging from 3 to 23 feet and a length of 1,580 feet, the replacement Noise Barrier 10 would provide 5 to 11 dBA of noise reduction (8 dBA average noise reduction), benefiting only 11 of the impacted receptors (48%) while maintaining the sound attenuation line of the existing noise barrier. Since the replacement Noise Barrier 10 would benefit less than 50% of the impacted receptors at the existing sound attenuation line, the barrier would fail to meet the acoustical feasibility goal, and so would not be considered feasible. Since there would be additional impacted receptors at the south end of Noise Barrier 10, additional design options were evaluated in an attempt to mitigate those impacts. In these cases, the incremental quantity of noise barrier materials and the incremental number of benefits were considered in the feasibility and reasonableness determination.

The design described herein consists of increasing the height of replacement Noise Barrier 10 by 4 feet across its entire length and adding a separate stand-alone section of noise barrier that would be located south of the Live Oak Drive overpass (i.e., Noise Barrier 10 Ext.) The longer and taller replacement noise barrier system would be 1,542 feet in total length, with heights ranging from 7 to 27 feet above ground level. The section of noise barrier south of the Live Oak Drive overpass would be 460 feet in length with heights ranging between 18 and 26 feet. These enhancements to the replacement Noise Barrier 10 along with Noise Barrier 10 Ext. would benefit another 11 impacted residential and recreational units, plus one non-impacted units, for a total of 12 incremental benefits (relative to the number of benefits provided by the replacement barrier while maintaining the sound attenuation line). Receptor E-026 was unable to be benefited by the Barrier 10 Extension due to the need to maintain driveway access to the trail and Langley Swim and Tennis Club. This design option would provide 5 to 13 dBA of noise reduction (7 dBA average noise reduction) for the additional benefited receptors. With an incremental surface area of 12,839 square feet, the surface area per benefited receptor value for the incremental quantity would be 1,070 SF/BR. Since the incremental quantity meets VDOT's cost-effectiveness criterion of 1,600 SF/BR, this design option is considered reasonable.

Table 8 provides the predicted 2045 noise levels with and without a noise barrier, along with the predicted insertion loss and the benefit/impact status for receptors behind the two-barrier system that

consists of an enhanced replacement Noise Barrier 10 and Noise Barrier 10 Ext. Appendix A provides the predicted noise levels for the 2018 Existing conditions and the 2045 Design Year with the Project for all the receptors in CNE E and the south end of CNE C. Appendix B contains a figure and table summarizing barrier information, including stationing, sound attenuation line (barrier top profile), and proposed barrier heights. The Warranted/Feasibility/ Reasonableness worksheets for replacement Noise Barrier 10 and Noise Barrier 10 Ext. is in Appendix G.

Table 8 Predicted Traffic Noise Levels for the Modified Replacement of Noise Barrier 10 with an Extension

Rec. ID	Address/ Location[1]	No. of Units	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
C-021	Potomac Heritage Trail	1	C	1	65	62	3	No Impact/ No Benefit
C-022	Potomac Heritage Trail	1	C	1	**67**	61	**6**	Impact/Benefit
C-055	710 Live Oak Dr	1	B	1	**67**	62	**5**	Impact/Benefit
E-001	Potomac Heritage Trail	1	C	1	**67**	58	**9**	Impact/Benefit
E-002	Potomac Heritage Trail	1	C	1	**68**	59	**9**	Impact/Benefit
E-003	Potomac Heritage Trail	1	C	1	**70**	61	**9**	Impact/Benefit
E-004	Potomac Heritage Trail	1	C	1	**72**	62	**10**	Impact/Benefit
E-005	Potomac Heritage Trail	1	C	1	**74**	61	**13**	Impact/Benefit
E-006	Potomac Heritage Trail	1	C	1	**76**	64	**13**	Impact/Benefit
E-007	Potomac Heritage Trail	1	C	1	**77**	65	**12**	Impact/Benefit
E-008	Potomac Heritage Trail	1	C	1	**73**	66	**7**	Impact/Benefit
E-009	Potomac Heritage Trail	1	C	1	**69**	64	**5**	Impact/Benefit
E-010	Scott's Run Nature Preserve Trail	1	C	1	65	62	4	No Impact/No Benefit
E-011	Potomac Heritage Trail	1	C	1	64	60	4	No Impact/ No Benefit
E-012	Potomac Heritage Trail	1	C	1	64	61	4	No Impact/ No Benefit
E-013	Potomac Heritage Trail	1	C	1	65	61	4	No Impact/ No Benefit
E-014	Potomac Heritage Trail	1	C	1	64	60	4	No Impact/ No Benefit
E-015	Potomac Heritage Trail	1	C	1	63	60	3	No Impact/ No Benefit
E-016	Potomac Heritage Trail	1	C	1	64	60	3	No Impact/ No Benefit
E-017	Potomac Heritage Trail	1	C	1	61	58	3	No Impact/ No Benefit
E-018	Potomac Heritage Trail	1	C	1	60	57	3	No Impact/ No Benefit
E-019	Potomac Heritage Trail	1	C	1	61	58	3	No Impact/ No Benefit

Rec. ID	Address/ Location[1]	No. of Units	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
E-020	Potomac Heritage Trail	1	C	1	64	60	4	No Impact/ No Benefit
E-021	Potomac Heritage Trail	1	C	1	**66**	62	**5**	Impact/Benefit
E-022	Oak Trail	1	C	1	**68**	64	**5**	Impact/Benefit
E-023	Oak Trail	1	C	1	**69**	64	**5**	Impact/Benefit
E-024	Oak Trail	1	C	1	**69**	64	**5**	Impact/Benefit
E-025	Oak Trail	1	C	1	**70**	62	**8**	Impact/Benefit
E-026	Oak Trail	1	C	1	**71**	67	4	Impact/No Benefit
E-027	Oak Trail	1	C	1	**70**	62	**9**	Impact/Benefit
E-028	Oak Trail	1	C	1	**68**	61	**7**	Impact/Benefit
E-029	Oak Trail	1	C	1	**66**	61	**5**	Impact/Benefit
E-030	Oak Trail	1	C	1	64	60	4	No Impact/ No Benefit
E-031	Oak Trail	1	C	1	61	58	3	No Impact/ No Benefit
E-032	Oak Trail	1	C	1	60	58	3	No Impact/ No Benefit
E-033	Oak Trail	1	C	1	59	57	2	No Impact/ No Benefit
E-034	Oak Trail	1	C	1	59	57	2	No Impact/ No Benefit
E-035	Laurel Ridge Trail	1	C	1	59	57	2	No Impact/ No Benefit
E-036	Laurel Ridge Trail	1	C	1	58	56	2	No Impact/ No Benefit
E-037	Laurel Ridge Trail	1	C	1	57	55	2	No Impact/ No Benefit
E-038	Laurel Ridge Trail	1	C	1	56	54	2	No Impact/ No Benefit
E-039	Laurel Ridge Trail	1	C	1	55	54	1	No Impact/ No Benefit
E-040	728 Live Oak Dr	1	C	1	**69**	65	**5**	Impact/Benefit
E-041	728 Live Oak Dr	1	C	1	64	62	3	No Impact/ No Benefit
E-042	728 Live Oak Dr	1	C	1	65	62	3	No Impact/ No Benefit
E-043	728 Live Oak Dr	1	C	1	62	59	3	No Impact/ No Benefit
E-044	728 Live Oak Dr	1	C	1	63	60	3	No Impact/ No Benefit
E-045	712 Live Oak Dr	1	B	1	**73**	64	**9**	Impact/Benefit
E-046	714 Live Oak Dr	1	B	1	65	60	**5**	No Impact/Benefit
E-047	720 Live Oak Dr	1	B	1	**68**	62	**7**	Impact/Benefit

Notes:
1.) All receptors are located in McLean, VA.
2.) Rounding of decibels may make some subtractions appear incorrect.

Source: HMMH, 2022.

4.3 Replacement of Noise Barrier 13A

Noise Barrier 13A is a noise barrier system that provides noise abatement to receptors located within CNE H and CNE Y and is shown in Figure 4 on Sheets 3 to 5. The barrier system is located along the southbound side of I-495, between Georgetown Pike and Old Dominion Drive. This barrier would be physically impacted by the Project due to the proposed widening of I-495 southbound and a shift in the alignment of the on-ramp from Georgetown Pike to I-495 southbound. As a result, a replacement noise barrier system was evaluated.

The replacement Noise Barrier 13A would be located along I-495 southbound between Georgetown Pike and Old Dominion Drive, however, it would be shifted to a new location between the new edge of pavement of I-495 southbound and the proposed shared use path that is located parallel to the highway. The effects of reflected sound between parallel barriers 13A and 13E was evaluated using the TNM's Parallel Barrier module. Because both barriers are absorptive and very far apart, the potential increases due to reflected sound were typically 0 dB, and less than 1 dB. Therefore, since the effects were negligible, they were not directly accounted for in the analysis.

Without Noise Barrier 13A, a total of 23 receptors would be exposed to noise impact in 2045 as a result of the Project. The in-kind replacement of Noise Barrier 13A has heights ranging between 19 and 41 feet (average height of 29 feet) and a length of 3,977 feet. The barrier would provide 5 to 14 dBA of noise reduction and benefit all 23 impacted receptors and would therefore be considered acoustically feasible. Additionally, 32 non-impacted receptors also would be benefited by the replacement barrier. This barrier system also meets the noise reduction design goal, since 19 of the impacted receptors would receive noise reductions of 7 dBA or more. With a total surface area of 113,851 square feet, Noise Barrier 13A would benefit a total of 55 receptors, resulting in a surface area per benefited receptor value of 2,070 square feet. However, this value exceeds VDOT's allowable surface area per benefited receptor value of 1,600 square feet.

As described previously, a replacement noise barrier must, at a minimum, provide the same level of protection as the existing noise barrier. Proposed modifications to the barrier are not subject to the reasonableness criterion if site conditions require the modifications. Heights along Replacement Noise Barrier 13A were increased to maintain the existing sound attenuation line in locations where the barrier moved downslope and maintained the same height above ground in locations where the barrier moved upslope from its existing location. The replacement barrier ranges between 19 and 41 feet in height and has a length of 3,977 feet. Noise Barrier 13A benefits all 23 impacted receptors behind it by providing an average noise level reduction of 7 decibels. With a total surface area of 113,851 square feet, the surface area per benefited receptor value for the replacement barrier would be 2,070 SF/BR. Since there are no additional impacts for which modifications to the noise barrier would be justified, the replacement noise barrier system is recommended for construction without further modification. There are no design options by which the replacement noise barrier could be made cost-effective.

Table 9 provides the predicted 2045 noise levels with and without a noise barrier, along with the predicted insertion loss and the benefit/impact status for receptors behind replacement Noise Barrier 13A. Appendix A provides the predicted noise levels for the 2018 Existing conditions and the 2045 Design Year with the Project for all the receptors in CNE H and CNE Y. Appendix B contains a figure and table summarizing barrier information, including stationing, sound attenuation line (barrier top profile), and proposed barrier heights. The Warranted/Feasibility/Reasonableness worksheet for this noise barrier system is in Appendix G.

Table 9 Predicted Traffic Noise Levels for the Replacement of Noise Barrier 13A

Rec. ID	Address/ Location[1]	No. of Units[3]	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
H-001	902 Helga Pl	1	B	1	61	55	7	No Impact/Benefit
H-002	904 Helga Pl	1	B	1	64	57	**7**	No Impact/Benefit
H-003	900 Helga Pl	1	B	1	64	57	**7**	No Impact/Benefit
H-004	7302 Peter Pl	1	B	1	**66**	57	**9**	Impact/Benefit
H-005	906 Helga Pl	1	B	1	65	58	**7**	No Impact/Benefit
H-006	908 Helga Pl	1	B	1	**67**	58	**9**	Impact/Benefit
H-007	910 Helga Pl	1	B	1	64	56	**8**	No Impact/Benefit
H-008	912 Helga Pl	1	B	1	63	56	**7**	No Impact/Benefit
H-009	7303 Peter Pl	1	B	1	61	55	**6**	No Impact/Benefit
H-010	7305 Peter Pl	0	B	1	61	54	**7**	No Impact/Benefit
H-010 deck	7305 Peter Pl	1	B	1	**66**	54	**11**	Impact/Benefit
H-011	7307 Peter Pl	0	B	1	59	54	**6**	No Impact/Benefit
H-011 deck	7307 Peter Pl	1	B	1	63	53	**9**	No Impact/Benefit
H-012	914 Helga Pl	1	B	1	59	53	**6**	No Impact/Benefit
H-013	7308 Peter Pl	1	B	1	60	53	**7**	No Impact/Benefit
H-014	916 Helga Pl	1	B	1	59	53	**6**	No Impact/Benefit
H-015	987 Spencer Rd	1	B	1	**69**	59	**10**	Impact/Benefit
H-016	989 Spencer Rd	1	B	1	**67**	58	**9**	Impact/Benefit
H-017	915 Helga Pl	1	B	1	63	56	**7**	No Impact/Benefit
H-018	985 Spencer Rd	1	B	1	63	56	**7**	No Impact/Benefit
H-019	912 Helga Pl	1	B	1	**67**	58	**9**	Impact/Benefit
H-020	983 Spencer Rd	1	B	1	**72**	58	**14**	Impact/Benefit
H-021	1001 Spencer Rd	1	B	1	**67**	57	**10**	Impact/Benefit
H-022	979 Spencer Rd	1	B	1	64	56	**8**	No Impact/Benefit
H-023	977 Spencer Rd	1	B	1	62	55	**7**	No Impact/Benefit
H-024	1000 Spencer Rd	1	B	1	62	55	**7**	No Impact/Benefit
H-025	980 Spencer Rd	1	B	1	63	55	**8**	No Impact/Benefit
H-026	7400 Spencer Ct	1	B	1	**66**	57	**9**	Impact/Benefit
H-027	7410 Spencer Ct	1	B	1	60	54	**6**	No Impact/Benefit
H-028	7420 Spencer Ct	1	B	1	57	49	**7**	No Impact/Benefit
H-029	7419 Spencer Ct	1	B	1	61	53	**8**	No Impact/Benefit
H-030	7409 Spencer Ct	1	B	1	**68**	59	**8**	Impact/Benefit
H-031	1010 Spencer Rd	1	B	1	**74**	61	**12**	Impact/Benefit
H-076	Scott's Run Nature Preserve Trail	1	C	1	61	54	**7**	No Impact/Benefit
H-077	Scott's Run Nature Preserve Trail	1	C	1	61	54	**7**	No Impact/Benefit
H-078	Scott's Run Nature Preserve Trail	1	C	1	62	55	**7**	No Impact/Benefit

Rec. ID	Address/ Location[1]	No. of Units[3]	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
H-079	Scott's Run Nature Preserve Trail	1	C	1	62	55	**7**	No Impact/Benefit
H-080	Scott's Run Nature Preserve Trail	1	C	1	63	56	**7**	No Impact/Benefit
H-081	Scott's Run Nature Preserve Trail	1	C	1	63	57	**7**	No Impact/Benefit
H-082	Scott's Run Nature Preserve Trail	1	C	1	65	58	**7**	No Impact/Benefit
H-083	Scott's Run Nature Preserve Trail	1	C	1	**66**	59	**7**	Impact/Benefit
H-084	Scott's Run Nature Preserve Trail	1	C	1	**67**	59	**7**	Impact/Benefit
H-085	Scott's Run Nature Preserve Trail	1	C	1	**66**	60	**7**	Impact/Benefit
H-086	7514 Old Dominion Dr	1	B	1	**68**	60	**8**	Impact/Benefit
H-087	7518 Old Dominion Dr	1	B	1	**69**	63	**6**	Impact/Benefit
H-088	7505 Blaise Trl	1	B	1	**69**	61	**8**	Impact/Benefit
H-089	7504 Blaise Trl	1	B	1	**68**	58	**9**	Impact/Benefit
H-090	7508 Blaise Trl	1	B	1	64	56	**8**	No Impact/Benefit
H-091	7520 Old Dominion Dr	1	B	1	**67**	61	**6**	Impact/Benefit
H-092	7520 Old Dominion Dr	1	B	1	**67**	59	**8**	Impact/Benefit
H-093	7512 Blaise Trl	1	B	1	**66**	59	**8**	Impact/Benefit
H-094	7522 Old Dominion Dr	1	B	1	**67**	61	**6**	Impact/Benefit
H-095	7536 Old Dominion Dr	1	B	1	**66**	60	**6**	Impact/Benefit
Y-001	898 Helga Pl	1	B	1	64	56	**8**	No Impact/Benefit
Y-002	896 Helga Pl	1	B	1	64	56	**8**	No Impact/Benefit
Y-002 deck	896 Helga Pl	0	B	1	63	55	**8**	No Impact/Benefit
Y-003	894 Helga Pl	1	B	1	61	58	3	No Impact/ No Benefit
Y-004	7315 Georgetown Pike	1	B	1	58	57	2	No Impact/ No Benefit
Y-005	7321 Georgetown Pike	1	B	1	55	53	2	No Impact/ No Benefit
Y-006	7327 Georgetown Pike	1	B	1	54	52	2	No Impact/ No Benefit
Y-007	7306 Peter Pl	1	B	1	64	55	**9**	No Impact/Benefit
Y-008	7304 Peter Pl	1	B	1	64	55	**9**	No Impact/Benefit

Notes:
1.) All receptors are located in McLean, VA.
2.) Rounding of decibels may make some subtractions appear incorrect.
3.) For locations where multiple receptors were analyzed, the receptor with the loudest "No Barrier" noise levels were used when determining feasibility and reasonableness.

Source: HMMH, 2022.

4.4 Modified Partial Replacement of Noise Barrier 13B / 13B North Extension

Noise Barrier 13B is an existing barrier located on the southbound side of I-495 between Old Dominion Drive and Lewinsville Road and provides noise abatement to CNE AA and CNE J. The barrier is shown in Figure 4, on Sheets 5 to 7. Roadway improvements associated with the Project would physically impact the portion of the existing barrier adjacent to CNE AA and the northern end of CNE J, which would require consideration of a replacement-in-kind noise barrier. The replacement noise barrier would be shifted to accommodate widening of I-495 southbound and a proposed shared use path. Those receptors in CNE J that are behind the section of the existing Noise Barrier 13B, which would not be physically impacted by the project, would be exposed to design year noise levels that are below the applicable FHWA NAC. Therefore, according to VDOT policy, the section of Noise Barrier 13B that would not be physically impacted by the project is to remain in place without modification.

As described previously, the sound attenuation line of the replacement noise barrier must meet or exceed the elevation of the existing noise barrier's sound attenuation line. Proposed modifications to the barrier are not subject to the reasonableness criterion if site conditions require the modifications. Should additional modifications to the noise barrier be required to protect additional receptors impacted as a result of the 495 NEXT project, those additional modifications would be subject to the cost-effectiveness criterion, and only the additional benefited receptors would be subject to the reasonableness calculation. If the additional modifications are not reasonable for the additional benefited receptors, the new noise barrier would be constructed in a manner to provide the same level of protection as the existing noise barrier, by maintaining either the same sound attenuation line or the same height above ground, depending on the site conditions. To evaluate an in-kind replacement of Noise Barrier 13B, heights were increased to maintain the existing sound attenuation line in locations where the barrier moved downslope and maintained the same height above ground in locations where the barrier moved upslope from its existing location.

The replacement noise barrier includes an approximately 170-foot extension at the north end, to close a preexisting gap between the north end of the noise barrier and the bridge abutment supporting Old Dominion Drive. The replacement section of Noise Barrier 13B would extend southward for 2,273 feet and tie in with the existing section of Noise Barrier 13B that is to remain in place, in the vicinity of the southern end of Huntmaster Lane. Without replacement Noise Barrier 13B, 20 residential receptors would be exposed to noise impact in 2045 because of the Project. Replacement Noise Barrier 13B would benefit 19 of the 20 residential receptors (95%) behind the barrier in CNEs AA and J, and so would achieve VDOT's acoustical feasibility goal of providing at least 5 dBA of noise reduction to at least 50% of the impacted receptors. Following VDOT guidance, additional modifications to the noise barrier were evaluated in an attempt to protect the remaining noise impact at receptor AA-007, shown on Figure 2, Sheet 6, as a result of the 495 NEXT project. Those additional modifications would be subject to the cost-effectiveness criterion, and only the additional benefited receptors would be subject to the reasonableness calculation.

The in-kind replacement and 170-foot extension of the northern section of Noise Barrier 13B would range in height from 16 to 32 feet, with an average height of 27 feet, with a length of 2,273 feet and surface area of 62,207 square feet. To benefit remaining impacted receptors, heights along Noise Barrier 13B were increased by two feet between Stations 208+00 and 209+00 and increased by four feet between Stations 209+00 and 214+00. Increasing the height of replacement Noise Barrier 13B benefits all 13 impacted residential receptors in CNE AA plus all seven of the impacted residential receptors in CNE J, and so achieves the acoustical feasibility goal. The noise reduction design goal is also achieved since the taller replacement Noise Barrier 13B provides at least 7 dBA or noise reduction to 14 impacted

units. The modified replacement of Noise Barrier 13B would require an additional 2,462 square feet of material to benefit receptor AA-007 and two additional non-impacted receptors. The incremental square-foot per benefited receptor value for the modified replacement of Noise Barrier 13B would be 821 SF/BR, which meets VDOT's allowable square foot per benefited receptor value of 1,600. Therefore, the modified replacement of Noise Barrier 13B is recommended for construction.

Table 10 provides the predicted 2045 noise levels with and without a noise barrier, along with the predicted insertion loss and the benefit/impact status for receptors behind a modified replacement of Noise Barrier 13B. Appendix A provides the predicted noise levels for the 2018 Existing conditions and the 2045 Design Year with the Project for all the receptors in CNE AA and CNE J. Appendix B contains a figure and table summarizing barrier information, including stationing, sound attenuation line (barrier top profile), and proposed barrier height. The Warranted/Feasibility/Reasonableness worksheet for replacement Noise Barrier 13B is in Appendix G.

Table 10 Predicted Traffic Noise Levels for Noise Barrier 13B / 13B North Extension

Rec. ID	Address/ Location[1]	No. of Units[3]	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
AA-001	7515 Old Dominion Dr	0	B	1	**71**	63	**8**	Impact/Benefit
AA-002	7513 Old Dominion Dr	0	B	1	**72**	64	**8**	Impact/Benefit
AA-002 deck	7513 Old Dominion Dr	1	B	1	**73**	64	**9**	Impact/Benefit
AA-003	7517 Old Dominion Dr	1	B	1	**69**	64	**5**	Impact/Benefit
AA-004	7519 Old Dominion Dr	1	B	1	**70**	64	**6**	Impact/Benefit
AA-005	1116 Dominion Ct	1	B	1	**70**	61	**9**	Impact/Benefit
AA-006	1200 Dominion Ct	1	B	1	**74**	66	**8**	Impact/Benefit
AA-007	7525 Old Dominion Dr	0	B	1	65	61	4	No Impact/No Benefit
AA-007 deck	7525 Old Dominion Dr	1	B	1	**67**	62	**5**	Impact/Benefit
AA-008	7521 Old Dominion Dr	1	B	1	**66**	61	**5**	Impact/Benefit
AA-009	1124 Dominion Ct	1	B	1	**71**	65	**7**	Impact/Benefit
AA-010	7529 Old Dominion Dr	0	B	1	64	59	4	No Impact/No Benefit
AA-010 deck	7529 Old Dominion Dr	1	B	1	65	60	**5**	No Impact/Benefit
AA-011	7527 Old Dominion Dr	1	B	1	**66**	61	**5**	Impact/Benefit
AA-012	7523 Old Dominion Dr	1	B	1	**67**	62	**6**	Impact/Benefit
AA-013	1151 Dominion Ct	1	B	1	**69**	58	**11**	Impact/Benefit
J-001	7619 Huntmaster Ln	0	B	1	**69**	62	**7**	Impact/Benefit
J-001 deck	7619 Huntmaster Ln	1	B	1	**74**	65	**9**	Impact/Benefit
J-002	7621 Huntmaster Ln	0	B	1	**75**	65	**10**	Impact/Benefit
J-002 deck	7621 Huntmaster Ln	1	B	1	**77**	67	**9**	Impact/Benefit
J-003	7623 Huntmaster Ln	0	B	1	**74**	64	**10**	Impact/Benefit
J-003 deck	7623 Huntmaster Ln	1	B	1	**75**	66	**9**	Impact/Benefit

Rec. ID	Address/ Location[1]	No. of Units[3]	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
J-004	7625 Huntmaster Ln	0	B	1	**73**	64	**9**	Impact/Benefit
J-004 deck	7625 Huntmaster Ln	1	B	1	**75**	66	**9**	Impact/Benefit
J-005	7627 Huntmaster Ln	0	B	1	**73**	64	**9**	Impact/Benefit
J-005 deck	7627 Huntmaster Ln	1	B	1	**75**	66	**9**	Impact/Benefit
J-006	7629 Huntmaster Ln	0	B	1	**73**	64	**9**	Impact/Benefit
J-006 deck	7629 Huntmaster Ln	1	B	1	**75**	66	**9**	Impact/Benefit
J-007	7631 Huntmaster Ln	0	B	1	**73**	64	**9**	Impact/Benefit
J-007 deck	7631 Huntmaster Ln	1	B	1	**75**	66	**9**	Impact/Benefit
J-013	7620 Huntmaster Ln	1	B	1	56	51	**5**	No Impact/Benefit
J-014	7622 Huntmaster Ln	1	B	1	62	59	3	No Impact/No Benefit
J-015	7624 Huntmaster Ln	1	B	1	64	61	3	No Impact/No Benefit
J-016	7626 Huntmaster Ln	1	B	1	64	61	3	No Impact/No Benefit
J-017	7628 Huntmaster Ln	1	B	1	64	61	3	No Impact/No Benefit
J-018	7634 Huntmaster Ln	1	B	1	64	60	4	No Impact/No Benefit
J-019	1200 S Huntress Ct	1	B	1	65	59	**6**	No Impact/Benefit
J-020	1201 S Huntress Ct	1	B	1	63	59	4	No Impact/No Benefit
J-021	1203 Huntmaster Ct	1	B	1	62	59	3	No Impact/No Benefit
J-022	1205 Huntmaster Ct	1	B	1	61	58	4	No Impact/No Benefit
J-023	1202 S Huntress Ct	1	B	1	64	58	**6**	No Impact/Benefit
J-024	1203 S Huntress Ct	1	B	1	63	58	**5**	No Impact/Benefit
J-025	1201 Huntmaster Ct	1	B	1	63	59	4	No Impact/No Benefit

Notes:
1.) All receptors are located in McLean, VA.
2.) Rounding of decibels may make some subtractions appear incorrect.
3.) For locations where multiple receptors were analyzed, the receptor with the loudest "No Barrier" noise levels were used when determining feasibility and reasonableness.

Source: HMMH, 2022.

4.5 Modified Replacement of Noise Barrier 13D

Noise Barrier 13D is an existing barrier located on the northbound side of I-495 between Lewinsville Road and Old Dominion Drive and is shown in Figure 4, Sheets 5 to 7. The existing barrier currently provides noise abatement to receptors located within CNE K and CNE S. Due to the proposed widening

of I-495, this barrier would be physically impacted by the Project and would therefore require the full length of the barrier to be replaced in kind.

Further analysis for Noise Barrier 13D is being conducted at this time. Results of the analysis will be provided within an addendum to this report.

4.6 Modified Partial Replacement of Noise Barrier 13E

Noise Barrier 13E is an existing noise barrier located on the northbound side of I-495 between Old Dominion Drive and Georgetown Pike (Route 193), as shown in Figure 4 on Sheets 3, 4, and 5. The southern section of Noise Barrier 13E will be physically impacted by the 495 NEXT project and will be replaced in kind. The northern section of Noise Barrier 13E, approximately the northern 1,576 feet, will remain in place without modification.

Further analysis for Noise Barrier 13E is being conducted at this time. Results of the analysis will be provided within an addendum to this report.

4.7 Partial Replacement of Noise Barrier 12A2

Noise Barrier 12A2 is an existing noise barrier that begins along the northbound side of I-495, approximately 370 feet south of Scotts Crossing Road and extends north along the off-ramp from I-267 eastbound to I-495 northbound, and ends about 220 feet south of I-267 and is shown in Figure 4 on Sheets 8 and 9. Proposed improvements at the Dulles Toll Road (DTR) interchange will physically impact the northern portion of Noise Barrier 12A2. As seen in Figure 5 within Appendix B, a new ramp carrying traffic from DTR eastbound local lanes to 495 northbound express lanes will impact approximately 170 feet of Noise Barrier 12A2, between Station 23+82 and Station 25+82.

Further analysis for Noise Barrier 12A2 is being conducted at this time. Results of the analysis will be provided within an addendum to this report.

5 Summary of Final Designs for Potential Noise Barriers

Figure 4 (in Sheets 1 to 10) shows the locations of each of the barriers evaluated in this study. Table 11 presents a summary of the acoustical design details for each potential noise barrier in a new location, including the identifier, the number of benefited receptors, length, height range, average height, surface area, total cost, surface area per benefited receptor, and whether the barrier was found to be cost-reasonable. Based on the outcome of this final design study, one new noise barrier was found to be feasible and reasonable.

The following subsections provide narratives and tables of calculated noise levels and impact/benefit status by receptor that support the feasibility and reasonableness determinations for potential noise barriers evaluated to mitigate noise impact in areas not behind an existing noise barrier.

Appendix A provides a table that lists the computed sound levels at all of the receptors shown in Figure 4. The physical characteristics of the noise barriers needed for design, including the coordinates, estimated ground elevation, and top-of-wall elevation by barrier segment endpoint are provided in tabular format in Appendix B "Barrier Profiles – Sound Attenuation Lines."

The designs of the noise barriers described in the following subsections have been optimized following VDOT guidance, which states that the 1,600 square feet per benefited receptor figure is not a design goal or an allocation. Section 9.1 of the VDOT Guidance Manual offers the following perspective on noise barrier optimization (emphasis added):

> "*Similar to other environmental mitigation features, the goal to noise abatement is to achieve 100% effectiveness, i.e., provide benefits to every impacted noise sensitive receptor. However, it is not always possible to benefit every impacted receptor for various reasons. Therefore, when optimizing the proposed noise barrier, the three-tier set of abatement goals should be evaluated, when practical, in terms of establishing noise reductions for benefited receptors only within their areas of frequent outdoor activity to maximize the design year acoustical environment. The relationship between noise barrier cost and noise barrier performance is non-linear. This means that noise benefits typically increase with increased barrier height and/or length; however, at some point, further increases in barrier height and/or length result in smaller and smaller increases in benefit until a point of diminishing returns is reached. A point can be identified where a potential noise barrier provides the best balance between cost and benefit. Final design noise barriers should seek to maximize benefits while minimizing cost, given the need to achieve predetermined design goals and maintain noise barrier feasibility and reasonableness.*"

Table 11 Summary of Noise Barrier Characteristics

Barrier ID	Noise Reduction (dBA)		Noise Barrier Dimensions and Cost				Impacted Units	Impacted and Benefited Units	Non-Impacted and Benefited Units	Total Benefited Units	Surface Area per Benefited Receptor (SF/BR)	Barrier Status**
	Range	Avg.	Length (feet)	Range of Heights (feet)	Surface Area (sq ft)	Estimated Cost* at $42/sq ft						
C	5 to 15	11	984	13 to 18	14,090	$591,780	10	8	1	9	1,566	F & R
G	5 to 7	6	1,165	30	34,983	$1,469,286	3	3	1	4	8,746	F & NR
O West	5 to 7	6	899	24	21,579	$906,318	9	9	5	14	1,541	F & R
O East	5 to 7	6	615	22	13,530	$568,260	1	1	3	4	3,383	F & NR

Notes:
* The estimated cost is based on a unit cost of $42 per square foot. While cost does not factor into the reasonableness determination, it is presented for planning and/or informational purposes. The unit cost of $42 per square foot is based on a statewide average of historical cost data. Actual construction costs may vary. Refer to VDOT memorandum dated February 23, 2017, with subject "Average Noise Barrier Material and Installation Costs." This memorandum is available at the following web page hosted by VDOT (accessed on May 7, 2020): http://virginiadot.org/projects/resources/noisewalls/Statewide_average_barrier_cost_.pdf
** "F & R" = Feasible and Reasonable; "F & NR" = Feasible and Not Reasonable.
Source: HMMH, 2022

5.1 Noise Barrier C

Per Section 3.3.7.C in "Part 2 – Technical Requirements" (rev. 4 – 6-Apr-21) of the Request for Proposal, potential Noise Barriers C and 10 identified in the NEXT Environmental Assessment Noise Technical Report (February 2020) were to be evaluated as one continuous noise barrier to minimize the effects of flanking due to the presence of noise-sensitive sites located between the two noise barriers. In the event one continuous noise barrier is not found to be feasible and reasonable, the noise barriers are to be evaluated separately. Given the extent of predicted noise impact in CNE C and CNE E, noise abatement measures would not be warranted along the west side of the I-495/GWMP Interchange, as indicated by the receptor status shown on Sheets 1 and 2 in Figure 4. In order to meet the Technical Requirements and fill in the barrier gap between Barrier C and 10, a separate barrier analysis was performed and is included in Appendix K.

Since one continuous noise barrier between CNE C and E would not be warranted, the in-kind replacement of Noise Barrier 10 and potential Noise Barrier C were evaluated as separate stand-alone noise barriers. The in-kind replacement of Noise Barrier 10 is discussed in Section 4.2; while the feasibility and reasonableness determination for potential Noise Barrier C is presented below.

Potential Noise Barrier C was evaluated as a means to mitigate noise impacts along the Potomac Heritage Trail in the northern end of CNE C. As shown in the table below and on Sheets 1 and 2 in Figure 4, 10 recreational receptors would be exposed to noise impact with the 495 NEXT project in the design year. Potential Noise Barrier C would range in height from 13 to 18 feet (average height of 14 feet) and have a length of 984 feet, for a surface area of 14,090 square feet. Potential Noise Barrier C would benefit eight out of the 10 impacted recreational receptors associated with the Potomac Heritage Trail, and so would meet VDOT's acoustical feasibility goal. Noise Barrier C also would benefit one non-impacted residence, while providing 7 dBA, or more, of noise reduction to seven of the impacted receptors, thereby also meeting VDOT's noise reduction design goal. With a surface area per benefited receptor of 1,566 SF/BR, Noise Barrier C meets VDOT's cost-effectiveness criterion of 1,600 SF/BR. Therefore, Noise Barrier C would be considered reasonable, pending the outcome of a survey to benefited entities. It should be noted that no design options that would benefit Receptors C-001 and C-002 were found to be feasible and reasonable due to the cost-effectiveness criteria.

Noise Barrier C is shown on Sheet 1 and 2 in Figure 4. Table 15 provides the predicted 2045 noise levels with and without a noise barrier, along with the predicted insertion loss and the benefit/impact status for receptors behind Noise Barrier C. Appendix A provides the predicted noise levels for the 2018 Existing conditions and the 2045 Design Year with the Project for all the receptors in CNE C. The Warranted/Feasibility/Reasonableness worksheet for Noise Barrier C is in Appendix G.

In addition to the analysis of proposed Barrier C, a new noise barrier between Barrier C and Barrier 10/10 Extension was also evaluated to reduce noise levels at receptors located within this area. Appendix J describes a recommendation for the gap between Noise Barrier C and the modified replacement of Noise Barrier 10/10 Extension to the west of the GWMP interchange.

Table 12 Predicted Traffic Noise Levels for Noise Barrier C

Rec. ID	Address/ Location[1]	No. of Units	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
C-001	Potomac Heritage Trail	1	C	1	**66**	66	0	Impact/No Benefit
C-002	Potomac Heritage Trail	1	C	1	**66**	64	2	Impact/No Benefit
C-003	Potomac Heritage Trail	1	C	1	**67**	63	**5**	Impact/Benefit
C-004	Potomac Heritage Trail	1	C	1	**73**	60	**13**	Impact/Benefit
C-005	Potomac Heritage Trail	1	C	1	**74**	60	**14**	Impact/Benefit
C-006	Potomac Heritage Trail	1	C	1	**71**	59	**12**	Impact/Benefit
C-007	Potomac Heritage Trail	1	C	1	**71**	58	**14**	Impact/Benefit
C-008	Potomac Heritage Trail	1	C	1	**71**	56	**15**	Impact/Benefit
C-009	Potomac Heritage Trail	1	C	1	**68**	59	**10**	Impact/Benefit
C-010	Potomac Heritage Trail	1	C	1	**67**	59	**8**	Impact/Benefit
C-011	Potomac Heritage Trail	1	C	1	65	61	4	Impact/No Benefit
C-012	Potomac Heritage Trail	1	C	1	65	65	0	No Impact/No Benefit
C-013	Potomac Heritage Trail	1	C	1	63	64	0	No Impact/No Benefit
C-014	Potomac Heritage Trail	1	C	1	59	59	0	No Impact/No Benefit
C-015	Potomac Heritage Trail	1	C	1	58	58	0	No Impact/No Benefit
C-016	Potomac Heritage Trail	1	C	1	57	57	0	No Impact/No Benefit
C-017	Potomac Heritage Trail	1	C	1	58	58	0	No Impact/No Benefit
C-018	Potomac Heritage Trail	1	C	1	59	59	0	No Impact/No Benefit
C-019	Potomac Heritage Trail	1	C	1	61	61	0	No Impact/No Benefit
C-023	640 Live Oak Dr	1	B	1	61	59	3	No Impact/No Benefit
C-024	640 Rivercrest Dr	1	B	1	54	54	0	No Impact/No Benefit
C-025	636 Rivercrest Dr	1	B	1	51	49	2	No Impact/No Benefit
C-026	632 Rivercrest Dr	1	B	1	50	49	0	No Impact/No Benefit
C-027	628 Rivercrest Dr	1	B	1	50	50	0	No Impact/No Benefit
C-028	624 Rivercrest Dr	1	B	1	54	54	0	No Impact/No Benefit
C-029	620 Rivercrest Dr	1	B	1	54	54	0	No Impact/No Benefit
C-030	644 Live Oak Dr	1	B	1	61	59	2	No Impact/No Benefit

Rec. ID	Address/ Location[1]	No. of Units	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
C-031	648 Live Oak Dr	1	B	1	52	55	0	No Impact/No Benefit
C-032	650 Live Oak Dr	1	B	1	62	58	**5**	No Impact/Benefit
C-033	7004 Green Oak Dr	1	B	1	49	49	0	No Impact/No Benefit
C-034	7008 Green Oak Dr	1	B	1	49	49	0	No Impact/No Benefit
C-035	7012 Green Oak Dr	1	B	1	48	49	0	No Impact/No Benefit
C-036	7016 Green Oak Dr	1	B	1	50	50	0	No Impact/No Benefit
C-037	7001 Green Oak Dr	1	B	1	61	57	4	No Impact/No Benefit
C-038	7009 Green Oak Dr	1	B	1	59	57	2	No Impact/No Benefit
C-039	7015 Green Oak Dr	1	B	1	59	59	1	No Impact/No Benefit
C-040	7017 Green Oak Dr	1	B	1	58	58	0	No Impact/No Benefit
C-041	654 Live Oak Dr	1	B	1	59	60	0	No Impact/No Benefit
C-042	7018 Green Oak Dr	1	B	1	57	56	0	No Impact/No Benefit
C-043	7022 Green Oak Dr	1	B	1	55	55	0	No Impact/No Benefit
C-044	7024 Green Oak Dr	1	B	1	56	59	3	No Impact/No Benefit
C-045	7035 Green Oak Dr	1	B	1	54	54	0	No Impact/No Benefit

Notes:
1.) All receptors are located in McLean, VA.
2.) Rounding of decibels may make some subtractions appear incorrect
Source: HMMH, 2022.

5.2 Noise Barrier G

Noise Barrier G would be located along the southbound side of I-495 just north of Georgetown Pike. The noise barrier would begin at Linganore Drive, following the edge of pavement of Georgetown Pike westbound and continue approximately 1,200 feet along the I-495 southbound C-D road. This noise barrier was evaluated to mitigate noise impact at three residential receptors along Linganore Drive. At a height of 30 feet and a length of 1,165 feet, the barrier would have a surface area of 34,983 square feet. Noise Barrier G would provide 7 dBA of noise reduction at all three impacted receptors – meeting both the acoustical feasibility and noise reduction goals. However, with a SF/BR value of 8,746, the noise barrier is not reasonable and is therefore not recommended for construction.

Noise Barrier G is shown on Sheet 3 in Figure 4. Table 13 provides the predicted 2045 noise levels with and without a noise barrier, along with the predicted insertion loss and the benefit/impact status for receptors behind Noise Barrier G. Appendix A provides the predicted noise levels for the 2018 Existing conditions and the 2045 Design Year with the Project for all the receptors in CNE G. The Warranted/Feasibility/Reasonableness worksheet for Noise Barrier G is in Appendix G.

Table 13 Predicted Traffic Noise Levels for Noise Barrier G

Rec. ID	Address/ Location[1]	No. of Units	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[2]	
G-001	889 Linganore Dr	1	B	1	61	59	1	No Impact/ No Benefit
G-002	891 Linganore Dr	1	B	1	61	59	2	No Impact/ No Benefit
G-003	893 Linganore Dr	1	B	1	64	59	**5**	No Impact/Benefit
G-004	895 Linganore Dr	1	B	1	**66**	60	**6**	Impact/Benefit
G-005	897 Linganore Dr	1	B	1	**67**	61	**7**	Impact/Benefit
G-006	899 Linganore Dr	1	B	1	**67**	60	**7**	Impact/Benefit
G-007	890 Linganore Dr	1	B	1	62	59	3	No Impact/ No Benefit
G-008	892 Linganore Dr	1	B	1	62	60	3	No Impact/ No Benefit
G-009	7300 Linganore Ct	1	B	1	61	59	1	No Impact/ No Benefit

Notes:
1.) All receptors are located in McLean, VA.
2.) Rounding of decibels may make some subtractions appear incorrect.

Source: HMMH, 2022.

5.3 Noise Barrier O West / Noise Barrier O East

Three separate, potential noise barriers were analyzed to mitigate 14 traffic noise impacts at receptors representing outdoor use at BASIS Independent McLean and Valo Park office complex and a trail at Valo Lake within CNE O. These noise barriers would be located along the eastbound side of the Dulles Access and Toll Road just west of the I-495 interchange.

The first noise barrier design would begin approximately 1,400 feet west of the center of the I-495/Dulles Access and Toll Road interchange and extend eastward with a length of 2,028 feet and a uniform height of 28 feet in an attempt to mitigate traffic noise impacts to all receptors within this area. The barrier would have a surface area of 52,728 square feet and would provide 5 to 7 dBA of noise reduction at all 14 of the impacted receptors (100%) – meeting both the acoustical feasibility and noise reduction design goals. The barrier also would benefit 12 non-impacted recreational receptors. However, with a SF/BR value of 2,028, this noise barrier would not be considered reasonable and is therefore not recommended for construction.

Due to the large distance between impacted receptors within CNE O, two, separate noise barriers were evaluated in attempt to partially mitigate traffic noise impacts. Noise Barrier O West was evaluated to mitigate traffic noise impact to a total of 13 impacted receptors representing outdoor use at the BASIS Independent school and Valo Lake rooftop recreational use. Note that this total number of impacted units includes receptors representing upper-level outdoor use that would be above the point of intersection of a 30-foot-tall noise barrier projected onto the façade of an adjacent building. However, only those receptors located below this point of intersection would be considered for the purpose of the feasibility and reasonableness determination. Therefore, a total of nine impacted receptors representing outdoor use at BASIS Independent McLean were considered for the barrier analysis. Noise Barrier O West would have a total length of 899 feet and would be 24 feet tall with a surface area of 21,579 square feet. Noise Barrier O West would provide noise reductions ranging from 5 to 7 dBA (5.8 dBA

average noise reduction) to benefited receptors. The noise barrier would provide at least 5 dBA of noise reduction to all nine impacted receptors below the point of intersection with a 30-foot-tall noise barrier projected onto the façade of the building, thereby meeting the acoustical feasibility goal of benefiting 50% of the impacted receptors. The barrier would also benefit five non-impacted receptors and also would meet the noise reduction design goal of providing at least 7 dBA of noise reduction to at least one impacted receptor. With a surface area per benefited receptor value of 1,541 SF/BR, Noise Barrier O West would meet VDOT's cost-effectiveness criterion, of 1,600 SF/BR, and so would be considered reasonable.

A second noise barrier was also analyzed in an effort to mitigate a single noise impact located in the eastern section of CNE O, along the trail at Valo Lake. Noise Barrier O East has a total length of 615 feet and would be 22 feet tall, with a total surface area of 13,530 square feet. The barrier would benefit the single impacted receptor and therefore would be considered feasible. The barrier would also provide benefit to three non-impacted receptors. Additionally, Noise Barrier O East would meet the noise reduction design goal of providing at least 7 dBA of noise reduction to one impacted receptor. However, the surface area per benefited receptor value equals 3,383 SF/BR, which exceeds VDOT's allowable value of 1,600 SF/BR. Therefore, a barrier in this location would not be considered reasonable.

Noise Barrier O West and Noise Barrier O East are shown on Sheet 10 in Figure 4. Table 17 provides the predicted 2045 noise levels with and without a noise barrier, along with the predicted insertion loss and the benefit/impact status for receptors behind the noise barriers. Appendix A provides the predicted noise levels for the 2018 Existing conditions and the 2045 Design Year with the Project for all the receptors in CNE G. The Warranted/Feasibility/Reasonableness worksheets for Noise Barrier O West and Noise Barrier O East is in Appendix G.

Table 14 Predicted Traffic Noise Levels for Noise Barrier O West & Noise Barrier East

Rec. ID[4]	Address/ Location[1]	No. of Units	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status[3]
					Without Barrier	With Barrier	Insertion Loss[2]	
O-001[3]	BASIS Independent McLean Outdoor Terrace, 8000 Jones Branch Rd	1	C	3	**73**	68	4	Impact
O-002	BASIS Independent McLean Outdoor Terrace, 8000 Jones Branch Rd	1	C	2	**72**	66	**6**	Impact/Benefit
O-003	BASIS Independent McLean Outdoor Terrace, 8000 Jones Branch Rd	1	C	2	**73**	67	**5**	Impact/Benefit
O-009	BASIS Independent McLean Recreation Area, 8000 Jones Branch Rd	1	C	1	**68**	62	**5**	Impact/Benefit
O-010	BASIS Independent McLean Recreation Area, 8000 Jones Branch Rd	1	C	1	64	58	**7**	No Impact/Benefit
O-011	BASIS Independent McLean Recreation Area, 8000 Jones Branch Rd	1	C	1	**72**	65	**7**	Impact/Benefit
O-012	BASIS Independent McLean Recreation Area, 8000 Jones Branch Rd	1	C	1	**68**	62	**6**	Impact/Benefit
O-013	BASIS Independent McLean Recreation Area, 8000 Jones Branch Rd	1	C	1	65	59	**6**	No Impact/Benefit

Rec. ID[4]	Address/ Location[1]	No. of Units	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status[3]
					Without Barrier	With Barrier	Insertion Loss[2]	
O-014	BASIS Independent McLean Recreation Area, 8000 Jones Branch Rd	1	C	1	**72**	64	**8**	Impact/Benefit
O-015	BASIS Independent McLean Recreation Area, 8000 Jones Branch Rd	1	C	1	**68**	62	**7**	Impact/Benefit
O-016	BASIS Independent McLean Recreation Area, 8000 Jones Branch Rd	1	C	1	65	59	**6**	No Impact/Benefit
O-017	BASIS Independent McLean Recreation Area, 8000 Jones Branch Rd	1	C	1	**68**	60	**7**	Impact/Benefit
O-018	BASIS Independent McLean Recreation Area, 8000 Jones Branch Rd	1	C	1	64	57	**7**	No Impact/Benefit
O-019[3]	BASIS Independent McLean Outdoor Terrace, 8000 Jones Branch Rd	1	C	3	**74**	69	4	Impact
O-020	BASIS Independent McLean Recreation Area, 7950 Jones Branch Rd	1	C	1	**69**	61	**8**	Impact/Benefit
O-021	BASIS Independent McLean Recreation Area, 7950 Jones Branch Rd	1	C	1	62	56	**6**	No Impact/Benefit
O-022[3]	Valo Lake Rooftop Basketball/Tennis Courts, 7950 Jones Branch Rd	1	C	2	**68**	65	3	Impact
O-023[3]	Valo Lake Rooftop Basketball/Tennis Courts, 7950 Jones Branch Rd	1	C	2	65	61	4	No Impact
O-024[3]	Valo Lake Rooftop Basketball/Tennis Courts, 7950 Jones Branch Rd	1	C	2	63	60	4	No Impact
O-025[3]	Valo Lake Rooftop Basketball/Tennis Courts, 7950 Jones Branch Rd	1	C	2	**68**	67	1	No Impact
O-026[3]	Valo Lake Rooftop Basketball/Tennis Courts, 7950 Jones Branch Rd	1	C	4	63	61	2	No Impact
O-027[3]	Valo Lake Rooftop Basketball/Tennis Courts, 7950 Jones Branch Rd	1	C	4	65	64	1	No Impact
O-029[3]	Valo Park Terrace, 7950 Jones Branch Rd	1	C	1	65	65	0	No Impact
O-033	Valo Park Outdoor Terrace, 7950 Jones Branch Rd	1	E	9	65	65	0	No Impact/No Benefit
O-034	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	56	55	1	No Impact/No Benefit
O-035	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	55	54	1	No Impact/No Benefit
O-036	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	56	54	1	No Impact/No Benefit
O-037	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	56	55	2	No Impact/No Benefit

Rec. ID[4]	Address/ Location[1]	No. of Units	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status[3]
					Without Barrier	With Barrier	Insertion Loss[2]	
O-039	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	56	55	1	No Impact/No Benefit
O-040	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	58	55	3	No Impact/No Benefit
O-041	Valo Park Outdoor Terrace, 7950 Jones Branch Rd	1	E	1	67	60	**7**	No Impact/Benefit
O-042	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	59	56	3	No Impact/No Benefit
O-043	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	58	56	2	No Impact/No Benefit
O-044	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	64	57	**7**	No Impact/Benefit
O-045	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	57	56	1	No Impact/No Benefit
O-046	Valo Lake Jogging Path, 7940 Jones Branch Rd	1	C	1	**66**	59	**7**	Impact/Benefit
O-047	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	57	56	1	No Impact/No Benefit
O-048	Valo Lake Jogging Path, 7940 Jones Branch Rd	1	C	1	56	55	1	No Impact/No Benefit
O-049	Valo Lake Jogging Path, 7940 Jones Branch Rd	1	C	1	64	60	**5**	No Impact/ Benefit
O-050	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	57	56	1	No Impact/No Benefit
O-051	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	57	56	1	No Impact/No Benefit
O-052	Valo Lake Jogging Path, 7940 Jones Branch Rd	1	C	1	63	61	2	No Impact/No Benefit
O-053	Valo Lake Jogging Path, 7940 Jones Branch Rd	1	C	1	61	59	2	No Impact/No Benefit
O-054	Valo Lake Jogging Path, 7940 Jones Branch Rd	1	C	1	61	60	1	No Impact/No Benefit
O-055	Valo Lake Jogging Path, 7940 Jones Branch Rd	1	C	1	63	62	1	No Impact/No Benefit
O-056	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	58	58	0	No Impact/No Benefit
O-057	Valo Lake Jogging Path, 7940 Jones Branch Rd	1	C	1	62	62	1	No Impact/No Benefit
O-058	Valo Lake Jogging Path, 7940 Jones Branch Rd	1	C	1	61	61	0	No Impact/No Benefit
O-059	Valo Lake Jogging Path, 7950 Jones Branch Rd	1	C	1	60	59	0	No Impact/No Benefit
P-001	Scott's Run Nature Preserve Trail, 7950 Jones Branch Rd	1	C	1	57	57	0	No Impact/No Benefit
P-002	Scott's Run Nature Preserve Trail, 7940 Jones Branch Rd	1	C	1	56	55	1	No Impact/No Benefit
P-004	Scott's Run Nature Preserve Trail, 7940 Jones Branch Rd	1	C	1	54	54	1	No Impact/No Benefit
P-005	Scott's Run Nature Preserve Trail, 7940 Jones Branch Rd	1	C	1	54	54	0	No Impact/No Benefit

Rec. ID[4]	Address/ Location[1]	No. of Units	FHWA NAC	Floor	2045 Noise Levels, dBA L_{eq}			Benefit/ Impact Status[3]
					Without Barrier	With Barrier	Insertion Loss[2]	
P-007	Hilton Corporate Outdoor Courtyard, 7930 Jones Branch Rd	1	E	1	44	44	0	No Impact/No Benefit
P-009	Hilton Corporate Outdoor Courtyard, 7930 Jones Branch Rd	1	E	1	50	50	0	No Impact/No Benefit
P-010	Hilton Corporate Outdoor Courtyard, 7930 Jones Branch Rd	1	E	1	49	49	0	No Impact/No Benefit

Notes:
1.) All receptors are located in McLean, VA.
2.) Rounding of decibels may make some subtractions appear incorrect
3.) Upper floor units included in the impact assessment but excluded from the feasibility and reasonableness determination if they would be above the point of intersection of a 30-foot-tall noise barrier projected onto the façade of the building. These receptors are labeled with an "Impact" status and without a "Benefit" status.
4.) Receivers O-001 through O-029 are considered behind Noise Barrier West. Receivers O-033 through P-010 are considered behind Noise Barrier O East.
Source: HMMH, 2022.

6 Public Involvement Process

As needed, the community outreach and voting process will follow the procedures in VDOT's Guidance Manual (Version 8). As described in Section 2.3.2 of the Guidance Manual, the views of the benefited receptors represent the third element needed to determine the reasonableness of a potential noise barrier. The preferences of the potentially benefited property owners and residents will be surveyed through a mailing process, as necessary. A majority of the benefited receptors must favor the barrier for it to be considered reasonable to construct. Details of the public preference survey are included within Appendix H.

6.1 Public Preference Surveys

As necessary, this section will be completed at the conclusion of the public preference survey.

6.2 Survey Responses

As necessary, this section will be completed at the conclusion of the public preference survey.

Table 15 Summary of Noise Barrier Survey Letters Sent and Responses Received

Noise Barrier	# of Surveys Sent		# of Survey Responses		Undeliverable or Unclaimed-ed Surveys	# of Weighted Votes Cast		Percent of Weighted Votes Cast		Percent of Votes Outstanding
	1st Round	2nd Round	"Yes"	"No"		"Yes"	"No"	"Yes"	"No"	
C	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Notes:
1.) The tallied votes are for ballots received through TBD.

Source: HMMH, 2022.

7 Construction Noise

Construction noise provisions are contained in Section 107.16(b)3 Noise of the 2020 VDOT Road and Bridge Specifications. The specifications have been reproduced below:

- The Contractor's operations shall be performed so that exterior noise levels measured during a noise-sensitive activity shall not exceed 80 decibels. Such noise level measurements shall be taken at a point on the perimeter of the construction limit that is closest to the adjoining property on which a noise-sensitive activity is occurring. A noise-sensitive activity is any activity for which lowered noise levels are essential if the activity is to serve its intended purpose and not present an unreasonable public nuisance. Such activities include, but are not limited to, those associated with residences, hospitals, nursing homes, churches, schools, libraries, parks, and recreational areas.
- The Department may monitor construction-related noise. If construction noise levels exceed 80 decibels during noise sensitive activities, the Contractor shall take corrective action before proceeding with operations. The Contractor shall be responsible for costs associated with the abatement of construction noise and the delay of operations attributable to noncompliance with these requirements.
- The Department may prohibit or restrict to certain portions of the project any work that produces objectionable noise between 10 P.M. and 6 A.M. If other hours are established by local ordinance, the local ordinance shall govern.
- Equipment shall in no way be altered so as to result in noise levels that are greater than those produced by the original equipment.
- When feasible, the Contractor shall establish haul routes that direct his vehicles away from developed areas and ensure that noise from hauling operations is kept to a minimum.
- These requirements shall not be applicable if the noise produced by sources other than the Contractor's operation at the point of reception is greater than the noise from the Contractor's operation at the same point.

Appendix A Table of Computed Traffic Noise Levels

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
AA-001	7515 OLD DOMINION DR, Row 1 Flr. 1	Yes	1	B	Res.	63	65	71	63	**8**
AA-002	7513 OLD DOMINION DR, Row 1 Flr. 1	Yes	1	B	Res.	63	**66**	72	64	**8**
AA-002-deck	7513 OLD DOMINION DR, Row 1 Flr. 1	Yes	1	B	Res.	63	**67**	73	64	**9**
AA-003	7517 OLD DOMINION DR, Row 2 Flr. 1	Yes	1	B	Res.	62	**66**	69	64	**5**
AA-004	7519 OLD DOMINION DR, Row 2 Flr. 1	Yes	1	B	Res.	62	**67**	70	64	**6**
AA-005	1116 DOMINION CT, Row 1 Flr. 1	Yes	1	B	Res.	59	64	70	61	**9**
AA-006	1200 DOMINION CT, Row 1 Flr. 1	Yes	1	B	Res.	64	**69**	74	66	**8**
AA-007	7525 OLD DOMINION DR, Row 3 Flr. 1	Yes	1	B	Res.	61	62	65	61	4
AA-007-deck	7525 OLD DOMINION DR, Row 3 Flr. 1	Yes	1	B	Res.	62	64	67	62	**5**
AA-008	7521 OLD DOMINION DR, Row 2 Flr. 1	Yes	1	B	Res.	57	62	66	61	**5**
AA-009	1124 DOMINION CT, Row 1 Flr. 1	Yes	1	B	Res.	62	**67**	71	65	**7**
AA-010	7529 OLD DOMINION DR, Row 4 Flr. 1	Yes	1	B	Res.	56	61	64	59	4
AA-010-deck	7529 OLD DOMINION DR, Row 4 Flr. 1	Yes	1	B	Res.	58	61	65	60	**5**
AA-011	7527 OLD DOMINION DR, Row 3 Flr. 1	Yes	1	B	Res.	59	64	66	61	**5**
AA-012	7523 OLD DOMINION DR, Row 3 Flr. 1	Yes	1	B	Res.	59	64	67	62	**6**
AA-013	1151 DOMINION CT, Row 1 Flr. 1	Yes	1	B	Res.	58	61	69	58	**11**
AA-014	1150 DOMINION CT, Row 1 Flr. 1	Yes	1	B	Res.	60	63	NA	61	**12**
AB-001	930 DEAD RUN DR, Row 2 Flr. 1	Yes	1	B	Res.	56	57	NA	NA	NA
AB-002	932 DEAD RUN DR, Row 2 Flr. 1	Yes	1	B	Res.	54	56	NA	NA	NA
AB-003	934 DEAD RUN DR, Row 2 Flr. 1	Yes	1	B	Res.	52	55	NA	NA	NA
AB-004	936 DEAD RUN DR, Row 2 Flr. 1	Yes	1	B	Res.	51	54	NA	NA	NA
AB-005	938 DEAD RUN DR, Row 2 Flr. 1	Yes	1	B	Res.	49	53	NA	NA	NA
AB-006	940 DEAD RUN DR, Row 2 Flr. 1	Yes	1	B	Res.	45	49	NA	NA	NA
AB-007	931 DEAD RUN DR, Row 3 Flr. 1	Yes	1	B	Res.	55	51	NA	NA	NA
AB-008	935 DEAD RUN DR, Row 3 Flr. 1	Yes	1	B	Res.	52	51	NA	NA	NA
AB-009	937 DEAD RUN DR, Row 3 Flr. 1	Yes	1	B	Res.	51	51	NA	NA	NA
AB-010	939 DEAD RUN DR, Row 3 Flr. 1	Yes	1	B	Res.	50	50	NA	NA	NA
AB-011	941 DEAD RUN DR, Row 3 Flr. 1	Yes	1	B	Res.	48	49	NA	NA	NA
C-001	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	73	**66**	NA	66	0
C-002	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	74	**66**	NA	64	2
C-003	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	74	**67**	NA	63	**5**
C-004	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	73	**73**	NA	60	**13**
C-005	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	72	**74**	NA	60	**14**
C-006	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	70	**71**	NA	59	**12**
C-007	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	67	**71**	NA	58	**14**
C-008	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	67	**71**	NA	56	**15**
C-009	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	66	**68**	NA	59	**10**
C-010	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	65	**67**	NA	59	**8**
C-011	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	63	65	NA	61	4
C-012	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	63	65	NA	65	0
C-013	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	62	63	NA	64	-1
C-014	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	59	59	NA	59	0
C-015	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	58	58	NA	58	0
C-016	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	58	57	NA	57	0
C-017	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	59	58	NA	58	0
C-018	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	59	59	NA	59	0
C-019	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	60	61	NA	61	0
C-020	Potomac Heritage Trail, Row 1 Flr. 1	No	1	C	Rec.	60	62	NA	62	0
C-021	Potomac Heritage Trail, Row 1 Flr. 1	Yes	1	C	Rec.	61	62	65	62	3
C-022	Potomac Heritage Trail, Row 1 Flr. 1	Yes	1	C	Rec.	59	61	67	61	**6**

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
C-023	640 LIVE OAK DR, Row 1 Flr. 1	No	1	B	Res.	56	61	NA	59	3
C-024	640 RIVERCREST DR, Row 2 Flr. 1	No	1	B	Res.	47	54	NA	54	0
C-025	636 RIVERCREST DR, Row 2 Flr. 1	No	1	B	Res.	44	51	NA	49	2
C-026	632 RIVERCREST DR, Row 3 Flr. 1	No	1	B	Res.	42	50	NA	49	0
C-027	628 RIVERCREST DR, Row 3 Flr. 1	No	1	B	Res.	44	50	NA	50	0
C-028	624 RIVERCREST DR, Row 4 Flr. 1	No	1	B	Res.	49	54	NA	54	0
C-029	620 RIVERCREST DR, Row 4 Flr. 1	No	1	B	Res.	51	54	NA	54	0
C-030	644 LIVE OAK DR, Row 1 Flr. 1	No	1	B	Res.	57	61	NA	59	2
C-031	648 LIVE OAK DR, Row 1 Flr. 1	No	1	B	Res.	46	52	NA	55	0
C-032	650 LIVE OAK DR, Row 1 Flr. 1	No	1	B	Res.	56	62	NA	58	**5**
C-033	7004 GREEN OAK DR, Row 2 Flr. 1	No	1	B	Res.	45	49	NA	49	0
C-034	7008 GREEN OAK DR, Row 3 Flr. 1	No	1	B	Res.	45	49	NA	49	0
C-035	7012 GREEN OAK DR, Row 3 Flr. 1	No	1	B	Res.	44	48	NA	49	0
C-036	7016 GREEN OAK DR, Row 4 Flr. 1	No	1	B	Res.	46	50	NA	50	0
C-037	7001 GREEN OAK DR, Row 1 Flr. 1	No	1	B	Res.	58	61	NA	57	4
C-038	7009 GREEN OAK DR, Row 2 Flr. 1	No	1	B	Res.	57	59	NA	57	2
C-039	7015 GREEN OAK DR, Row 2 Flr. 1	No	1	B	Res.	57	59	NA	59	1
C-040	7017 GREEN OAK DR, Row 2 Flr. 1	No	1	B	Res.	56	58	NA	58	0
C-041	654 LIVE OAK DR, Row 1 Flr. 1	No	1	B	Res.	58	59	NA	60	0
C-042	7018 GREEN OAK DR, Row 4 Flr. 1	No	1	B	Res.	53	57	NA	56	0
C-043	7022 GREEN OAK DR, Row 5 Flr. 1	No	1	B	Res.	49	55	NA	55	0
C-044	7024 GREEN OAK DR, Row 5 Flr. 1	No	1	B	Res.	49	56	NA	56	0
C-045	7035 GREEN OAK DR, Row 5 Flr. 1	No	1	B	Res.	48	54	NA	54	0
C-046	658 LIVE OAK DR, Row 4 Flr. 1	No	1	B	Res.	50	55	NA	55	0
C-047	662 LIVE OAK DR, Row 3 Flr. 1	No	1	B	Res.	54	56	NA	56	0
C-048	666 LIVE OAK DR, Row 3 Flr. 1	No	1	B	Res.	53	55	NA	55	0
C-049	668 LIVE OAK DR, Row 3 Flr. 1	No	1	B	Res.	59	59	NA	59	0
C-050	672 LIVE OAK DR, Row 3 Flr. 1	No	1	B	Res.	59	59	NA	59	0
C-051	670 LIVE OAK DR, Row 3 Flr. 1	No	1	B	Res.	62	64	NA	64	0
C-052	664 LIVE OAK DR, Row 2 Flr. 1	No	1	B	Res.	55	56	NA	56	0
C-053	702 LIVE OAK DR, Row 2 Flr. 1	No	1	B	Res.	61	60	NA	60	0
C-054	704 LIVE OAK DR, Row 1 Flr. 1	No	1	B	Res.	63	62	NA	62	0
C-055	710 LIVE OAK DR, Row 1 Flr. 1	Yes	1	B	Res.	65	64	67	62	**5**
C-056	708 LIVE OAK DR, Row 2 Flr. 1	No	1	B	Res.	54	60	NA	60	0
C-057	700 LIVE OAK DR, Row 2 Flr. 1	No	1	B	Res.	53	59	NA	59	0
D-001	6701 WEMBERLY WAY, Row 1 Flr. 1	No	1	B	Res.	46	51	NA	NA	NA
D-002	6700 WEMBERLY WAY, Row 1 Flr. 1	No	1	B	Res.	53	58	NA	NA	NA
D-003	6706 LUPINE LN, Row 1 Flr. 1	No	1	B	Res.	53	58	NA	NA	NA
D-004	6708 LUPINE LN, Row 1 Flr. 1	No	1	B	Res.	50	54	NA	NA	NA
D-005	6800 LUPINE LN, Row 1 Flr. 1	No	1	B	Res.	56	57	NA	NA	NA
D-006	6802 LUPINE LN, Row 1 Flr. 1	No	1	B	Res.	59	61	NA	NA	NA
D-007	6804 LUPINE LN, Row 1 Flr. 1	No	1	B	Res.	61	64	NA	NA	NA
D-008	6806 LUPINE LN, Row 1 Flr. 1	No	1	B	Res.	62	65	NA	NA	NA
D-009	6808 LUPINE LN, Row 1 Flr. 1	No	1	B	Res.	58	62	NA	NA	NA
D-010	6810 LUPINE LN, Row 1 Flr. 1	No	1	B	Res.	54	61	NA	NA	NA
D-011	6812 LUPINE LN, Row 1 Flr. 1	No	1	B	Res.	55	63	NA	NA	NA
D-012	6900 LUPINE LN, Row 1 Flr. 1	No	1	B	Res.	54	61	NA	NA	NA
D-013	6902 LUPINE LN, Row 2 Flr. 1	No	1	B	Res.	54	61	NA	NA	NA
D-014	6904 LUPINE LN, Row 3 Flr. 1	No	1	B	Res.	52	58	NA	NA	NA
D-014-deck	6904 LUPINE LN, Row 3 Flr. 1	Yes	1	B	Res.	53	60	NA	NA	NA
D-015	6704 WEMBERLY WAY, Row 2 Flr. 1	No	1	B	Res.	50	53	NA	NA	NA

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
D-016	6704 LUPINE LN, Row 2 Flr. 1	No	1	B	Res.	47	52	NA	NA	NA
D-017	6707 LUPINE LN, Row 2 Flr. 1	No	1	B	Res.	49	52	NA	NA	NA
D-018	6709 LUPINE LN, Row 2 Flr. 1	No	1	B	Res.	50	54	NA	NA	NA
D-019	6801 LUPINE LN, Row 2 Flr. 1	No	1	B	Res.	52	57	NA	NA	NA
D-020	6803 LUPINE LN, Row 2 Flr. 1	No	1	B	Res.	48	53	NA	NA	NA
D-021	6805 LUPINE LN, Row 2 Flr. 1	No	1	B	Res.	45	51	NA	NA	NA
D-022	6807 LUPINE LN, Row 2 Flr. 1	No	1	B	Res.	50	56	NA	NA	NA
D-023	6809 LUPINE LN, Row 2 Flr. 1	No	1	B	Res.	52	59	NA	NA	NA
D-024	6811 LUPINE LN, Row 2 Flr. 1	No	1	B	Res.	54	61	NA	NA	NA
D-025	6901 LUPINE LN, Row 2 Flr. 1	No	1	B	Res.	53	60	NA	NA	NA
D-026	6903 LUPINE LN, Row 3 Flr. 1	No	1	B	Res.	51	58	NA	NA	NA
E-001	Potomac Heritage Trail, Row 1 Flr. 1	Yes	1	C	Rec.	57	59	67	58	**9**
E-002	Potomac Heritage Trail, Row 1 Flr. 1	Yes	1	C	Rec.	57	60	68	59	**9**
E-003	Potomac Heritage Trail, Row 1 Flr. 1	Yes	1	C	Rec.	60	62	70	61	**9**
E-004	Potomac Heritage Trail, Row 1 Flr. 1	Yes	1	C	Rec.	61	63	72	62	**10**
E-005	Potomac Heritage Trail, Row 1 Flr. 1	Yes	1	C	Rec.	62	63	74	61	**13**
E-006	Potomac Heritage Trail, Row 1 Flr. 1	Yes	1	C	Rec.	63	**66**	76	64	**13**
E-007	Potomac Heritage Trail, Row 1 Flr. 1	Yes	1	C	Rec.	65	**69**	77	65	**12**
E-008	Potomac Heritage Trail, Row 1 Flr. 1	Yes	1	C	Rec.	64	**68**	73	66	**7**
E-009	Potomac Heritage Trail, Row 2 Flr. 1	Yes	1	C	Rec.	62	**66**	69	64	**5**
E-010	Scott's Run Nature Preserve Trail, Row 2 Flr. 1	Yes	1	C	Rec.	59	63	65	62	4
E-011	Potomac Heritage Trail, Row 2 Flr. 1	Yes	1	C	Rec.	58	62	64	60	4
E-012	Potomac Heritage Trail, Row 3 Flr. 1	Yes	1	C	Rec.	59	62	64	61	4
E-013	Potomac Heritage Trail, Row 3 Flr. 1	Yes	1	C	Rec.	60	63	65	61	4
E-014	Potomac Heritage Trail, Row 4 Flr. 1	Yes	1	C	Rec.	60	63	64	60	4
E-015	Potomac Heritage Trail, Row 4 Flr. 1	Yes	1	C	Rec.	59	62	63	60	3
E-016	Potomac Heritage Trail, Row 4 Flr. 1	Yes	1	C	Rec.	59	62	64	60	3
E-017	Potomac Heritage Trail, Row 4 Flr. 1	Yes	1	C	Rec.	56	60	61	58	3
E-018	Potomac Heritage Trail, Row 3 Flr. 1	Yes	1	C	Rec.	54	59	60	57	3
E-019	Potomac Heritage Trail, Row 3 Flr. 1	Yes	1	C	Rec.	56	60	61	58	3
E-020	Potomac Heritage Trail, Row 3 Flr. 1	Yes	1	C	Rec.	59	63	64	60	4
E-021	Potomac Heritage Trail, Row 2 Flr. 1	Yes	1	C	Rec.	61	**66**	66	62	**5**
E-022	Oak Trail, Row 1 Flr. 1	Yes	1	C	Rec.	63	**67**	68	64	**5**
E-023	Oak Trail, Row 2 Flr. 1	Yes	1	C	Rec.	64	**68**	69	64	**5**
E-024	Oak Trail, Row 2 Flr. 1	Yes	1	C	Rec.	65	**69**	69	64	**5**
E-025	Oak Trail, Row 2 Flr. 1	Yes	1	C	Rec.	66	**69**	70	62	**8**
E-026	Oak Trail, Row 1 Flr. 1	Yes	1	C	Rec.	67	**71**	71	67	4
E-027	Oak Trail, Row 2 Flr. 1	Yes	1	C	Rec.	67	**70**	70	62	**9**
E-028	Oak Trail, Row 2 Flr. 1	Yes	1	C	Rec.	65	**68**	68	61	**7**
E-029	Oak Trail, Row 2 Flr. 1	Yes	1	C	Rec.	64	**66**	66	61	**5**
E-030	Oak Trail, Row 3 Flr. 1	Yes	1	C	Rec.	63	64	64	60	4
E-031	Oak Trail, Row 3 Flr. 1	Yes	1	C	Rec.	61	61	61	58	3
E-032	Oak Trail, Row 3 Flr. 1	Yes	1	C	Rec.	59	60	60	58	3
E-033	Oak Trail, Row 3 Flr. 1	Yes	1	C	Rec.	58	59	59	57	2
E-034	Oak Trail, Row 3 Flr. 1	Yes	1	C	Rec.	57	59	59	57	2
E-035	Laurel Ridge Trail, Row 3 Flr. 1	Yes	1	C	Rec.	58	59	59	57	2
E-036	Laurel Ridge Trail, Row 3 Flr. 1	Yes	1	C	Rec.	57	58	58	56	2
E-037	Laurel Ridge Trail, Row 4 Flr. 1	Yes	1	C	Rec.	55	57	57	55	2
E-038	Laurel Ridge Trail, Row 4 Flr. 1	Yes	1	C	Rec.	53	55	56	54	2
E-039	Laurel Ridge Trail, Row 4 Flr. 1	Yes	1	C	Rec.	52	55	55	54	1

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
E-040	Langley Swim & Tennis Club, 728 LIVE OAK DR, Row 1 Flr. 1	Yes	1	C	Rec.	62	66	69	65	**5**
E-041	Langley Swim & Tennis Club, 728 LIVE OAK DR, Row 1 Flr. 1	Yes	1	C	Rec.	59	63	64	62	3
E-042	Langley Swim & Tennis Club, 728 LIVE OAK DR, Row 1 Flr. 1	Yes	1	C	Rec.	59	63	65	62	3
E-043	Langley Swim & Tennis Club, 728 LIVE OAK DR, Row 3 Flr. 1	Yes	1	C	Rec.	57	61	62	59	3
E-044	Langley Swim & Tennis Club, 728 LIVE OAK DR, Row 3 Flr. 1	Yes	1	C	Rec.	58	62	63	60	3
E-045	712 LIVE OAK DR, Row 1 Flr. 1	Yes	1	B	Res.	62	66	73	64	**9**
E-046	714 LIVE OAK DR, Row 1 Flr. 1	Yes	1	B	Res.	58	61	65	60	**5**
E-047	720 LIVE OAK DR, Row 1 Flr. 1	Yes	1	B	Res.	60	64	68	62	**7**
F-001	6900 PORTOBELLO RD, Row 1 Flr. 1	Yes	1	B	Res.	55	59	68	59	**9**
F-001-deck	6900 PORTOBELLO RD, Row 1 Flr. 1	Yes	1	B	Res.	56	60	70	60	**10**
F-002	6911 PORTOBELLO RD, Row 1 Flr. 1	Yes	1	B	Res.	56	60	72	60	**12**
F-003	721 LAWTON ST, Row 1 Flr. 1	Yes	1	B	Res.	59	63	75	63	**12**
F-004	720 LAWTON ST, Row 1 Flr. 1	Yes	1	B	Res.	60	63	77	63	**13**
F-005	722 LAWTON ST, Row 1 Flr. 1	Yes	1	B	Res.	58	62	76	62	**13**
F-005-deck	722 LAWTON ST, Row 1 Flr. 1	Yes	1	B	Res.	60	64	77	64	**12**
F-006	6926 BUTTERNUT CT, Row 1 Flr. 1	Yes	1	B	Res.	59	62	76	62	**14**
F-007	6928 BUTTERNUT CT, Row 1 Flr. 1	Yes	1	B	Res.	60	63	76	63	**13**
F-007-deck	6928 BUTTERNUT CT, Row 1 Flr. 1	Yes	1	B	Res.	60	64	77	64	**13**
F-008	6927 BUTTERNUT CT, Row 2 Flr. 1	Yes	1	B	Res.	55	59	71	59	**13**
F-008-deck	6927 BUTTERNUT CT, Row 2 Flr. 1	Yes	1	B	Res.	56	60	72	60	**12**
F-009	723 LAWTON ST, Row 2 Flr. 1	Yes	1	B	Res.	57	62	70	62	**8**
F-010	725 LAWTON ST, Row 3 Flr. 1	Yes	1	B	Res.	56	62	69	62	**7**
F-011	729 LAWTON ST, Row 3 Flr. 1	Yes	1	B	Res.	55	61	67	61	**7**
F-012	6925 BUTTERNUT CT, Row 3 Flr. 1	Yes	1	B	Res.	53	57	66	57	**10**
F-013	726 LAWTON ST, Row 3 Flr. 1	Yes	1	B	Res.	53	58	65	58	**8**
F-014	730 LAWTON ST, Row 4 Flr. 1	Yes	1	B	Res.	50	54	63	54	**9**
F-014-deck	730 LAWTON ST, Row 4 Flr. 1	Yes	1	B	Res.	53	58	66	58	**8**
F-015	7002 RIVER OAKS DR, Row 4 Flr. 1	Yes	1	B	Res.	52	56	67	56	**11**
F-015-deck	7002 RIVER OAKS DR, Row 4 Flr. 1	Yes	1	B	Res.	52	57	67	57	**10**
F-016	7004 RIVER OAKS DR, Row 3 Flr. 1	Yes	1	B	Res.	52	55	66	55	**11**
F-016-deck-1	7004 RIVER OAKS DR, Row 3 Flr. 1	Yes	1	B	Res.	52	56	67	56	**11**
F-016-deck-2	7004 RIVER OAKS DR, Row 3 Flr. 1	Yes	1	B	Res.	53	57	70	57	**13**
F-016-deck-3	7004 RIVER OAKS DR, Row 3 Flr. 1	Yes	1	B	Res.	54	58	71	58	**13**
F-017	7006 RIVER OAKS DR, Row 2 Flr. 1	Yes	1	B	Res.	55	58	70	58	**11**
F-018	7007 RIVER OAKS DR, Row 2 Flr. 1	Yes	1	B	Res.	56	59	73	59	**13**
F-018-deck	7007 RIVER OAKS DR, Row 2 Flr. 1	Yes	1	B	Res.	55	59	73	59	**13**
F-019	7005 RIVER OAKS DR, Row 3 Flr. 1	Yes	1	B	Res.	51	54	65	54	**12**
F-020	7003 RIVER OAKS DR, Row 4 Flr. 1	Yes	1	B	Res.	51	54	65	54	**12**
F-021	7048 ARBOR LN, Row 1 Flr. 1	Yes	1	B	Res.	58	61	74	61	**13**
F-021-deck	7048 ARBOR LN, Row 1 Flr. 1	Yes	1	B	Res.	59	63	76	63	**13**
F-022	7040 ARBOR LN, Row 2 Flr. 1	Yes	1	B	Res.	56	58	70	58	**12**
F-022-deck	7040 ARBOR LN, Row 2 Flr. 1	Yes	1	B	Res.	55	59	71	59	**12**
F-023	7036 ARBOR LN, Row 3 Flr. 1	Yes	1	B	Res.	53	56	68	56	**11**
F-023-deck	7036 ARBOR LN, Row 3 Flr. 1	Yes	1	B	Res.	54	57	69	57	**11**
F-024	7032 ARBOR LN, Row 4 Flr. 1	Yes	1	B	Res.	52	56	66	56	**11**
F-024-deck	7032 ARBOR LN, Row 4 Flr. 1	Yes	1	B	Res.	54	57	68	57	**11**
F-025	7028 ARBOR LN, Row 4 Flr. 1	Yes	1	B	Res.	51	54	65	54	**11**
F-026	7024 ARBOR LN, Row 5 Flr. 1	Yes	1	B	Res.	51	55	65	55	**10**
F-027	7018 ARBOR LN, Row 5 Flr. 1	Yes	1	B	Res.	51	55	64	55	**8**
F-028	7012 ARBOR LN, Row 6 Flr. 1	Yes	1	B	Res.	48	52	60	52	**8**
F-028-deck	7012 ARBOR LN, Row 6 Flr. 1	Yes	1	B	Res.	49	53	63	53	**9**

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
F-029	7050 ARBOR LN, Row 1 Flr. 1	Yes	1	B	Res.	59	62	75	62	**13**
F-030	801 BALLS HILL RD, Row 2 Flr. 1	Yes	1	B	Res.	55	58	68	58	**10**
F-031	803 BALLS HILL RD, Row 2 Flr. 1	Yes	1	B	Res.	54	57	66	57	**8**
F-032	7029 ARBOR LN, Row 3 Flr. 1	Yes	1	B	Res.	55	57	67	57	**9**
F-032-deck	7029 ARBOR LN, Row 3 Flr. 1	Yes	1	B	Res.	56	59	69	59	**9**
F-033	7025 ARBOR LN, Row 3 Flr. 1	Yes	1	B	Res.	54	57	65	57	**8**
F-034	7021 ARBOR LN, Row 4 Flr. 1	Yes	1	B	Res.	53	56	64	56	**8**
F-035	7017 ARBOR LN, Row 5 Flr. 1	Yes	1	B	Res.	51	55	37	30	**7**
F-036	805 BALLS HILL RD, Row 1 Flr. 1	Yes	1	B	Res.	53	55	59	55	3
F-037	809 BALLS HILL RD, Row 1 Flr. 1	Yes	1	B	Res.	56	59	61	59	2
F-038	811 BALLS HILL RD, Row 1 Flr. 1	Yes	1	B	Res.	55	57	59	57	2
F-039	7112 BENJAMIN ST, Row 1 Flr. 1	Yes	1	B	Res.	55	57	60	57	3
F-039-deck	7112 BENJAMIN ST, Row 1 Flr. 1	Yes	1	B	Res.	57	59	68	59	**9**
F-040	7108 BENJAMIN ST, Row 2 Flr. 1	Yes	1	B	Res.	53	56	60	56	4
F-040-deck	7108 BENJAMIN ST, Row 2 Flr. 1	Yes	1	B	Res.	57	60	68	60	**8**
F-041	7104 BENJAMIN ST, Row 4 Flr. 1	Yes	1	B	Res.	53	55	61	55	**5**
F-042	7100 BENJAMIN ST, Row 5 Flr. 1	Yes	1	B	Res.	52	55	61	55	**6**
F-042-deck	7100 BENJAMIN ST, Row 5 Flr. 1	Yes	1	B	Res.	54	57	64	57	**7**
F-043	7032 BENJAMIN ST, Row 5 Flr. 1	Yes	1	B	Res.	51	54	60	54	**6**
F-044	7028 BENJAMIN ST, Row 5 Flr. 1	Yes	1	B	Res.	51	55	61	55	**7**
F-045	7024 BENJAMIN ST, Row 6 Flr. 1	Yes	1	B	Res.	48	51	57	51	**6**
F-046	7109 BENJAMIN ST, Row 1 Flr. 1	Yes	1	B	Res.	58	61	70	61	**9**
F-047	7105 BENJAMIN ST, Row 2 Flr. 1	Yes	1	B	Res.	49	53	56	53	3
F-048	7101 BENJAMIN ST, Row 4 Flr. 1	Yes	1	B	Res.	51	54	59	54	**5**
F-049	7033 BENJAMIN ST, Row 5 Flr. 1	Yes	1	B	Res.	49	53	56	53	4
F-050	7029 BENJAMIN ST, Row 6 Flr. 1	Yes	1	B	Res.	48	52	55	52	4
F-051	Holy Trinity Church, 850 BALLS HILL RD, Row 1 Flr. 1	Yes	1	D	Ext.	59	63	76	63	**13**
					Int.	34	38	51	38	
F-052	7112 HOLYROOD DR, Row 1 Flr. 1	Yes	1	B	Res.	55	58	64	58	**6**
F-053	7110 HOLYROOD DR, Row 1 Flr. 1	Yes	1	B	Res.	58	61	67	61	**6**
F-054	7108 HOLYROOD DR, Row 2 Flr. 1	Yes	1	B	Res.	53	56	61	56	**5**
F-055	7106 HOLYROOD DR, Row 4 Flr. 1	Yes	1	B	Res.	52	56	60	56	4
F-056	7104 HOLYROOD DR, Row 5 Flr. 1	Yes	1	B	Res.	50	54	57	54	3
F-094	6924 BUTTERNUT CT, Row 2 Flr. 1	Yes	1	B	Res.	57	62	73	62	**11**
F-095	9640 GEORGETOWN PIKE, Row 1 Flr. 1	Yes	1	B	Res.	57	59	NA	NA	NA
G-001	889 LINGANORE DR, Row 1 Flr. 1	No	1	B	Res.	60	61	NA	59.4	2
G-002	891 LINGANORE DR, Row 1 Flr. 1	No	1	B	Res.	61	61	NA	59.3	3
G-003	893 LINGANORE DR, Row 1 Flr. 1	No	1	B	Res.	61	64	NA	59.1	**6**
G-004	895 LINGANORE DR, Row 1 Flr. 1	No	1	B	Res.	62	**66**	NA	60.1	**6**
G-005	897 LINGANORE DR, Row 1 Flr. 1	No	1	B	Res.	63	**67**	NA	60.7	**6**
G-006	899 LINGANORE DR, Row 1 Flr. 1	No	1	B	Res.	62	**67**	NA	60.0	**7**
G-007	890 LINGANORE DR, Row 2 Flr. 1	No	1	B	Res.	59	62	NA	59	3
G-008	892 LINGANORE DR, Row 2 Flr. 1	No	1	B	Res.	60	62	NA	60	3
G-009	7300 LINGANORE CT, Row 2 Flr. 1	No	1	B	Res.	58	61	NA	59	2
H-001	902 HELGA PL, Row 1 Flr. 1	Yes	1	B	Res.	52	55	61	55	**7**
H-002	904 HELGA PL, Row 1 Flr. 1	Yes	1	B	Res.	53	57	64	57	**7**
H-003	900 HELGA PL, Row 1 Flr. 1	Yes	1	B	Res.	55	57	64	57	**7**
H-004	7302 PETER PL, Row 2 Flr. 1	Yes	1	B	Res.	53	57	66	57	**9**
H-005	906 HELGA PL, Row 1 Flr. 1	Yes	1	B	Res.	53	58	65	58	**7**
H-006	908 HELGA PL, Row 1 Flr. 1	Yes	1	B	Res.	53	58	67	58	**9**
H-007	910 HELGA PL, Row 1 Flr. 1	Yes	1	B	Res.	52	56	64	56	**8**

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
H-008	912 HELGA PL, Row 1 Flr. 1	Yes	1	B	Res.	52	56	63	56	**7**
H-009	7303 PETER PL, Row 2 Flr. 1	Yes	1	B	Res.	50	55	61	55	**6**
H-010	7305 PETER PL, Row 2 Flr. 1	Yes	1	B	Res.	50	54	61	54	**7**
H-010-deck	7305 PETER PL, Row 2 Flr. 1	Yes	1	B	Res.	51	56	66	54	**11**
H-011	7307 PETER PL, Row 2 Flr. 1	Yes	1	B	Res.	49	54	59	54	**6**
H-011-deck	7307 PETER PL, Row 2 Flr. 1	Yes	1	B	Res.	50	54	63	53	**9**
H-012	914 HELGA PL, Row 2 Flr. 1	Yes	1	B	Res.	49	53	59	53	**6**
H-013	7308 PETER PL, Row 3 Flr. 1	Yes	1	B	Res.	49	53	60	53	**7**
H-014	916 HELGA PL, Row 3 Flr. 1	Yes	1	B	Res.	49	54	59	53	**6**
H-015	987 SPENCER RD, Row 1 Flr. 1	Yes	1	B	Res.	55	59	69	59	**10**
H-016	989 SPENCER RD, Row 1 Flr. 1	Yes	1	B	Res.	55	58	67	58	**9**
H-017	915 HELGA PL, Row 2 Flr. 1	Yes	1	B	Res.	52	56	63	56	**7**
H-018	985 SPENCER RD, Row 2 Flr. 1	Yes	1	B	Res.	52	56	63	56	**7**
H-019	912 HELGA PL, Row 1 Flr. 1	Yes	1	B	Res.	54	58	67	58	**9**
H-020	983 SPENCER RD, Row 1 Flr. 1	Yes	2	B	Res.	55	58	72	58	**14**
H-021	1001 SPENCER RD, Row 2 Flr. 1	Yes	1	B	Res.	53	57	67	57	**10**
H-022	979 SPENCER RD, Row 2 Flr. 1	Yes	1	B	Res.	53	56	64	56	**8**
H-023	977 SPENCER RD, Row 3 Flr. 1	Yes	1	B	Res.	52	56	62	55	**7**
H-024	1000 SPENCER RD, Row 2 Flr. 1	Yes	1	B	Res.	51	55	62	55	**7**
H-025	980 SPENCER RD, Row 3 Flr. 1	Yes	1	B	Res.	51	56	63	55	**8**
H-026	7400 SPENCER CT, Row 2 Flr. 1	Yes	1	B	Res.	54	57	66	57	**9**
H-027	7410 SPENCER CT, Row 2 Flr. 1	Yes	1	B	Res.	51	55	60	54	**6**
H-028	7420 SPENCER CT, Row 3 Flr. 1	Yes	1	B	Res.	45	49	57	49	**7**
H-029	7419 SPENCER CT, Row 3 Flr. 1	Yes	1	B	Res.	49	54	61	53	**8**
H-030	7409 SPENCER CT, Row 2 Flr. 1	Yes	1	B	Res.	56	60	68	59	**8**
H-031	1010 SPENCER RD, Row 1 Flr. 1	Yes	1	B	Res.	59	63	74	61	**12**
H-076	Scott's Run Nature Preserve Trail, Row 3 Flr. 1	Yes	1	C	Rec.	50	55	61	54	**7**
H-077	Scott's Run Nature Preserve Trail, Row 3 Flr. 1	Yes	1	C	Rec.	51	55	61	54	**7**
H-078	Scott's Run Nature Preserve Trail, Row 3 Flr. 1	Yes	1	C	Rec.	51	56	62	55	**7**
H-079	Scott's Run Nature Preserve Trail, Row 3 Flr. 1	Yes	1	C	Rec.	52	56	62	55	**7**
H-080	Scott's Run Nature Preserve Trail, Row 2 Flr. 1	Yes	1	C	Rec.	52	57	63	56	**7**
H-081	Scott's Run Nature Preserve Trail, Row 2 Flr. 1	Yes	1	C	Rec.	53	58	63	57	**7**
H-082	Scott's Run Nature Preserve Trail, Row 2 Flr. 1	Yes	1	C	Rec.	54	59	65	58	**7**
H-083	Scott's Run Nature Preserve Trail, Row 2 Flr. 1	Yes	1	C	Rec.	55	60	66	59	**7**
H-084	Scott's Run Nature Preserve Trail, Row 1 Flr. 1	Yes	1	C	Rec.	57	60	67	59	**7**
H-085	Scott's Run Nature Preserve Trail, Row 1 Flr. 1	Yes	1	C	Rec.	58	61	66	60	**7**
H-086	7514 OLD DOMINION DR, Row 1 Flr. 1	Yes	1	B	Res.	57	62	68	60	**8**
H-087	7518 OLD DOMINION DR, Row 1 Flr. 1	Yes	1	B	Res.	62	67	69	63	**6**
H-088	7505 BLAISE TRL, Row 1 Flr. 1	Yes	1	B	Res.	57	63	69	61	**8**
H-089	7504 BLAISE TRL, Row 1 Flr. 1	Yes	1	B	Res.	55	60	68	58	**9**
H-090	7508 BLAISE TRL, Row 2 Flr. 1	Yes	1	B	Res.	52	57	64	56	**8**
H-091	7520 OLD DOMINION DR, Row 2 Flr. 1	Yes	1	B	Res.	58	64	67	61	**6**
H-092	7511 BLAISE TRL, Row 2 Flr. 1	Yes	1	B	Res.	56	62	67	59	**8**
H-093	7512 BLAISE TRL, Row 2 Flr. 1	Yes	1	B	Res.	55	60	66	59	**8**
H-094	7522 OLD DOMINION DR, Row 3 Flr. 1	Yes	1	B	Res.	58	64	67	61	**6**
H-095	7536 OLD DOMINION DR, Row 4 Flr. 1	Yes	1	B	Res.	56	64	66	60	**6**
J-001	7619 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	59	63	69	62	**7**
J-001-deck	7619 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	61	65	74	65	**9**
J-002	7621 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	62	65	75	65	**10**
J-002-deck	7621 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	64	67	77	67	**9**
J-003	7623 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	61	64	74	64	**10**

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
J-003-deck	7623 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	63	**66**	75	66	**9**
J-004	7625 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	60	64	73	64	**9**
J-004-deck	7625 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	62	65	75	66	**9**
J-005	7627 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	60	64	73	64	**9**
J-005-deck	7627 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	62	65	75	66	**9**
J-006	7629 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	61	64	73	64	**9**
J-006-deck	7629 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	62	**66**	75	66	**9**
J-007	7631 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	61	64	73	64	**9**
J-007-deck	7631 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	63	**66**	75	66	**9**
J-008	7633 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	60	63	NA	NA	NA
J-008-deck	7633 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	62	65	NA	NA	NA
J-009	7635 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	57	60	NA	NA	NA
J-009-deck	7635 HUNTMASTER LN, Row 1 Flr. 1	Yes	1	B	Res.	60	63	NA	NA	NA
J-010	7637 HUNTMASTER LN, Row 2 Flr. 1	Yes	1	B	Res.	54	57	NA	NA	NA
J-010-deck	7637 HUNTMASTER LN, Row 2 Flr. 1	Yes	1	B	Res.	56	59	NA	NA	NA
J-011	7639 HUNTMASTER LN, Row 3 Flr. 1	Yes	1	B	Res.	52	54	NA	NA	NA
J-011-deck	7639 HUNTMASTER LN, Row 3 Flr. 1	Yes	1	B	Res.	54	56	NA	NA	NA
J-012	7641 HUNTMASTER LN, Row 4 Flr. 1	Yes	1	B	Res.	53	56	NA	NA	NA
J-012-deck	7641 HUNTMASTER LN, Row 4 Flr. 1	Yes	1	B	Res.	55	57	NA	NA	NA
J-013	7620 HUNTMASTER LN, Row 2 Flr. 1	Yes	1	B	Res.	48	52	56	51	**5**
J-014	7622 HUNTMASTER LN, Row 2 Flr. 1	Yes	1	B	Res.	56	59	62	59	3
J-015	7624 HUNTMASTER LN, Row 2 Flr. 1	Yes	1	B	Res.	58	61	64	61	3
J-016	7626 HUNTMASTER LN, Row 2 Flr. 1	Yes	1	B	Res.	58	61	64	61	3
J-017	7628 HUNTMASTER LN, Row 2 Flr. 1	Yes	1	B	Res.	58	61	64	61	3
J-018	7634 HUNTMASTER LN, Row 2 Flr. 1	Yes	1	B	Res.	57	60	64	60	4
J-019	1200 S HUNTRESS CT, Row 3 Flr. 1	Yes	1	B	Res.	55	60	65	59	**6**
J-020	1201 S HUNTRESS CT, Row 3 Flr. 1	Yes	1	B	Res.	56	60	63	59	4
J-021	1203 HUNTMASTER CT, Row 3 Flr. 1	Yes	1	B	Res.	56	60	62	59	3
J-022	1205 HUNTMASTER CT, Row 3 Flr. 1	Yes	1	B	Res.	55	58	61	58	4
J-023	1202 S HUNTRESS CT, Row 4 Flr. 1	Yes	1	B	Res.	55	59	64	58	**6**
J-024	1203 S HUNTRESS CT, Row 4 Flr. 1	Yes	1	B	Res.	55	59	63	58	**5**
J-025	1201 HUNTMASTER CT, Row 4 Flr. 1	Yes	1	B	Res.	56	60	63	59	4
J-026	7600 TIMBERLY CT, Row 1 Flr. 1	Yes	1	B	Res.	61	64	NA	NA	NA
J-027	7602 TIMBERLY CT, Row 1 Flr. 1	Yes	1	B	Res.	58	61	NA	NA	NA
J-028	7604 TIMBERLY CT, Row 2 Flr. 1	Yes	1	B	Res.	55	58	NA	NA	NA
J-028-deck	7604 TIMBERLY CT, Row 2 Flr. 1	Yes	1	B	Res.	58	61	NA	NA	NA
J-029	7608 TIMBERLY CT, Row 2 Flr. 1	Yes	1	B	Res.	53	56	NA	NA	NA
J-029-deck	7608 TIMBERLY CT, Row 2 Flr. 1	Yes	1	B	Res.	56	59	NA	NA	NA
J-030	7610 TIMBERLY CT, Row 2 Flr. 1	Yes	1	B	Res.	52	55	NA	NA	NA
J-030-deck	7610 TIMBERLY CT, Row 2 Flr. 1	Yes	1	B	Res.	54	57	NA	NA	NA
J-031	7612 TIMBERLY CT, Row 3 Flr. 1	Yes	1	B	Res.	51	54	NA	NA	NA
J-032	7614 TIMBERLY CT, Row 4 Flr. 1	Yes	1	B	Res.	50	52	NA	NA	NA
J-033	7601 TIMBERLY CT, Row 1 Flr. 1	Yes	1	B	Res.	56	58	NA	NA	NA
J-034	7603 TIMBERLY CT, Row 2 Flr. 1	Yes	1	B	Res.	57	58	NA	NA	NA
J-035	7605 TIMBERLY CT, Row 3 Flr. 1	Yes	1	B	Res.	56	58	NA	NA	NA
J-036	7607 TIMBERLY CT, Row 4 Flr. 1	Yes	1	B	Res.	55	56	NA	NA	NA
J-037	7609 TIMBERLY CT, Row 5 Flr. 1	Yes	2	B	Res.	54	55	NA	NA	NA
J-038	1335 TIMBERLY LN, Row 1 Flr. 1	Yes	1	B	Res.	58	60	NA	NA	NA
J-038-deck	1335 TIMBERLY LN, Row 1 Flr. 1	Yes	1	B	Res.	60	61	NA	NA	NA
J-039	1333 TIMBERLY LN, Row 1 Flr. 1	Yes	1	B	Res.	56	58	NA	NA	NA
J-039-deck	1333 TIMBERLY LN, Row 1 Flr. 1	Yes	1	B	Res.	58	60	NA	NA	NA

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
J-040	1331 TIMBERLY LN, Row 2 Flr. 1	Yes	1	B	Res.	55	57	NA	NA	NA
J-040-deck	1331 TIMBERLY LN, Row 2 Flr. 1	Yes	1	B	Res.	57	59	NA	NA	NA
J-041	1329 TIMBERLY LN, Row 3 Flr. 1	Yes	1	B	Res.	55	56	NA	NA	NA
J-041-deck	1329 TIMBERLY LN, Row 3 Flr. 1	Yes	1	B	Res.	57	58	NA	NA	NA
J-042	1325 TIMBERLY LN, Row 4 Flr. 1	Yes	1	B	Res.	53	55	NA	NA	NA
J-042-deck	1325 TIMBERLY LN, Row 4 Flr. 1	Yes	1	B	Res.	56	57	NA	NA	NA
J-043	1321 TIMBERLY LN, Row 5 Flr. 1	Yes	1	B	Res.	50	53	NA	NA	NA
J-043-deck	1321 TIMBERLY LN, Row 5 Flr. 1	Yes	1	B	Res.	54	56	NA	NA	NA
J-044	1319 TIMBERLY LN, Row 5 Flr. 1	Yes	1	B	Res.	51	52	NA	NA	NA
J-044-deck	1319 TIMBERLY LN, Row 5 Flr. 1	Yes	1	B	Res.	54	55	NA	NA	NA
J-045	1317 TIMBERLY LN, Row 5 Flr. 1	Yes	1	B	Res.	55	56	NA	NA	NA
J-046	1315 TIMBERLY LN, Row 6 Flr. 1	Yes	1	B	Res.	55	56	NA	NA	NA
J-047	1336 TIMBERLY LN, Row 1 Flr. 1	Yes	1	B	Res.	66	65	NA	NA	NA
J-048	1332 TIMBERLY LN, Row 2 Flr. 1	Yes	1	B	Res.	62	62	NA	NA	NA
J-049	1330 TIMBERLY LN, Row 3 Flr. 1	Yes	1	B	Res.	67	64	NA	NA	NA
J-050	1328 TIMBERLY LN, Row 4 Flr. 1	Yes	1	B	Res.	67	63	NA	NA	NA
J-051	1326 TIMBERLY LN, Row 5 Flr. 1	Yes	1	B	Res.	66	61	NA	NA	NA
J-052	1324 TIMBERLY LN, Row 5 Flr. 1	Yes	1	B	Res.	60	59	NA	NA	NA
J-053	1322 TIMBERLY LN, Row 6 Flr. 1	Yes	1	B	Res.	55	55	NA	NA	NA
J-054	1320 TIMBERLY LN, Row 6 Flr. 1	Yes	1	B	Res.	49	50	NA	NA	NA
J-055	1318 TIMBERLY LN, Row 6 Flr. 1	Yes	1	B	Res.	47	47	NA	NA	NA
L-001	1355 SNOW MEADOW LN, Row 0 Flr. 1	Yes	1	B	Res.	59	58	NA	NA	NA
L-002	8510 REHOBOTH CT, Row 0 Flr. 1	Yes	1	B	Res.	59	59	NA	NA	NA
L-003	1359 SNOW MEADOW LN, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
L-004	1360 SNOW MEADOW LN, Row 0 Flr. 1	Yes	1	B	Res.	56	56	NA	NA	NA
L-005	1358 SNOW MEADOW LN, Row 0 Flr. 1	Yes	1	B	Res.	57	57	NA	NA	NA
L-006	1356 SNOW MEADOW LN, Row 0 Flr. 1	Yes	1	B	Res.	59	58	NA	NA	NA
L-007	1354 SNOW MEADOW LN, Row 0 Flr. 1	Yes	1	B	Res.	60	60	NA	NA	NA
L-008	1352 SNOW MEADOW LN, Row 0 Flr. 1	Yes	1	B	Res.	61	61	NA	NA	NA
L-009	1350 SNOW MEADOW LN, Row 0 Flr. 1	Yes	1	B	Res.	63	61	NA	NA	NA
L-010	7711 LEWINSVILLE RD, Row 0 Flr. 1	Yes	1	B	Res.	54	54	NA	NA	NA
L-011	7713 LEWINSVILLE RD, Row 0 Flr. 1	Yes	1	B	Res.	57	57	NA	NA	NA
L-012	7707 LEWINSVILLE RD, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
L-013	7703 LEWINSVILLE RD, Row 0 Flr. 1	Yes	1	B	Res.	69	59	NA	NA	NA
L-014	1353 SNOW MEADOW LN, Row 0 Flr. 1	Yes	1	B	Res.	61	60	NA	NA	NA
L-015	1351 SNOW MEADOW LN, Row 0 Flr. 1	Yes	1	B	Res.	63	61	NA	NA	NA
M-001	7721 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	52	52	NA	NA	NA
M-002	7723 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	54	54	NA	NA	NA
M-003	7727 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	53	54	NA	NA	NA
M-004	7716 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	53	53	NA	NA	NA
M-005	7714 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	55	55	NA	NA	NA
M-006	7712 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	55	55	NA	NA	NA
M-007	7702 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	56	56	NA	NA	NA
M-008	7700 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-009	7710 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	56	56	NA	NA	NA
M-010	7701 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-011	7703 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-012	7705 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-013	7711 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	57	57	NA	NA	NA
M-014	7713 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	58	57	NA	NA	NA
M-015	7715 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	57	57	NA	NA	NA

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
M-016	7717 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-017	7729 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	57	57	NA	NA	NA
M-018	7721 LEAR RD, Row 0 Flr. 1	Yes	1	B	Res.	56	55	NA	NA	NA
M-019	7731 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-020	7735 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	57	57	NA	NA	NA
M-021	7801 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-022	7803 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-023	7805 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-024	7807 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	56	56	NA	NA	NA
M-025	7809 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	54	54	NA	NA	NA
M-026	7811 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	0	0	NA	NA	NA
M-027	7813 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	55	55	NA	NA	NA
M-028	7815 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	54	54	NA	NA	NA
M-029	7817 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	55	54	NA	NA	NA
M-030	7819 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	55	55	NA	NA	NA
M-031	7821 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	55	54	NA	NA	NA
M-032	1401 GOWER CT, Row 0 Flr. 1	Yes	1	B	Res.	55	56	NA	NA	NA
M-033	1403 GOWER CT, Row 0 Flr. 1	Yes	1	B	Res.	57	57	NA	NA	NA
M-034	1404 GOWER CT, Row 0 Flr. 1	Yes	1	B	Res.	57	58	NA	NA	NA
M-035	1402 GOWER CT, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-036	1402 GOWER CT, Row 0 Flr. 1	Yes	1	B	Res.	58	59	NA	NA	NA
M-037	7909 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	58	59	NA	NA	NA
M-038	7911 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	59	60	NA	NA	NA
M-039	7913 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	59	60	NA	NA	NA
M-040	7915 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	57	58	NA	NA	NA
M-041	7917 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	55	56	NA	NA	NA
M-042	7919 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	56	58	NA	NA	NA
M-043	7923 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	57	58	NA	NA	NA
M-044	7925 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	57	58	NA	NA	NA
M-045	8001 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	56	56	NA	NA	NA
M-046	8005 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	54	55	NA	NA	NA
M-047	7728 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	59	59	NA	NA	NA
M-048	7730 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	60	60	NA	NA	NA
M-049	1405 ROMEO CT, Row 0 Flr. 1	Yes	1	B	Res.	60	60	NA	NA	NA
M-050	1404 ROMEO CT, Row 0 Flr. 1	Yes	1	B	Res.	57	57	NA	NA	NA
M-051	7804 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	57	56	NA	NA	NA
M-052	7808 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	56	56	NA	NA	NA
M-053	7810 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	56	56	NA	NA	NA
M-054	7814 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	53	53	NA	NA	NA
M-055	7816 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	52	52	NA	NA	NA
M-056	1329 PORTIA PL, Row 0 Flr. 1	Yes	1	B	Res.	53	52	NA	NA	NA
M-057	7822 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	52	51	NA	NA	NA
M-058	7904 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	54	54	NA	NA	NA
M-059	7906 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	53	53	NA	NA	NA
M-060	1329 OBERON WAY, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-061	7912 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	59	59	NA	NA	NA
M-062	7914 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	59	59	NA	NA	NA
M-063	7916 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	60	61	NA	NA	NA
M-064	7920 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	60	61	NA	NA	NA
M-065	7922 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	59	60	NA	NA	NA
M-066	7924 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	57	57	NA	NA	NA

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
M-067	1335 MACBETH ST, Row 0 Flr. 1	Yes	1	B	Res.	55	56	NA	NA	NA
M-068	1337 MACBETH ST, Row 0 Flr. 1	Yes	1	B	Res.	55	56	NA	NA	NA
M-069	1339 MACBETH ST, Row 0 Flr. 1	Yes	1	B	Res.	56	57	NA	NA	NA
M-070	1341 MACBETH ST, Row 0 Flr. 1	Yes	1	B	Res.	56	56	NA	NA	NA
M-071	1343 MACBETH ST, Row 0 Flr. 1	Yes	1	B	Res.	56	57	NA	NA	NA
M-072	1345 MACBETH ST, Row 0 Flr. 1	Yes	1	B	Res.	55	56	NA	NA	NA
M-073	1347 MACBETH ST, Row 0 Flr. 1	Yes	1	B	Res.	55	56	NA	NA	NA
M-074	7725 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	55	55	NA	NA	NA
M-075	7733 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	58	58	NA	NA	NA
M-076	7921 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	57	58	NA	NA	NA
M-077	7927 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	56	57	NA	NA	NA
M-078	8003 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	55	55	NA	NA	NA
M-079	7902 FALSTAFF RD, Row 0 Flr. 1	Yes	1	B	Res.	53	53	NA	NA	NA
N-001	National Center For Plastic Surgery, 0, Row 1 Flr. 1	No	1	D	Ext.	71	73	NA	NA	NA
					Int.	46	48	NA	NA	
O-001	BASIS Independent McLean Outdoor Terrace, 8000 JONES BRANCH RD, Row 0 Flr. 3	No	1	C	Rec.	59	**73**	NA	69	4
O-002	BASIS Independent McLean Outdoor Terrace, 8000 JONES BRANCH RD, Row 0 Flr. 2	No	1	C	Rec.	54	**72**	NA	67	**6**
O-003	BASIS Independent McLean Outdoor Terrace, 8000 JONES BRANCH RD, Row 0 Flr. 2	No	1	C	Rec.	72	**73**	NA	68	**5**
O-009	BASIS Independent McLean Recreation Area, 8000 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	68	**68**	NA	63	**5**
O-010	BASIS Independent McLean Recreation Area, 8000 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	64	64	NA	58	**6**
O-011	BASIS Independent McLean Recreation Area, 8000 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	72	**72**	NA	65	**7**
O-012	BASIS Independent McLean Recreation Area, 8000 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	68	**68**	NA	63	**5**
O-013	BASIS Independent McLean Recreation Area, 8000 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	65	65	NA	60	**6**
O-014	BASIS Independent McLean Recreation Area, 8000 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	72	**72**	NA	65	**7**
O-015	BASIS Independent McLean Recreation Area, 8000 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	68	**68**	NA	63	**6**
O-016	BASIS Independent McLean Recreation Area, 8000 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	65	65	NA	59	**6**
O-017	BASIS Independent McLean Recreation Area, 8000 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	67	**68**	NA	61	**6**
O-018	BASIS Independent McLean Recreation Area, 8000 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	63	64	NA	57	**6**
O-019	BASIS Independent McLean Outdoor Terrace, 8000 JONES BRANCH RD, Row 0 Flr. 3	No	1	C	Rec.	74	**74**	NA	70	4
O-020	BASIS Independent McLean Recreation Area, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	69	**69**	NA	62	**7**
O-021	BASIS Independent McLean Recreation Area, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	62	0	NA	56	**6**
O-022	Valo Lake Rooftop Basketball/Tennis Courts, 7950 JONES BRANCH RD, Row 0 Flr. 3	No	1	C	Rec.	68	**68**	NA	65	3
O-023	Valo Lake Rooftop Basketball/Tennis Courts, 7950 JONES BRANCH RD, Row 0 Flr. 3	No	1	C	Rec.	65	65	NA	62	3
O-024	Valo Lake Rooftop Basketball/Tennis Courts, 7950 JONES BRANCH RD, Row 0 Flr. 3	No	1	C	Rec.	63	63	NA	60	3
O-025	Valo Lake Rooftop Basketball/Tennis Courts, 7950 JONES BRANCH RD, Row 0 Flr. 3	No	1	C	Rec.	69	**68**	NA	67	1
O-026	Valo Lake Rooftop Basketball/Tennis Courts, 7950 JONES BRANCH RD, Row 0 Flr. 4	No	1	C	Rec.	63	63	NA	61	2
O-027	Valo Lake Rooftop Basketball/Tennis Courts, 7950 JONES BRANCH RD, Row 0 Flr. 4	No	1	C	Rec.	66	65	NA	64	1
O-029	Valo Park Terrace, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	67	65	NA	65	0
O-033	Valo Park Outdoor Terrace, 7950 JONES BRANCH RD, Row 0 Flr. 9	No	1	E	Com.	66	65	NA	65	0
O-034	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	58	56	NA	55	1
O-035	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	58	55	NA	54	1
O-036	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	58	55	NA	54	1
O-037	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	59	56	NA	55	2
O-039	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	59	56	NA	55	1
O-040	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	61	58	NA	55	3
O-041	Valo Park Outdoor Terrace, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	E	Com.	71	**67**	NA	60	**7**
O-042	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	62	59	NA	56	3
O-043	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	61	58	NA	56	2
O-044	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	68	64	NA	57	**7**
O-045	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	60	57	NA	56	1
O-046	Valo Lake Jogging Path, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	69	**66**	NA	59	**7**

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
O-047	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	59	57	NA	56	1
O-048	Scott's Run Nature Preserve Trail, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	58	56	NA	55	1
O-049	Valo Lake Jogging Path, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	68	64	NA	60	**5**
O-050	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	59	56	NA	56	1
O-051	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	59	57	NA	56	1
O-052	Valo Lake Jogging Path, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	66	63	NA	61	2
O-053	Valo Lake Jogging Path, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	64	61	NA	59	2
O-054	Valo Lake Jogging Path, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	63	61	NA	60	1
O-055	Valo Lake Jogging Path, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	65	63	NA	62	1
O-056	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	60	58	NA	58	0
O-057	Valo Lake Jogging Path, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	64	62	NA	62	1
O-058	Valo Lake Jogging Path, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	63	61	NA	61	0
O-059	Valo Lake Jogging Path, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	62	60	NA	59	0
P-001	Scott's Run Nature Preserve Trail, 7950 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	60	57	NA	57	0
P-002	Scott's Run Nature Preserve Trail, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	58	55	NA	55	1
P-004	Scott's Run Nature Preserve Trail, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	56	54	NA	54	1
P-005	Scott's Run Nature Preserve Trail, 7940 JONES BRANCH RD, Row 0 Flr. 1	No	1	C	Rec.	56	54	NA	54	0
P-007	Hilton Corporate Outdoor Courtyard, 7930 JONES BRANCH RD, Row 0 Flr. 1	No	1	E	Com.	44	44	NA	44	0
P-009	Hilton Corporate Outdoor Courtyard, 7930 JONES BRANCH RD, Row 0 Flr. 1	No	1	E	Com.	50	50	NA	50	0
P-010	Hilton Corporate Outdoor Courtyard, 7930 JONES BRANCH RD, Row 0 Flr. 1	No	1	E	Com.	49	49	NA	49	0
T-001	7400 OLD DOMINION DR, Row 4 Flr. 1	Yes	1	B	Res.	58	59	NA	58	3
T-002	7332 OLD DOMINION DR, Row 5 Flr. 1	Yes	1	B	Res.	57	58	NA	57	2
T-003	7330 OLD DOMINION DR, Row 6 Flr. 1	Yes	1	B	Res.	57	58	NA	58	2
T-004	7328 OLD DOMINION DR, Row 7 Flr. 1	Yes	1	B	Res.	57	0	NA	0	0
T-005	7326 OLD DOMINION DR, Row 8 Flr. 1	Yes	1	B	Res.	56	58	NA	58	2
T-006	7420 OLD DOMINION DR, Row 3 Flr. 1	Yes	1	B	Res.	59	64	NA	64	3
T-007	7329 WESTERLY LN, Row 4 Flr. 1	Yes	1	B	Res.	57	61	NA	61	2
T-008	7327 WESTERLY LN, Row 5 Flr. 1	Yes	1	B	Res.	56	60	NA	59	2
T-009	7325 WESTERLY LN, Row 6 Flr. 1	Yes	1	B	Res.	56	59	NA	59	2
T-010	7323 WESTERLY LN, Row 7 Flr. 1	Yes	1	B	Res.	55	59	NA	59	2
T-011	7315 WESTERLY LN, Row 8 Flr. 1	Yes	1	B	Res.	55	59	NA	58	2
T-012	7318 OLD DOMINION DR, Row 9 Flr. 1	Yes	1	B	Res.	59	54	NA	54	2
T-013	7312 OLD DOMINION DR, Row 10 Flr. 1	Yes	1	B	Res.	56	55	NA	54	1
T-014	7306 OLD DOMINION DR, Row 11 Flr. 1	Yes	1	B	Res.	53	55	NA	54	2
T-015	7227 WESTERLY LN, Row 12 Flr. 1	Yes	1	B	Res.	52	56	NA	55	2
T-016	7304 OLD DOMINION DR, Row 12 Flr. 1	Yes	1	B	Res.	52	54	NA	53	2
T-017	7302 OLD DOMINION DR, Row 13 Flr. 1	Yes	1	B	Res.	50	53	NA	53	2
T-018	7300 OLD DOMINION DR, Row 13 Flr. 1	Yes	1	B	Res.	51	53	NA	52	2
T-019	7225 WESTERLY LN, Row 12 Flr. 1	Yes	1	B	Res.	52	56	NA	55	2
T-020	7301 WESTERLY LN, Row 11 Flr. 1	Yes	1	B	Res.	52	56	NA	55	2
T-021	7307 WESTERLY LN, Row 10 Flr. 1	Yes	1	B	Res.	52	55	NA	55	1
T-022	7311 WESTERLY LN, Row 9 Flr. 1	Yes	1	B	Res.	54	57	NA	57	1
W-008	7106 COUNTRY MEADOW CT, Row 1 Flr. 1	Yes	1	B	Res.	53	56	NA	NA	NA
W-009	7113 HOLYROOD DR, Row 1 Flr. 1	Yes	1	B	Res.	53	57	NA	NA	NA
W-010	7107 HOLYROOD DR, Row 2 Flr. 1	Yes	1	B	Res.	51	54	NA	NA	NA
W-011	7104 COUNTRY MEADOW CT, Row 2 Flr. 1	Yes	1	B	Res.	49	53	NA	NA	NA
W-012	7103 HOLYROOD DR, Row 3 Flr. 1	Yes	1	B	Res.	50	53	NA	NA	NA
W-013	7102 COUNTRY MEADOW CT, Row 3 Flr. 1	Yes	1	B	Res.	49	53	NA	NA	NA
W-014	7101 HOLYROOD DR, Row 4 Flr. 1	Yes	1	B	Res.	50	53	NA	NA	NA
W-015	7013 HOLYROOD DR, Row 5 Flr. 1	Yes	1	B	Res.	49	53	NA	NA	NA
W-016	7011 HOLYROOD DR, Row 7 Flr. 1	Yes	1	B	Res.	47	50	NA	NA	NA

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***
W-017	7015 DUNCRAIG CT, Row 8 Flr. 1	Yes	1	B	Res.	47	48	NA	NA	NA
W-018	909 COUNTRYSIDE CT, Row 7 Flr. 1	Yes	1	B	Res.	49	50	NA	NA	NA
W-019	907 COUNTRYSIDE CT, Row 6 Flr. 1	Yes	1	B	Res.	50	52	NA	NA	NA
W-020	903 COUNTRYSIDE CT, Row 5 Flr. 1	Yes	1	B	Res.	50	52	NA	NA	NA
W-021	7107 COUNTRY MEADOW CT, Row 1 Flr. 1	Yes	1	B	Res.	54	56	NA	NA	NA
W-022	7120 GEORGETOWN PIKE, Row 1 Flr. 1	Yes	1	B	Res.	60	60	NA	NA	NA
W-023	7105 COUNTRY MEADOW CT, Row 2 Flr. 1	Yes	1	B	Res.	54	56	NA	NA	NA
W-024	7118 GEORGETOWN PIKE, Row 2 Flr. 1	Yes	1	B	Res.	58	57	NA	NA	NA
W-025	7103 COUNTRY MEADOW CT, Row 3 Flr. 1	Yes	1	B	Res.	50	52	NA	NA	NA
W-026	7112 GEORGETOWN PIKE, Row 3 Flr. 1	Yes	1	B	Res.	57	54	NA	NA	NA
W-026-deck	7112 GEORGETOWN PIKE, Row 3 Flr. 1	Yes	1	B	Res.	55	55	NA	NA	NA
W-027	7100 COUNTRY MEADOW CT, Row 4 Flr. 1	Yes	2	B	Res.	49	52	NA	NA	NA
W-028	904 COUNTRYSIDE CT, Row 4 Flr. 1	Yes	1	B	Res.	54	50	NA	NA	NA
W-029	906 COUNTRYSIDE CT, Row 5 Flr. 1	Yes	1	B	Res.	57	49	NA	NA	NA
W-030	908 COUNTRYSIDE CT, Row 6 Flr. 1	Yes	1	B	Res.	56	49	NA	NA	NA
W-031	910 COUNTRYSIDE CT, Row 7 Flr. 1	Yes	1	B	Res.	49	49	NA	NA	NA
W-032	7013 DUNCRAIG CT, Row 8 Flr. 1	Yes	1	B	Res.	48	48	NA	NA	NA
W-033	7011 DUNCRAIG CT, Row 8 Flr. 1	Yes	1	B	Res.	47	48	NA	NA	NA
X-001	7310 LINGANORE CT, Row 3 Flr. 1	Yes	1	B	Res.	58	62	NA	NA	NA
X-002	898 LINGANORE DR, Row 2 Flr. 1	No	1	B	Res.	55	55	NA	NA	NA
X-003	7303 LINGANORE CT, Row 3 Flr. 1	No	1	B	Res.	57	54	NA	NA	NA
X-004	7305 LINGANORE CT, Row 4 Flr. 1	No	1	B	Res.	56	54	NA	NA	NA
X-005	7307 LINGANORE CT, Row 4 Flr. 1	No	1	B	Res.	57	57	NA	NA	NA
X-006	7309 LINGANORE CT, Row 4 Flr. 1	No	1	B	Res.	53	57	NA	NA	NA
X-007	7311 LINGANORE CT, Row 4 Flr. 1	No	1	B	Res.	51	55	NA	NA	NA
X-008	7312 LINGANORE CT, Row 4 Flr. 1	No	1	B	Res.	55	58	NA	NA	NA
X-009	Stubblefield Falls Overlook Trail, Row 5 Flr. 1	No	1	C	Rec.	50	54	NA	NA	NA
X-010	Stubblefield Falls Overlook Trail, Row 5 Flr. 1	No	1	C	Rec.	51	54	NA	NA	NA
X-011	Stubblefield Falls Overlook Trail, Row 5 Flr. 1	No	1	C	Rec.	52	54	NA	NA	NA
X-012	Stubblefield Falls Overlook Trail, Row 5 Flr. 1	No	1	C	Rec.	55	56	NA	NA	NA
X-013	Stubblefield Falls Overlook Trail, Row 5 Flr. 1	No	1	C	Rec.	56	56	NA	NA	NA
X-014	Stubblefield Falls Overlook Trail, Row 5 Flr. 1	No	1	C	Rec.	60	54	NA	NA	NA
X-015	Stubblefield Falls Overlook Trail, Row 5 Flr. 1	No	1	C	Rec.	60	54	NA	NA	NA
X-016	Stubblefield Falls Overlook Trail, Row 6 Flr. 1	No	1	C	Rec.	58	56	NA	NA	NA
X-017	Stubblefield Falls Overlook Trail, Row 6 Flr. 1	No	1	C	Rec.	58	56	NA	NA	NA
X-018	Stubblefield Falls Overlook Trail, Row 6 Flr. 1	No	1	C	Rec.	58	55	NA	NA	NA
X-019	Stubblefield Falls Overlook Trail, Row 6 Flr. 1	No	1	C	Rec.	57	55	NA	NA	NA
X-020	Stubblefield Falls Overlook Trail, Row 6 Flr. 1	No	1	C	Rec.	55	55	NA	NA	NA
X-021	Stubblefield Falls Overlook Trail, Row 6 Flr. 1	No	1	C	Rec.	55	54	NA	NA	NA
Y-001	898 HELGA PL, Row 2 Flr. 1	No	1	B	Res.	53	57	NA	56	**8**
Y-002	896 HELGA PL, Row 3 Flr. 1	Yes	1	B	Res.	53	57	NA	56	**8**
Y-002-deck	896 HELGA PL, Row 3 Flr. 1	Yes	1	B	Res.	54	57	NA	55	**8**
Y-003	894 HELGA PL, Row 2 Flr. 1	Yes	1	B	Res.	58	59	NA	58	3
Y-004	7315 GEORGETOWN PIKE, Row 3 Flr. 1	Yes	1	B	Res.	59	58	NA	57	2
Y-005	7321 GEORGETOWN PIKE, Row 4 Flr. 1	Yes	1	B	Res.	58	54	NA	53	2
Y-006	7327 GEORGETOWN PIKE, Row 5 Flr. 1	Yes	1	B	Res.	54	53	NA	52	2
Y-007	7306 PETER PL, Row 3 Flr. 1	Yes	1	B	Res.	51	55	NA	55	**9**
Y-008	7304 PETER PL, Row 3 Flr. 1	Yes	1	B	Res.	52	56	NA	55	**9**

* "Cat." = FHWA Activity Category.

Table A-1: Predicted Existing (2018) and Design Year (2045) Noise Levels

CNE-Site No.	Address	Behind Existing Noise Barrier?	Units	Cat.*	Land Use	Worst Noise Hour L_{eq} (dBA)				
						2018	2045	Noise Barriers**		
						Existing	Build	No Barrier	With Barrier	I.L.***

** For receptors located behind existing noise barriers, "No Barrier" sound levels represent conditions where no noise barrier is present and was used to analyze fesability and reasonableness. For receptors located behind proposed noise barriers, "No Barrier" noise levels represent 2045 Build conditions. Depending on the condition, "With Barrier" results are sound levels at receptors with an in-kind replacement, a modified in-kind replacement, or a proposed noise barrier. "NA" results indicate that benefit from the existing noise barrier was not determined or a proposed barrier was not warrented and therefore, not evaluated.

*** "I.L." = insertion loss or noise reduction provided by a potential noise barrier.

‡ While units are shown for receptors at deck locations for single-family homes, the impact assessment, as well as the noise barrier feasibility and reasonbleness determinations, were based on the worst-case noise level.

Source: HMMH, 2022.

Appendix B Barrier Profiles – Sound Attenuation Lines and Barrier Station Details

Table 16 Sound Attenuation Line for Noise Barrier 13A

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier 13A 214+75	10+00.00 (NB-13A-1)	11,851,815.00	7,030,134.00	239.20	259.7	20.5
Barrier 13A 215+25	10+72.30 (NB-13A-1)	11,851,838.00	7,030,186.50	236.86	260.7	23.8
Barrier 13A 216+50	12+17.30 (NB-13A-1)	11,851,902.00	7,030,316.50	243.22	269.7	26.4
Barrier 13A 217+00	12+71.94 (NB-13A-1)	11,851,928.00	7,030,364.50	244.36	273.7	29.4
Barrier 13A 217+50	13+13.50 (NB-13A-1)	11,851,947.00	7,030,401.50	245.00	274.4	29.4
Barrier 13A 217+75	13+34.52 (NB-13A-1)	11,851,957.00	7,030,420.00	245.77	276.3	30.5
Barrier 13A 218+00	13+59.52 (NB-13A-1)	11,851,968.00	7,030,442.50	246.00	268.4	22.4
Barrier 13A 218+25	13+89.10 (NB-13A-1)	11,851,983.00	7,030,468.00	246.98	269.4	22.4
Barrier 13A 219+00	N/A BRIDGE PLAN (NB-13A-2)	11,852,019.00	7,030,528.50	248.86	267.7	18.8
Barrier 13A 219+50	N/A BRIDGE PLAN (NB-13A-2)	11,852,040.00	7,030,564.50	249.94	268.7	18.8
Barrier 13A 220+00	N/A BRIDGE PLAN (NB-13A-2)	11,852,064.00	7,030,606.50	251.00	269.8	18.8
Barrier 13A 220+25	15+79.12 (NB-13A-3)	11,852,079.00	7,030,632.00	251.86	271.4	19.6
Barrier 13A 221+25	16+87.76 (NB-13A-3)	11,852,135.00	7,030,725.00	254.70	281.0	26.3
Barrier 13A 222+25	17+87.42 (NB-13A-3)	11,852,190.00	7,030,808.00	257.47	285.6	28.1
Barrier 13A 223+25	18+90.33 (NB-13A-3)	11,852,248.00	7,030,893.00	260.18	288.8	28.6
Barrier 13A 224+25	19+92.75 (NB-13A-3)	11,852,308.00	7,030,976.00	263.00	291.2	28.2
Barrier 13A 224+50	20+25.96 (NB-13A-3)	11,852,328.00	7,031,002.50	264.00	292.2	28.2
Barrier 13A 225+00	20+61.57 (NB-13A-3)	11,852,350.00	7,031,030.50	265.65	293.9	28.2
Barrier 13A 225+25	20+88.98 (NB-13A-3)	11,852,367.00	7,031,052.00	266.61	288.3	21.7
Barrier 13A 225+50	21+15.14 (NB-13A-3)	11,852,382.00	7,031,069.50	267.00	292.8	25.8
Barrier 13A 226+00	10+50.81 (NB-13A-4)	11,852,413.00	7,031,109.50	270.95	292.9	22.0
Barrier 13A 226+50	11+01.02 (NB-13A-4)	11,852,444.00	7,031,149.00	271.96	302.9	31.0
Barrier 13A 227+00	11+45.46 (NB-13A-4)	11,852,472.00	7,031,183.50	273.00	307.6	34.6
Barrier 13A 227+25	11+95.52 (NB-13A-4)	11,852,504.00	7,031,222.00	274.64	312.7	38.1
Barrier 13A 227+75	12+46.61 (NB-13A-4)	11,852,537.00	7,031,261.00	281.00	314.8	33.8
Barrier 13A 228+25	12+95.90 (NB-13A-4)	11,852,569.00	7,031,298.50	276.96	314.4	37.4
Barrier 13A 228+75	13+43.03 (NB-13A-4)	11,852,600.00	7,031,334.00	284.99	311.9	26.9
Barrier 13A 229+25	13+93.28 (NB-13A-4)	11,852,634.00	7,031,371.00	279.68	309.0	29.3
Barrier 13A 229+75	14+43.90 (NB-13A-4)	11,852,668.00	7,031,408.50	280.96	307.2	26.3
Barrier 13A 230+00	14+70.07 (NB-13A-4)	11,852,686.00	7,031,427.50	281.81	307.2	25.4
Barrier 13A 230+25	14+94.14 (NB-13A-4)	11,852,702.00	7,031,445.50	283.00	305.5	22.5

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier 13A 230+50	15+23.50 (NB-13A-4)	11,852,722.00	7,031,467.00	282.77	305.2	22.4
Barrier 13A 230+75	15+38.00 (NB-13A-4)	11,852,732.00	7,031,477.50	282.88	306.4	23.5
Barrier 13A 231+25	10+36.23 (NB-13A-5)	11,852,769.00	7,031,515.50	274.40	307.6	33.2
Barrier 13A 231+75	10+85.36 (NB-13A-5)	11,852,804.00	7,031,550.00	274.17	308.9	34.7
Barrier 13A 232+25	10+35.25 (NB-13A-5)	11,852,838.00	7,031,586.50	275.94	310.2	34.3
Barrier 13A 232+75	11+85.87 (NB-13A-5)	11,852,872.00	7,031,624.00	277.00	311.5	34.5
Barrier 13A 233+50	12+52.25 (NB-13A-5)	11,852,916.00	7,031,673.50	287.21	313.7	26.5
Barrier 13A 233+75	12+76.25 (NB-13A-5)	11,852,924.00	7,031,696.50	288.04	314.5	26.5
Barrier 13A 234+00	13+00.25 (NB-13A-5)	11,852,940.00	7,031,714.50	288.05	314.6	26.5
Barrier 13A 234+75	13+24.25 (NB-13A-5)	11,852,962.00	7,031,724.00	289.07	315.6	26.5
Barrier 13A 235+25	13+87.51 (NB-13A-5)	11,853,003.00	7,031,771.50	279.36	316.8	37.5
Barrier 13A 235+75	14+37.39 (NB-13A-5)	11,853,037.00	7,031,808.00	280.86	318.1	37.3
Barrier 13A 236+25	14+87.60 (NB-13A-5)	11,853,072.00	7,031,844.00	285.34	319.6	34.2
Barrier 13A 236+50	15+37.11 (NB-13A-5)	11,853,106.00	7,031,880.00	287.02	320.0	33.0
Barrier 13A 236+50	15+58.68 (NB-13A-5)	11,853,121.00	7,031,895.50	287.56	320.8	33.2
Barrier 13A 236+75	15+69.99 (NB-13A-5)	11,853,129.00	7,031,903.50	290.00	321.0	31.0
Barrier 13A 236+75	15+84.49 (NB-13A-5)	11,853,139.00	7,031,914.00	289.29	321.8	32.5
Barrier 13A 236+75	29+96.87 (NB-13A-6)	11,853,144.00	7,031,919.00	292.40	322.6	30.2
Barrier 13A 237+00	30+34.08 (NB-13A-6)	11,853,167.00	7,031,945.00	295.47	322.6	27.1
Barrier 13A 237+50	30+62.74 (NB-13A-6)	11,853,186.00	7,031,966.50	295.99	324.2	28.2
Barrier 13A 237+50	30+80.41 (NB-13A-6)	11,853,199.00	7,031,978.50	296.44	325.8	29.4
Barrier 13A 238+00	31+35.24 (NB-13A-6)	11,853,236.00	7,032,019.00	297.07	332.0	34.9
Barrier 13A 238+50	31+85.09 (NB-13A-6)	11,853,271.00	7,032,054.50	297.98	336.6	38.6
Barrier 13A 239+00	32+31.42 (NB-13A-6)	11,853,303.00	7,032,088.00	298.44	338.0	39.5
Barrier 13A 239+25	32+59.00 (NB-13A-6)	11,853,322.00	7,032,108.00	298.86	339.4	40.5
Barrier 13A 239+50	32+84.49 (NB-13A-6)	11,853,339.00	7,032,127.00	299.09	337.5	38.4
Barrier 13A 240+00	33+35.04 (NB-13A-6)	11,853,374.00	7,032,163.50	299.67	334.6	34.9
Barrier 13A 240+50	33+82.15 (NB-13A-6)	11,853,405.00	7,032,199.00	300.18	330.5	30.4
Barrier 13A 241+00	34+17.61 (NB-13A-6)	11,853,428.00	7,032,226.00	300.61	328.9	28.3
Barrier 13A 241+00	34+27.87 (NB-13A-6)	11,853,435.00	7,032,233.50	301.00	329.4	28.4
Barrier 13A 241+50	34+77.54 (NB-13A-6)	11,853,467.00	7,032,271.50	301.39	329.8	28.4
Barrier 13A 242+00	35+26.82 (NB-13A-6)	11,853,499.00	7,032,309.00	301.69	330.1	28.4
Barrier 13A 242+50	35+75.61 (NB-13A-6)	11,853,529.00	7,032,347.50	302.00	330.4	28.4

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier 13A 243+00	36+29.26 (NB-13A-6)	11,853,563.00	7,032,389.00	302.48	330.6	28.1
Barrier 13A 243+50	36+78.67 (NB-13A-6)	11,853,594.00	7,032,427.50	302.59	330.7	28.1
Barrier 13A 10+50	37+27.26 (NB-13A-6)	11,853,623.00	7,032,466.50	302.98	330.6	27.6
Barrier 13A 11+00	37+77.84 (NB-13A-6)	11,853,654.00	7,032,506.50	303.72	330.4	26.7
Barrier 13A 11+50	38+25.03 (NB-13A-6)	11,853,682.00	7,032,544.50	303.87	330.5	26.6
Barrier 13A 11+75	38+46.64 (NB-13A-6)	11,853,694.00	7,032,562.50	302.96	330.5	27.5
Barrier 13A 12+00	38+71.22 (NB-13A-6)	11,853,709.00	7,032,582.00	302.00	330.2	28.2
Barrier 13A 12+25	38+91.04 (NB-13A-6)	11,853,720.00	7,032,598.50	304.00	330.1	26.1
Barrier 13A 12+50	39+17.09 (NB-13A-6)	11,853,734.00	7,032,620.50	302.40	329.6	27.2
Barrier 13A 13+00	39+67.56 (NB-13A-6)	11,853,762.00	7,032,662.50	301.92	329.0	27.1
Barrier 13A 13+50	40+17.64 (NB-13A-6)	11,853,787.00	7,032,706.00	300.88	328.5	27.6
Barrier 13A 14+00	40+66.99 (NB-13A-6)	11,853,809.00	7,032,749.50	300.84	327.8	27.0
Barrier 13A 14+50	41+16.67 (NB-13A-6)	11,853,832.00	7,032,793.50	299.95	327.2	27.3
Barrier 13A 15+00	41+66.00 (NB-13A-6)	11,853,854.00	7,032,837.50	299.39	327.0	27.6
Barrier 13A 15+50	42+12.61 (NB-13A-6)	11,853,874.00	7,032,879.50	299.00	327.4	28.4
Barrier 13A 16+00	42+66.27 (NB-13A-6)	11,853,893.00	7,032,929.50	300.00	328.3	28.3
Barrier 13A 16+50	43+11.95 (NB-13A-6)	11,853,908.00	7,032,972.50	300.94	330.0	29.0
Barrier 13A 17+00	43+65.49 (NB-13A-6)	11,853,927.00	7,033,022.50	302.66	329.6	27.0
Barrier 13A 17+25	43+88.90 (NB-13A-6)	11,853,935.00	7,033,044.50	303.59	331.6	28.1
Barrier 13A 17+50	44+14.52 (NB-13A-6)	11,853,944.00	7,033,068.50	304.67	334.3	29.6
Barrier 13A 17+75	44+43.30 (NB-13A-6)	11,853,954.00	7,033,095.50	305.98	335.4	29.4
Barrier 13A 18+00	44+61.66 (NB-13A-6)	11,853,961.00	7,033,112.50	306.78	335.3	28.5
Barrier 13A 18+25	44+87.13 (NB-13A-6)	11,853,971.00	7,033,136.00	307.96	336.0	28.0
Barrier 13A 18+50	45+07.99 (NB-13A-6)	11,853,977.00	7,033,156.00	308.92	336.4	27.5
Barrier 13A 19+00	45+56.70 (NB-13A-6)	11,853,993.00	7,033,202.00	310.97	338.6	27.7
Barrier 13A 19+25	45+97.33 (NB-13A-6)	11,854,006.00	7,033,240.50	312.90	339.4	26.5
Barrier 13A 19+75	46+41.93 (NB-13A-6)	11,854,021.00	7,033,282.50	314.88	341.4	26.5
Barrier 13A 20+25	46+96.16 (NB-13A-6)	11,854,038.00	7,033,334.00	316.86	345.8	29.0
Barrier 13A 20+50	47+21.84 (NB-13A-6)	11,854,047.00	7,033,368.50	318.19	344.0	25.8

Source: HMMH, 2022.

Table 17 Sound Attenuation Line for Partial Replacement of Noise Barrier 8

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier 8 16+00	10+00.00 (NB-8-1)	11,854,718.00	7,033,846.00	288.8	308.5	19.7
Barrier 8 16+50	10+44.37 (NB-8-1)	11,854,718.00	7,033,894.00	290.3	310.0	19.7
Barrier 8 17+00	10+55.49 (NB-8-2)	11,854,730.00	7,033,951.00	289.0	308.7	19.7
Barrier 8 18+50	12+01.79 (NB-8-2)	11,854,763.00	7,034,093.50	293.0	309.9	16.9
Barrier 8 19+25	12+75.79 (NB-8-2)	11,854,782.00	7,034,165.00	294.0	308.7	14.7
Barrier 8 21+00	14+42.97 (NB-8-2)	11,854,825.00	7,034,326.50	293.0	308.7	15.7
Barrier 8 667+00	15+75.55 (NB-8-2)	11,854,863.00	7,034,453.50	291.0	308.7	17.7
Barrier 8 669+00	17+32.33 (NB-8-2)	11,854,910.00	7,034,603.00	289.0	307.7	18.7
Barrier 8 669+50	17+99.41 (NB-8-2)	11,854,932.00	7,034,666.00	288.0	307.7	19.7
Barrier 8 669+75	18+23.41 (NB-8-2)	11,854,948.00	7,034,684.50	288.0	307.7	19.7
Barrier 8 670+00	18+47.41 (NB-8-2)	11,854,955.00	7,034,707.50	287.0	307.7	20.7
Barrier 8 670+25	18+71.41 (NB-8-2)	11,854,955.00	7,034,729.00	287.0	307.7	20.7
Barrier 8 671+00	10+95.26 (NB-8-3)	11,854,994.00	7,034,817.00	285.0	305.7	20.7
Barrier 8 672+00	11+67.33 (NB-8-3)	11,855,027.00	7,034,881.00	282.0	303.8	21.8
Barrier 8 673+00	12+62.37 (NB-8-3)	11,855,075.00	7,034,963.00	264.0	301.3	37.3
Barrier 8 674+00	13+58.37 (NB-8-3)	11,855,128.00	7,035,043.00	273.0	297.2	24.2
Barrier 8 675+00	14+40.41 (NB-8-3)	11,855,176.00	7,035,109.50	268.8	295.5	26.7
Barrier 8 675+50	15+01.50 (NB-8-3)	11,855,215.00	7,035,156.50	266.9	294.8	27.9
Barrier 8 676+00	15+33.91 (NB-8-3)	11,855,235.00	7,035,182.00	264.7	292.8	28.1

Source: HMMH, 2022.

Table 18 Sound Attenuation Line for Noise Barrier 9-1 (On Retaining Wall)

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier 9-1 676+25	15+75.42 (NB-9-1A)	11,855,262.00	7,035,213.50	263.0	297.0	34.0
Barrier 9-1 676+75	16+18.98 (NB-9-1A)	11,855,291.00	7,035,246.00	261.0	293.0	32.0
Barrier 9-1 676+14	16+62.13 (NB-9-1A)	11,855,321.00	7,035,277.00	260.1	286.1	26.0
Barrier 9-1 677+24	16+76.99 (NB-9-1A)	11,855,331.00	7,035,288.00	260.0	289.5	29.5
Barrier 9-1 678+00	17+20.14 (NB-9-1A)	11,855,362.00	7,035,318.00	259.0	284.4	25.4
Barrier 9-1 678+50	10+14.58 (NB-9-1B)	11,855,403.00	7,035,357.50	258.0	284.4	26.4
Barrier 9-1 679+50	11+19.92 (NB-9-1B)	11,855,483.00	7,035,426.00	249.0	283.7	34.7
Barrier 9-1 680+00	11+69.13 (NB-9-1B)	11,855,522.00	7,035,456.00	254.0	279.0	25.0
Barrier 9-1 681+00	12+52.75 (NB-9-1B)	11,855,589.00	7,035,506.00	251.8	273.8	22.0
Barrier 9-1 681+25	12+77.16 (NB-9-1B)	11,855,609.00	7,035,520.00	251.9	272.9	21.0
Barrier 9-1 681+50	13+20.73 (NB-9-1B)	11,855,645.00	7,035,544.50	250.6	275.6	25.0
Barrier 9-1 682+50	13+96.52 (NB-9-1B)	11,855,708.00	7,035,586.00	248.7	277.7	29.0
Barrier 9-1 682+50	14+20.52 (NB-9-1B)	11,855,731.00	7,035,588.00	248.0	274.0	26.0
Barrier 9-1 683+00	14+45.52 (NB-9-1B)	11,855,754.00	7,035,602.00	246.0	271.2	25.2
Barrier 9-1 683+00	14+67.42 (NB-9-1B)	11,855,766.00	7,035,620.50	247.9	271.1	23.2
Barrier 9-1 684+00	10+85.63 (NB-9-1C)	11,855,841.00	7,035,661.00	234.9	268.5	33.6
Barrier 9-1 684+50	11+31.77 (NB-9-1C)	11,855,881.00	7,035,684.00	229.5	262.8	33.3
Barrier 9-1 684+50	11+51.74 (NB-9-1C)	11,855,898.00	7,035,694.50	228.6	262.5	33.9
Barrier 9-1 685+00	11+69.47 (NB-9-1C)	11,855,913.00	7,035,704.00	228.4	261.8	33.4
Barrier 9-1 685+00	11+91.80 (NB-9-1C)	11,855,933.00	7,035,714.00	227.4	261.3	33.9
Barrier 9-1 685+25	12+28.27 (NB-9-1C)	11,855,965.00	7,035,731.50	227.2	261.3	34.1
Barrier 9-1 685+50	12+48.24 (NB-9-1C)	11,855,982.00	7,035,742.00	226.2	260.4	34.2
Barrier 9-1 686+25	13+08.02 (NB-9-1C)	11,856,034.00	7,035,771.50	225.0	258.8	33.8
Barrier 9-1 686+75	13+67.81 (NB-9-1C)	11,856,086.00	7,035,801.00	224.8	257.9	33.1
Barrier 9-1 688+00	14+75.97 (NB-9-1C)	11,856,180.00	7,035,854.50	223.4	258.0	34.6
Barrier 9-1 689+00	15+83.88 (NB-9-1C)	11,856,274.00	7,035,907.50	221.6	254.8	33.2
Barrier 9-1 689+75	16+57.55 (NB-9-1C)	11,856,338.00	7,035,944.00	219.8	251.9	32.1
Barrier 9-1 690+33	17+13.90 (NB-9-1C)	11,856,388.00	7,035,972.50	228.1	249.9	21.8

Source: HMMH, 2022.

Table 19 Sound Attenuation Line for Noise Barrier 9-2 (Ground Mounted)

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier 9-2 10+0.0	10+00.25 (NB-9-2)	11,856,392.00	7,035,970.50	228.34	252.8	23.5
Barrier 9-2 10+57.1	10+61.03 (NB-9-2)	11,856,442.00	7,035,998.00	227.14	251.6	23.5
Barrier 9-2 11+7.2	11+11.16 (NB-9-2)	11,856,486.00	7,036,022.00	226.06	251.1	24.0
Barrier 9-2 11+57.1	11+61.06 (NB-9-2)	11,856,530.00	7,036,045.50	224.97	250.0	24.0
Barrier 9-2 12+6.2	12+10.49 (NB-9-2)	11,856,574.00	7,036,068.00	223.89	248.9	24.0
Barrier 9-2 12+56.8	12+60.81 (NB-9-2)	11,856,619.00	7,036,090.50	222.81	248.3	24.5
Barrier 9-2 13+6.9	13+10.92 (NB-9-2)	11,856,664.00	7,036,112.50	221.73	247.2	24.5
Barrier 9-2 13+56.8	13+60.80 (NB-9-2)	11,856,709.00	7,036,134.00	220.65	245.7	24.0
Barrier 9-2 14+7.3	14+11.38 (NB-9-2)	11,856,755.00	7,036,155.00	219.57	244.1	23.5
Barrier 9-2 14+56.6	14+60.64 (NB-9-2)	11,856,800.00	7,036,175.00	218.49	242.5	23.0
Barrier 9-2 14+82.8	14+86.84 (NB-9-2)	11,856,824.00	7,036,185.50	217.93	242.4	23.5
Barrier 9-2 15+32.7	15+36.82 (NB-9-2)	11,856,870.00	7,036,205.00	216.78	241.8	24.0
Barrier 9-2 15+82.5	15+86.60 (NB-9-2)	11,856,916.00	7,036,224.00	215.16	240.7	24.5
Barrier 9-2 16+32.8	16+42.20 (NB-9-2)	11,856,968.00	7,036,243.50	214.78	239.5	24.7

Source: HMMH, 2022.

Table 20 Sound Attenuation Line for Noise Barrier 9-3 (Ground Mounted)

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier 9-3 10+0.0	9+95.00 (NB-9-3)	11,856,923.50	7,036,207.00	214.7	237.2	22.5
Barrier 9-3 10+42.9	10+42.67 (NB-9-3)	11,856,968.00	7,036,224.50	213.2	235.9	22.7
Barrier 9-3 10+93.0	10+92.90 (NB-9-3)	11,857,016.00	7,036,239.00	210.7	234.0	23.3
Barrier 9-3 11+43.4	11+43.33 (NB-9-3)	11,857,065.00	7,036,250.50	208.2	232.0	23.8
Barrier 9-3 11+93.0	11+93.08 (NB-9-3)	11,857,114.00	7,036,258.50	205.6	231.8	26.2
Barrier 9-3 12+43.4	12+43.50 (NB-9-3)	11,857,164.00	7,036,265.00	203.1	233.0	29.9
Barrier 9-3 12+86.8	12+86.94 (NB-9-3)	11,857,207.00	7,036,270.50	201.0	234.0	33
Barrier 9-3 12+92.8	12+93.08 (NB-9-3)	11,857,213.00	7,036,270.00	200.7	234.1	33.4
Barrier 9-3 13+28.8	13+28.82 (NB-9-3)	11,857,249.00	7,036,268.50	203.2	234.7	31.5
Barrier 9-3 13+43.0	13+43.02 (NB-9-3)	11,857,263.00	7,036,270.50	204.6	235.0	30.4
Barrier 9-3 13+92.6	13+92.59 (NB-9-3)	11,857,312.00	7,036,278.00	209.8	236.9	27.1
Barrier 9-3 14+43.2	14+43.22 (NB-9-3)	11,857,362.00	7,036,286.00	215.9	237.8	21.9
Barrier 9-3 14+92.8	14+92.79 (NB-9-3)	11,857,411.00	7,036,293.50	223.3	241.5	18.2
Barrier 9-3 15+20.1	15+20.20 (NB-9-3)	11,857,438.00	7,036,297.50	227.7	245.4	17.7
Barrier 9-3 15+43.1	15+43.25 (NB-9-3)	11,857,461.00	7,036,299.00	231.5	249.1	17.6
Barrier 9-3 15+93.2	15+93.33 (NB-9-3)	11,857,511.00	7,036,302.00	240.8	258.4	17.6
Barrier 9-3 16+43.3	16+43.40 (NB-9-3)	11,857,561.00	7,036,304.50	254.4	272.3	17.9
Barrier 9-3 16+93.3	16+93.24 (NB-9-3)	11,857,611.00	7,036,307.50	263.5	281.1	17.6

Source: HMMH, 2022.

Table 21 Sound Attenuation Line for the Replacement of Noise Barrier 10

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier 10 10+0.0	16+20.68 (NB-10N-2)	11,856,037.00	7,036,369.50	223.6	246.6	23.0
Barrier 10 10+75.3	15+46.38 (NB-10N-2)	11,856,023.00	7,036,295.50	224.8	247.8	23.0
Barrier 10 11+46.3	14+76.54 (NB-10N-2)	11,855,997.00	7,036,229.50	224.5	249.5	25.0
Barrier 10 11+95.9	14+19.72 (NB-10N-2)	11,855,974.00	7,036,185.50	224.9	250.9	26.0
Barrier 10 12+64.3	13+51.18 (NB-10N-2)	11,855,934.00	7,036,130.00	224.6	251.2	26.6
Barrier 10 13+38.9	12+76.42 (NB-10N-2)	11,855,881.00	7,036,077.50	225.8	252.4	26.6
Barrier 10 13+99.4	12+15.86 (NB-10N-2)	11,855,832.00	7,036,042.00	229.0	254.1	25.1
Barrier 10 14+52.1	11+63.17 (NB-10N-2)	11,855,788.00	7,036,013.00	231.9	256.3	24.5
Barrier 10 15+9.5	11+05.75 (NB-10N-2)	11,855,740.00	7,035,981.50	236.8	259.3	22.5
Barrier 10 15+56.1	10+59.16 (NB-10N-2)	11,855,701.00	7,035,956.00	240.7	262.3	21.6
Barrier 10 15+100	10+15.34 (NB-10N-2)	11,855,665.00	7,035,931.00	244.9	263.0	18.1
Barrier 10 16+62.9	17+43.34 (NB-10N-1)	11,855,612.00	7,035,897.00	248.8	264.6	15.8
Barrier 10 17+4.5	17+01.74 (NB-10N-1)	11,855,577.00	7,035,874.50	251.5	265.2	13.7
Barrier 10 17+51.2	16+55.15 (NB-10N-1)	11,855,539.00	7,035,847.50	255.0	269.2	14.2
Barrier 10 18+23.3	15+83.03 (NB-10N-1)	11,855,478.00	7,035,809.00	261.0	273.2	12.2
Barrier 10 18+94.3	15+12.03 (NB-10N-1)	11,855,419.00	7,035,769.50	266.3	278.3	12.0
Barrier 10 19+42.6	14+63.77 (NB-10N-1)	11,855,379.00	7,035,742.50	269.3	281.3	12.0
Barrier 10 19+95.5	14+10.85 (NB-10N-1)	11,855,335.00	7,035,713.00	272.0	284.0	12.0
Barrier 10 20+37.8	13+68.57 (NB-10N-1)	11,855,302.00	7,035,686.50	274.0	286.1	12.1
Barrier 10 20+87.3	13+19.09 (NB-10N-1)	11,855,263.00	7,035,656.00	275.2	287.1	11.9
Barrier 10 21+79.9	12+26.61 (NB-10N-1)	11,855,193.00	7,035,595.50	278.0	289.1	11.1
Barrier 10 22+77.5	11+29.05 (NB-10N-1)	11,855,123.00	7,035,527.50	280.0	292.9	12.9
Barrier 10 23+97.3	10+09.17 (NB-10N-1)	11,855,037.00	7,035,444.00	290.2	297.1	7.0

Source: HMMH, 2022.

Table 22 Sound Attenuation Line for Noise Barrier 10 Ext.

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier 10 Ext. 10+00	14+37.49 (NB-10S-1)	11,854,782.00	7,035,087.50	283.0	301.3	18
Barrier 10 Ext. 10+70	15+06.49 (NB-10S-1)	11,854,818.00	7,035,147.50	282.7	300.1	17
Barrier 10 Ext. 11+20	10+13.47 (NB-10S-2)	11,854,845.00	7,035,190.00	278.6	300.0	21
Barrier 10 Ext. 11+97	10+90.51 (NB-10S-2)	11,854,889.00	7,035,253.00	277.1	303.1	26
Barrier 10 Ext. 12+69	11+62.13 (NB-10S-2)	11,854,932.00	7,035,310.00	274.5	300.5	26
Barrier 10 Ext. 13+36	12+29.55 (NB-10S-2)	11,854,974.00	7,035,362.50	274.3	300.3	26
Barrier 10 Ext. 13+77	12+71.07 (NB-10S-2)	11,854,998.00	7,035,396.50	277.5	303.5	26
Barrier 10 Ext. 13+96	10+18.31 (NB-10S-3)	11,854,987.00	7,035,412.00	277.4	303.4	26
Barrier 10 Ext. 14+31	10+54.21 (NB-10S-3)	11,854,978.00	7,035,445.50	276.7	302.7	26
Barrier 10 Ext. 14+60	10+80.45 (NB-10S-3)	11,854,977.00	7,035,474.00	276.5	302.5	26

Source: HMMH, 2022.

Table 23 Sound Attenuation Line for Section of Noise Barrier 13B / 13B North Extension

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier 13B 191+00	19+97.80 (NB-13B)	11850809.01	7028013.52	295.41	316.31	20.9
Barrier 13B 192+00	21+73.66 (NB-13B)	11850842.57	7028086.91	295.31	310.96	15.7
Barrier 13B 192+50	21+24.00 (NB-13B)	11850864.26	7028132.32	293.27	313.77	20.5
Barrier 13B 193+00	21+80.25 (NB-13B)	11850888.44	7028177.68	291.02	312.49	21.5
Barrier 13B 194+00	22+93.43 (NB-13B)	11850941.68	7028277.56	285.96	312.93	27.0
Barrier 13B 195+50	24+24.34 (NB-13B)	11851003.25	7028393.09	280.11	308.29	28.2
Barrier 13B 196+00	24+62.08 (NB-13B)	11851021.00	7028426.40	278.42	306.55	28.1
Barrier 13B 197+00	25+60.58 (NB-13B)	11851067.33	7028513.32	273.94	305.44	31.5
Barrier 13B 198+00	26+66.08 (NB-13B)	11851116.95	7028606.42	268.75	297.55	28.8
Barrier 13B 199+00	27+82.78 (NB-13B)	11851171.84	7028709.41	262.99	295.38	32.4
Barrier 13B 200+00	28+65.48 (NB-13B)	11851207.02	7028784.21	259.12	285.60	26.5
Barrier 13B 200+50	29+24.63 (NB-13B)	11851230.75	7028838.39	256.95	283.52	26.6
Barrier 13B 201+00	29+67.12 (NB-13B)	11851247.80	7028877.31	255.74	281.55	25.8
Barrier 13B 201+50	30+22.61 (NB-13B)	11851270.08	7028928.13	254.57	281.04	26.5
Barrier 13B 202+00	30+77.23 (NB-13B)	11851292.02	7028978.15	253.82	280.49	26.7
Barrier 13B 203+00	31+74.01 (NB-13B)	11851330.91	7029066.77	252.56	278.50	25.9
Barrier 13B 205+00	33+55.35 (NB-13B)	11851403.87	7029232.79	250.20	280.67	30.5
Barrier 13B 206+50	35+04.46 (NB-13B)	11851463.94	7029369.27	248.27	278.00	29.7
Barrier 13B 207+00	35+74.32 (NB-13B)	11851492.10	7029433.20	247.66	277.50	29.8
Barrier 13B 208+00	36+76.31 (NB-13B)	11851533.25	7029526.52	247.01	272.54	27.5
Barrier 13B 209+00	37+69.49 (NB-13B)	11851570.93	7029611.74	246.42	270.50	28.1
Barrier 13B 210+00	38+87.67 (NB-13B)	11851619.22	7029719.60	245.66	269.30	27.6
Barrier 13B 210+50	39+36.02 (NB-13B)	11851639.14	7029763.66	245.35	268.81	27.5
Barrier 13B 211+50	40+30.07 (NB-13B)	11851678.16	7029849.23	244.75	268.79	28.0

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier 13B 212+75	41+46.01 (NB-13B)	11851726.77	7029954.49	244.01	267.51	27.5
Barrier 13B 214+00	42+70.86 (NB-13B)	11851779.74	7030067.55	243.21	267.51	28.3

Source: HMMH, 2022.

Table 24 Sound Attenuation Line for the Potential Noise Barrier C

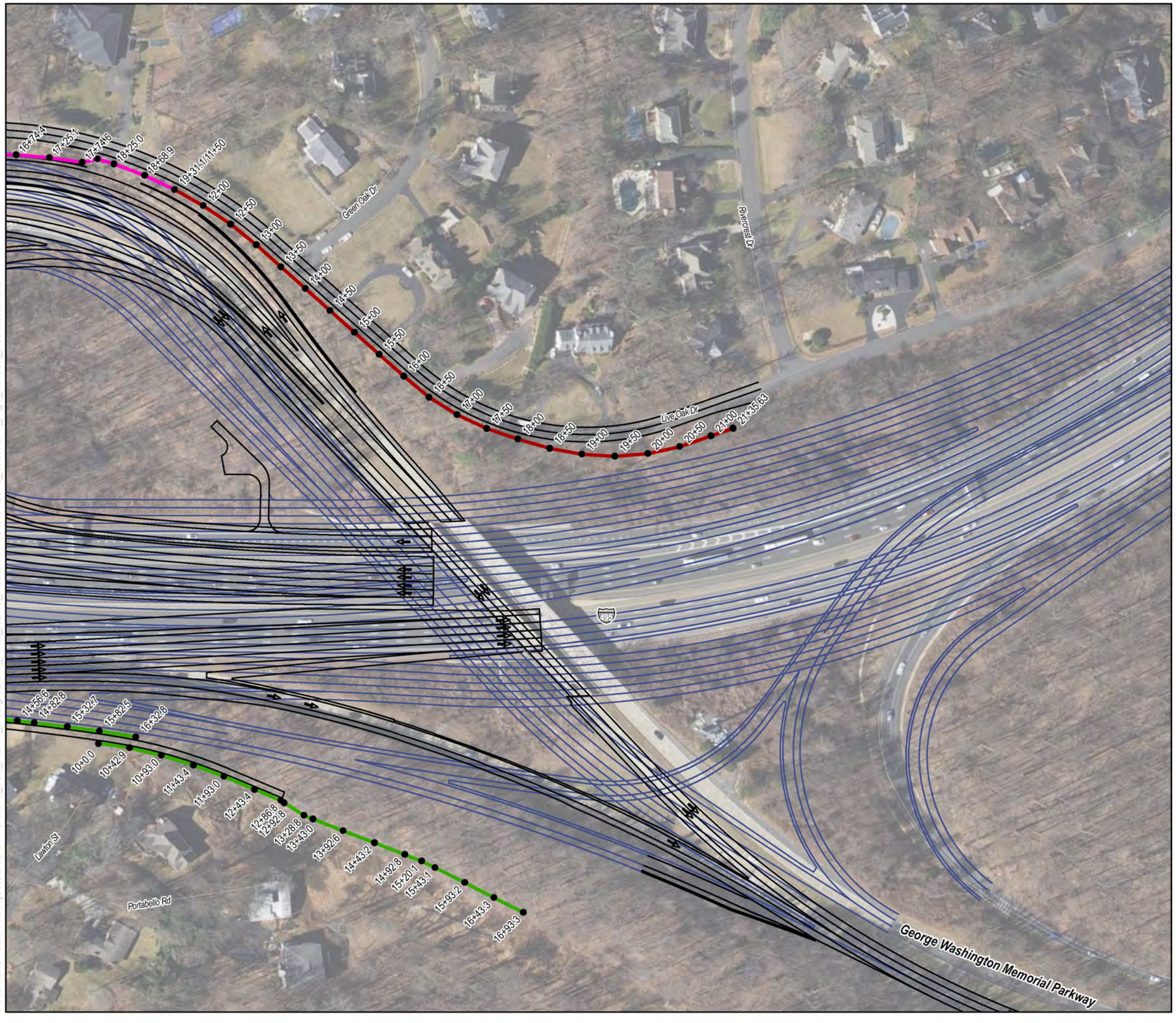
Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier C 11+50	11+50 (NB-C)	11856603.7	7036992.5	225.41	239.41	14
Barrier C 12+00	12+00 (NB-C)	11856653.6	7036992.9	229.66	247.66	18
Barrier C 12+50	12+50 (NB-C)	11856703.5	7036989.4	233.84	249.84	16
Barrier C 13+00	13+00 (NB-C)	11856752.9	7036982.0	237.5	251.5	14
Barrier C 13+50	13+50 (NB-C)	11856801.9	7036971.9	240.57	253.57	13
Barrier C 14+00	14+00 (NB-C)	11856850.9	7036961.8	243.05	256.05	13
Barrier C 14+50	14+50 (NB-C)	11856899.8	7036951.6	244.94	257.94	13
Barrier C 15+00	15+00 (NB-C)	11856948.8	7036941.4	246.24	259.24	13
Barrier C 15+50	15+50 (NB-C)	11856997.8	7036931.3	247.07	260.07	13
Barrier C 16+00	16+00 (NB-C)	11857046.7	7036921.1	247.21	260.21	13
Barrier C 16+50	16+50 (NB-C)	11857096.0	7036913.2	246.4	259.4	13
Barrier C 17+00	17+00 (NB-C)	11857146.0	7036911.3	244.75	258.75	14
Barrier C 17+50	17+50 (NB-C)	11857195.8	7036915.4	242.98	257.98	15
Barrier C 18+00	18+00 (NB-C)	11857244.7	7036925.6	241.48	257.48	16
Barrier C 18+50	18+50 (NB-C)	11857293.2	7036937.4	241.25	257.25	16
Barrier C 19+00	19+00 (NB-C)	11857340.4	7036953.9	241.68	257.68	16
Barrier C 19+50	19+50 (NB-C)	11857385.0	7036976.5	242.35	257.35	15
Barrier C 20+00	20+00 (NB-C)	11857426.2	7037004.7	243.38	257.38	14
Barrier C 20+50	20+50 (NB-C)	11857463.3	7037038.2	243.45	257.45	14
Barrier C 21+00	21+00 (NB-C)	11857496.0	7037076.0	241.55	254.55	13
Barrier C 21+35.63	21+35.63 (NB-C)	11857519.3	7037103.0	240.92	254.92	14

Source: HMMH, 2022.

Table 25 Sound Attenuation Line for the Potential Noise Barrier O West

Approximate Barrier Station No.	Plan Equivalent Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
		East (X)	North (Y)	Ground		
Barrier O 10+00	N/A	11,846,211.49	7,025,592.23	324.86	348.86	24.00
Barrier O 10+50	N/A	11,846,261.44	7,025,594.47	323.50	347.50	24.00
Barrier O 11+00	N/A	11,846,311.40	7,025,596.55	322.13	346.13	24.00
Barrier O 11+50	N/A	11,846,361.34	7,025,599.01	321.04	345.04	24.00
Barrier O 12+00	N/A	11,846,411.30	7,025,600.93	319.43	343.43	24.00
Barrier O 12+50	N/A	11,846,461.29	7,025,601.81	318.29	342.29	24.00
Barrier O 13+00	N/A	11,846,511.28	7,025,603.04	315.67	339.67	24.00
Barrier O 13+50	N/A	11,846,561.25	7,025,604.78	315.59	339.59	24.00
Barrier O 14+00	N/A	11,846,611.25	7,025,604.65	313.96	337.96	24.00
Barrier O 14+50	N/A	11,846,661.25	7,025,605.06	311.10	335.10	24.00
Barrier O 15+00	N/A	11,846,711.24	7,025,604.37	308.87	332.87	24.00
Barrier O 15+50	N/A	11,846,761.24	7,025,604.96	307.02	331.02	24.00
Barrier O 16+00	N/A	11,846,811.24	7,025,604.63	306.00	330.00	24.00
Barrier O 16+50	N/A	11,846,861.00	7,025,601.00	304.60	328.60	24.00
Barrier O 17+00	N/A	11,846,911.00	7,025,596.50	303.61	327.61	24.00
Barrier O 17+50	N/A	11,846,960.00	7,025,590.00	302.26	326.26	24.00

Source: HMMH, 2022.



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VDOT
Virginia Department of Transportation

Figure 5
Noise Barrier Station Numbers

I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

- Barrier Station Numbers

Noise Barriers

- Feasible and Reasonable
- Feasible and Not Reasonable
- Not Feasible
- Not Reasonable
- Existing Barrier to Remain
- Existing Barrier to be Replaced
- Analyzed Under Supplemental Analysis
- To Be Addressed in Addendum

Sheet 1 of 13

0 75 150 Feet

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VDOT
Virginia Department of Transportation

Figure 5
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I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

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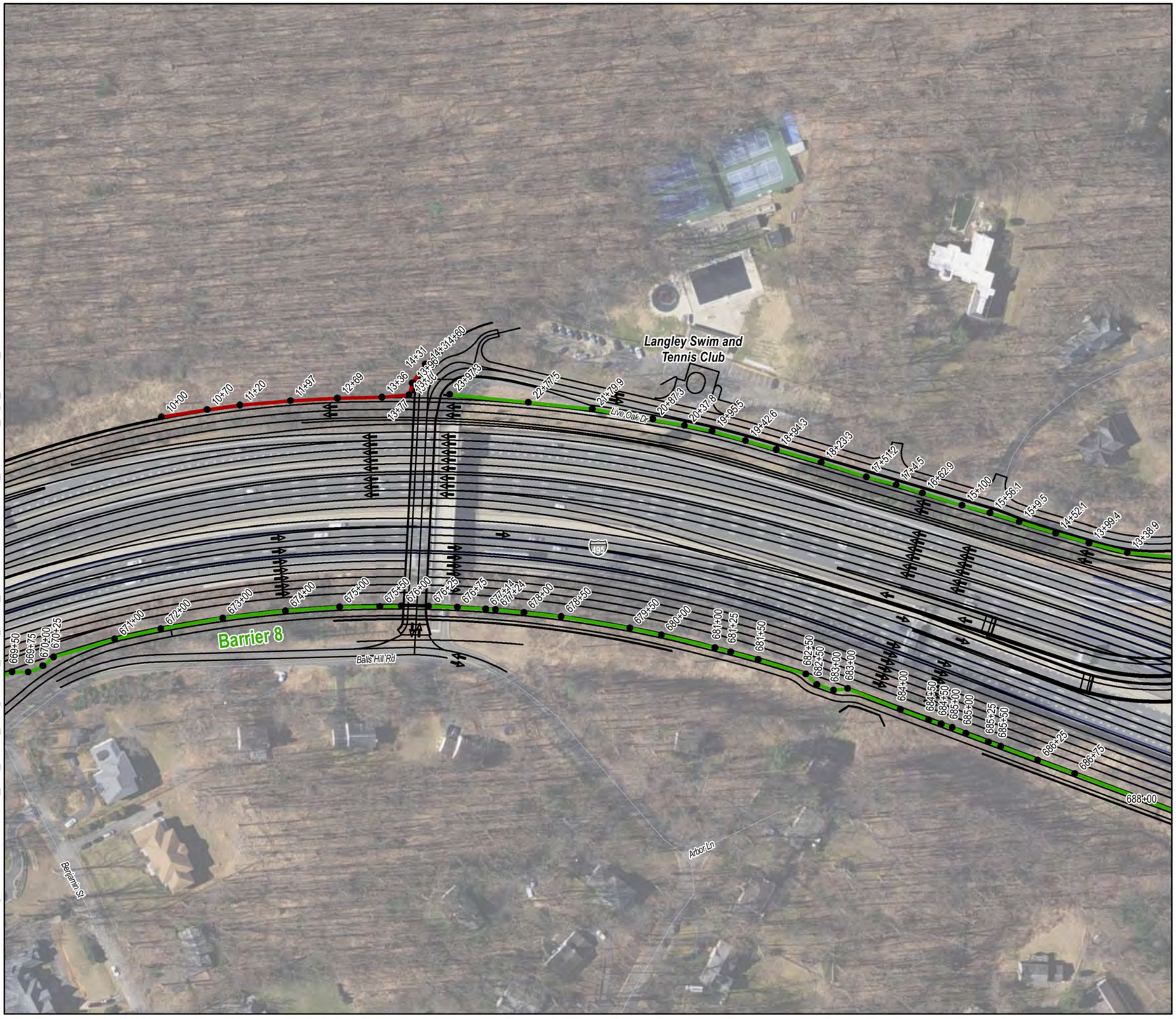

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Virginia Department of Transportation

Figure 5
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Northern Extension Project

Fairfax County, Virginia

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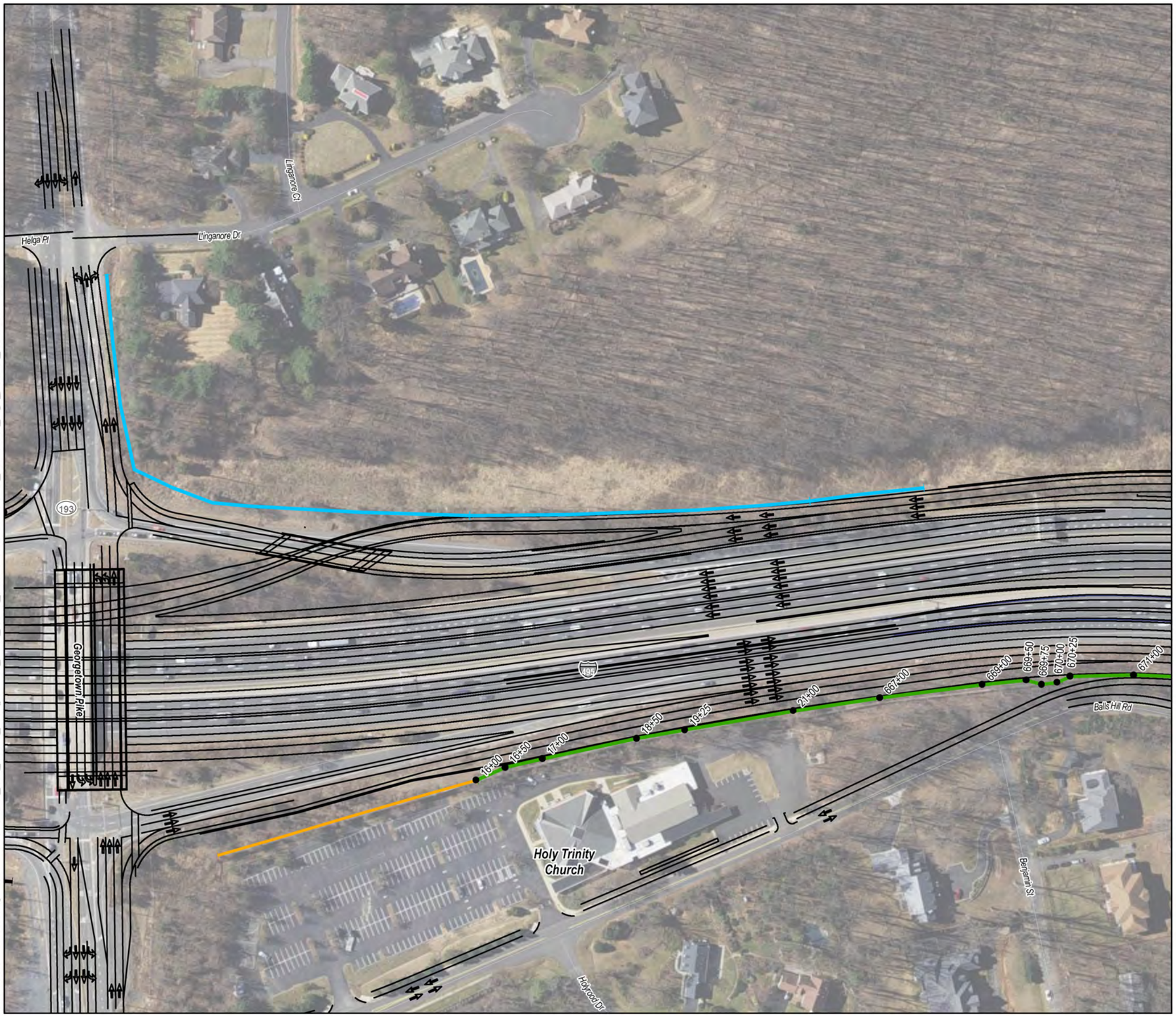

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Virginia Department of Transportation

Figure 5
Noise Barrier Station Numbers

I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

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Sheet 4 of 13

0 75 150 Feet

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Virginia Department of Transportation

Figure 5
Noise Barrier Station Numbers

I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

- Barrier Station Numbers

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Sheet 5 of 13

0 75 150 Feet

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VDOT
Virginia Department of Transportation

Figure 5
Noise Barrier Station Numbers

I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

- Barrier Station Numbers

Noise Barriers

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- Feasible and Not Reasonable
- Not Feasible
- Not Reasonable
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Sheet 6 of 13

0 75 150 Feet

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VDOT Virginia Department of Transportation

Figure 5
Noise Barrier Station Numbers

I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

- Barrier Station Numbers

Noise Barriers

- Feasible and Reasonable
- Feasible and Not Reasonable
- Not Feasible
- Not Reasonable
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- Existing Barrier to be Replaced
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Sheet 7 of 13

0 75 150 Feet

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Virginia Department of Transportation

Figure 5
Noise Barrier Station Numbers

I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

- Barrier Station Numbers

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Sheet 8 of 13

0 75 150 Feet

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Virginia Department of Transportation

Figure 5
Noise Barrier Station Numbers

I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

- Barrier Station Numbers

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lmmh

VDOT
Virginia Department of Transportation

Figure 5
Noise Barrier Station Numbers

I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

- Barrier Station Numbers

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Sheet 10 of 13

0 75 150 Feet

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Virginia Department of Transportation

Figure 5
Noise Barrier Station Numbers

I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

- Barrier Station Numbers

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Sheet 11 of 13

0 75 150 Feet

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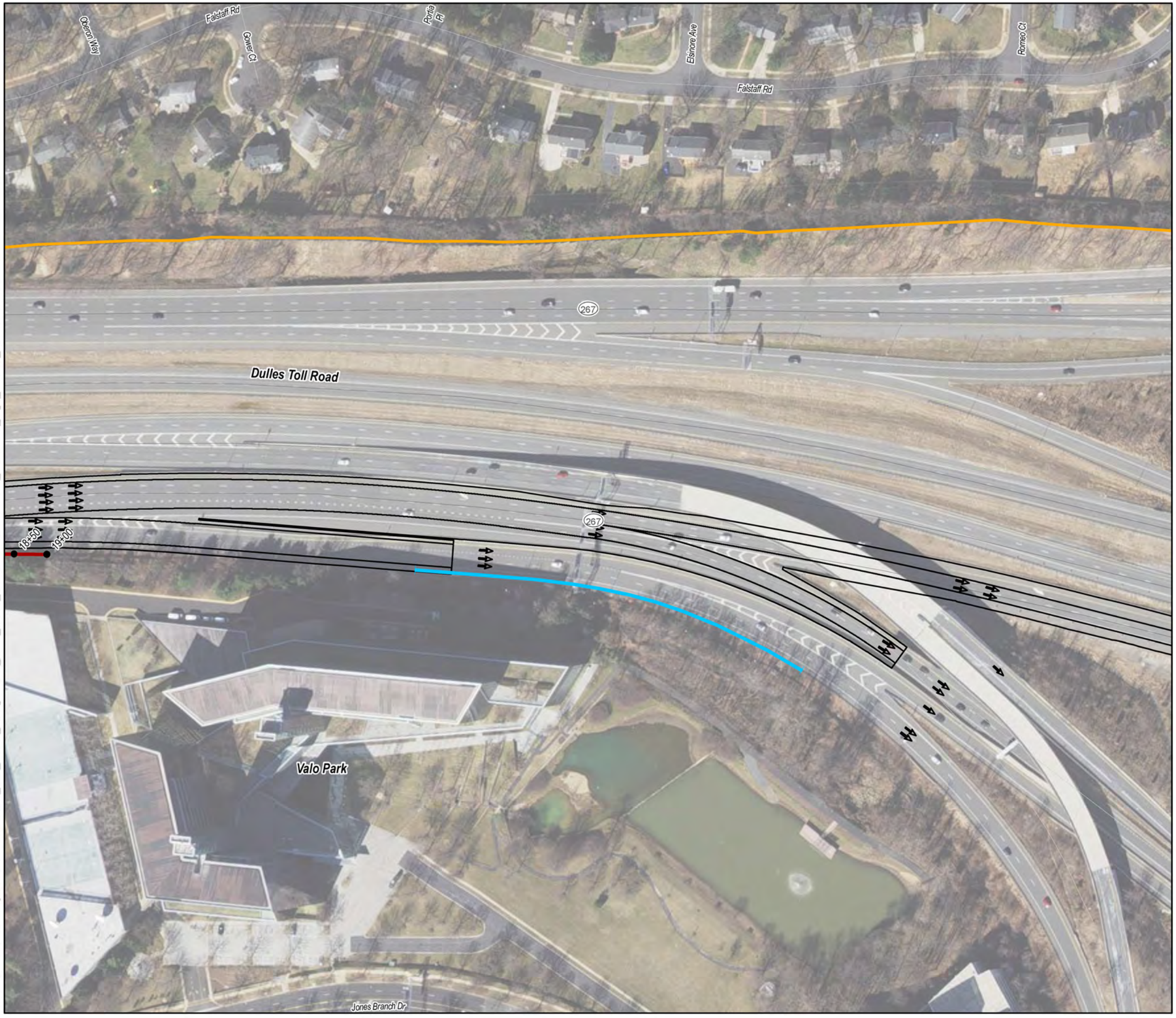

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VDOT
Virginia Department of Transportation

Figure 5
Noise Barrier Station Numbers

I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

- Barrier Station Numbers

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Sheet 12 of 13

0 75 150 Feet

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VDOT
Virginia Department of Transportation

Figure 5
Noise Barrier Station Numbers

I-495 Express Lanes
Northern Extension Project

Fairfax County, Virginia

- Barrier Station Numbers

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0 75 150 Feet

lmmh

Appendix C Documentation for Loudest Hour Traffic Conditions

Traffic data were extracted from ENTRADA sheets, which were provided by Rinker Design Associates, P.C. and processed to determine the hourly breakdown of vehicles for the I-495 general purpose and express lanes. HMMH utilized VDOT's Loudest Hour Determination (LHD) Tool[4] to process the ENTRADA data sheets and develop reference hourly noise levels based on volume, vehicle mix, and speed for a 24-hour period. Each hour of the day was rank ordered based on the reference hourly noise levels that were computed from the LHD Tool. The traffic conditions for the two loudest hours were then used as input into full TNM 2.5 models for both existing conditions and the 495 NEXT project in the design year at a set of representative receptors.

Based on the results of the TNM 2.5 modeling with the representative receptors, traffic data for the hour starting at 11 AM consistently yielded higher noise levels throughout the project corridor for the 495 NEXT project in the design year and the hour starting 17:00 for existing conditions. Table 25 shows a summary of the results from the LHD Tool for the 495 NEXT project in the design year, while Table 24 shows the results for existing conditions.

[4] https://www.virginiadot.org/projects/planning_web_tools.asp

Table 26 Loudest Hour Spreadsheet Summary for 2045 Design Year for the 495 NEXT Project

495 NEXT

BUILD

Note: Tally is for ONLY 495 ROADWAY SEGMENTS for loudest hour determination

Order	File Name	Segment	Roadway	Direction	File Name	Segment	Roadway	Direction
11	Build_FGS495CBP01_Output	FGS495CBP01	I-495 FGS495CBP01	SB	Build_FGN495GWP02_Output	FGN495GWP02	I-495 FGN495GWP02	NB
12	Build_FGS495GWP01_Output	FGS495GWP01	I-495_FGS495GWP01	SB	Build_FGN495GWP01_Output	FGN495GWP01	I-495 FGN495GWP01	NB
13	Build_FGS49519301_Output	FGS49519301	I-495 FGS49519301	SB	Build_FGN49519302_Output	FGN49519302	I-495 FGN49519302	NB
14	Build_FGS49519302_Output	FGS49519302	I-495 FGS49519302	SB	Build_FGN49519301_Output	FGN49519301	I-495 FGN49519301	NB
15	Build_FGS49519303_Output	FGS49519303	I-495 FGS49519303	SB	Build_FGN49526704_Output	FGN49526704	I-495 NB GP FGN49526704	NB
19	Build_FHS495CBP01_Output	FHS495CBP01	I-495 Express_FHS495CBP01	SB	Build_FHN495GWP02_Output	FHN495GWP02	I-495 Express_FHN495GWP02	NB
20	Build_FHS496GWP01_Output	FHS495GWP01	I-495 Express_FHS495GWP01	SB	Build_FHN495GWP01_Output	FHN495GWP01	I-495 Express_FHN495GWP01	NB
21	Build_FHS49510301_Output	FHS49519301	I-495 SB HOT FHS49519301	SB	Build_FHN49526705_Output	FHN49526705	I-495 Express FHN49526705	NB

	Combined Leq for Top 3 Loudest Hours by Road Segment																						
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Order	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
11	76.4	75.38	74.72	75.59	77.18	**79.11**	77.31	74.61	74.48	78.13	78.97	**79.45**	78.92	77.82	77.77	78.47	**79.05**	78.4	78.5	78.5	78.98	79.04	78.54	77.65
12	76.01	75.16	74.72	75.21	76.76	78.9	78.99	77.79	78.5	79.63	**79.95**	**80.12**	**79.88**	79.4	79.36	79.52	79.81	79.76	79.1	78.76	78.89	78.53	78.07	76.96
13	76.06	75.21	74.75	75.23	76.81	79.02	76.09	75.44	74.12	75.53	76.71	**80.03**	**79.71**	**79.19**	76.1	76.74	77	77.06	76.11	75.71	78.94	78.64	78.17	77.05
14	76.01	75.2	74.73	75.21	76.78	78.91	76.15	75.16	73.62	75.02	76.42	**79.92**	**79.84**	**79.28**	75.72	76.46	76.77	76.91	76.13	75.71	78.9	78.6	78.13	77.01
15	75.9	75.49	74.74	74.49	75.35	77.39	75.58	74.16	77.19	78.37	**78.52**	**78.7**	**78.46**	78.1	77.69	77.91	77.73	77.42	77.5	77.22	77.76	77.94	77.5	76.68
19	56.34	52.98	52.98	55.23	57.99	72.78	74.84	**76.74**	**76.59**	76.25	76.43	**77.52**	75.81	76.36	76.25	76.15	76.49	76.41	75.92	74.96	73.08	71.54	69	70.06
20	67.9	68.79	69.79	69.55	68.49	72.68	74.56	75.78	75.46	**76.11**	**75.86**	75.27	74.72	75.41	75.46	75.5	**76.39**	75.61	74.71	75.31	73.15	72.1	71.73	67.52
21	68.07	69.11	70.16	69.86	68.74	72.91	74.87	**76.46**	76.1	**76.38**	76.2	76.27	75.07	75.82	75.84	76.11	**76.99**	75.95	75.2	75.39	73	71.96	71.9	67.66

Table 27 Loudest Hour Spreadsheet Summary for Existing Conditions for the 495 NEXT Project

495 NEXT

EXISTING 2018

Order	Roadway	Direction	Start/End	Roadway	Direction	Start/End
1	I-495	NB	Route 123 On-Ramp - DTR WB Off-Ramp	I-495	SB	495 SB General Purpose to DTR EB Off-Ramp - DAAR On-Ramp/Route 123 WB Off Ramp
2	I-495	NB	DTR WB Off-Ramp - DAAR On-Ramp	I-495	SB	495 SB General Purpose to DTR WB Off-Ramp - 495 SB General Purpose to DTR EB Off-Ramp
3	I-495	NB	DAAR On-Ramp - DTR WB On-Ramp	I-495	SB	495 SB Express to DTR WB Off-Ramp - 495 SB General Purpose to DTR WB Off-Ramp
4	I-495	NB	DTR WB On-Ramp - Jones Branch/NB Express On-Ramp	I-495	SB	495 SB Express - 495 SB Express to DTR WB Off-Ramp
5	I-495	NB	Jones Branch/NB Express On-Ramp - Georgetown Pike Off-Ramp	I-495	SB	Georgetown Pike On-Ramp - 495 SB Express
6	I-495	NB	Shoulder Start - Georgetown Pike Off-Ramp	I-495	SB	Georgetown Pike On-Ramp - 495 SB Express
7	I-495	NB	Georgetown Pike Off-Ramp - Georgetown Pike On-Ramp	I-495	SB	CD On-Ramp/Georgetown Pike Off-Ramp - Georgetown Pike On-Ramp
8	I-495	NB	Georgetown Pike Off-Ramp - Georgetown Pike On-Ramp	I-495	SB	CD On-Ramp/Georgetown Pike Off-Ramp - Georgetown Pike On-Ramp
9	I-495	NB	Georgetown Pike On-Ramp - George Washington Memorial Parkway Off Ramp	I-495	SB	CD Off-Ramp - CD On-Ramp/Georgetown Pike Off-Ramp
10	I-495	NB	Georgetown Pike On-Ramp - George Washington Memorial Parkway Off Ramp	I-495	SB	CD Off-Ramp - CD On-Ramp/Georgetown Pike Off-Ramp
11	I-495	NB	George Washington Memorial Parkway Off Ramp - George Washington Memorial Parkway On Ramp	I-495	SB	CD Off-Ramp - CD On-Ramp/Georgetown Pike Off-Ramp
12	I-495	NB	George Washington Memorial Parkway On Ramp - Clara Barton Off-Ramp	I-495	SB	Clara Barton On-Ramp - George Washington Memorial Parkway/CD Off-Ramp
24	I-495 Express	NB	Route 123 On-Ramp - Jones Branch Off-Ramp	I-495 Express	SB	Jones Branch On-Ramp - DTR EB General Purpose On-Ramp
25	I-495 Express	NB	Jones Branch Off-Ramp - DTR WB Off-Ramp	I-495 Express	SB	Jones Branch Off-Ramp - Jones Branch On-Ramp
26	I-495 Express	NB	DTR WB Off-Ramp - Jones Branch On-Ramp	I-495 Express	SB	Jones Branch Off-Ramp - Jones Branch On-Ramp
27	I-495 Express	NB	Jones Branch On-Ramp - Reduction to 2 lanes	NA	NA	NA
28	I-495 Express	NB	Reduction to 2 lanes - I-495 NB General Purpose	I-495 Express	SB	I-495 SB General Purpose - DTR WB Off-Ramp

	Combined Leq for Top 3 Loudest Hours by Road Segment																							
Order	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
1	75.41	74.53	74.18	74.68	76.21	78.36	78.82	78.75	78.9	**79.64**	**79.73**	79.58	79.53	**79.61**	79.5	79.21	79.41	79.2	78.39	77.97	78.16	78.01	77.41	76.3
2	75.29	74.34	74.03	74.55	76.04	78.15	78.5	78.63	79.06	**79.64**	**79.53**	79.41	79.38	**79.46**	79.34	78.94	79.23	78.92	78.06	77.62	77.91	77.86	77.21	76.12
3	73.53	72.32	71.94	72.21	74.16	77.03	77.83	77.75	78.18	78.35	**78.53**	78.33	**78.37**	78.32	**78.49**	78.02	78.17	78.19	77.28	77.02	76.97	76.7	76.07	74.64
4	74.15	72.95	72.53	72.91	74.98	77.71	78.02	77.15	77.14	78.01	78.4	**78.47**	78.4	78.2	78.21	**78.51**	78.45	**78.5**	77.93	77.6	77.66	77.22	76.68	75.3
5	74.15	73	72.57	72.95	75.01	77.76	77.92	76.95	76.52	77.26	77.99	**78.22**	**78.29**	77.83	77.7	**78.21**	78.09	78.07	77.71	77.42	77.72	77.32	76.65	75.4
6	74.15	73	72.57	72.95	75.01	77.76	77.92	76.95	76.52	77.26	77.99	**78.22**	**78.29**	77.83	77.7	**78.21**	78.09	78.07	77.71	77.42	77.72	77.32	76.65	75.4
7	74.1	72.97	72.55	72.93	74.98	77.76	77.92	77.13	76.84	77.51	78.14	78.31	**78.41**	78.1	77.94	**78.39**	78.28	**78.37**	77.7	77.58	77.76	77.25	76.75	75.36
8	74.1	72.97	72.55	72.93	74.98	77.76	77.92	77.13	76.84	77.51	78.14	78.31	**78.41**	78.1	77.94	**78.39**	78.28	**78.37**	77.7	77.58	77.76	77.25	76.75	75.36
9	74.05	72.93	72.51	72.91	74.96	77.72	77.99	77.31	77.67	78.26	78.37	78.41	78.44	78.28	78.23	**78.52**	**78.61**	**78.5**	77.9	77.66	77.61	77.14	76.64	75.26
10	74.05	72.93	72.51	72.91	74.96	77.72	77.99	77.31	77.67	78.26	78.37	78.41	78.44	78.28	78.23	**78.52**	**78.61**	**78.5**	77.9	77.66	77.61	77.14	76.64	75.26
11	74.14	72.95	72.54	72.97	75	77.72	78.07	76.85	77.27	78.26	78.51	78.55	78.41	78.2	78.16	**78.66**	**79**	**78.91**	78.21	77.93	77.72	77.3	76.75	75.32
12	76.4	75.42	74.91	75.44	77.18	**79.06**	76.6	73.71	74.51	77.3	78.46	**78.95**	78.45	77.34	77	78.06	78.55	78.13	78.21	78.27	**78.88**	78.82	78.57	77.7
24	59.24	56.04	55.38	56.44	59.92	66.92	70.48	72.55	73.05	73.06	72.26	**73.55**	71.74	72.69	72.37	73.29	**73.79**	**74.44**	73.12	71.4	69.09	67.18	65.85	63.51
25	58.99	55.92	55.26	56.48	59.69	66.74	70.3	72.26	72.55	72.53	72.05	**73.42**	71.54	72.58	72.19	72.99	**73.23**	**73.76**	72.69	71.17	68.92	66.99	65.79	63.31
26	58.06	55.36	54.54	55.81	58.06	64.69	68.74	70.84	70.86	71.35	71.3	**72.92**	70.7	71.67	71.22	71.7	**71.79**	**72.48**	71.64	70.4	68.12	66.36	65.33	62.87
27	54.68	51.68	51.68	53.88	56.48	63.34	68.37	**70.82**	70.58	69.76	69.61	**71.79**	68.64	69.49	68.91	69.63	70.3	**70.74**	69.3	68.03	65.63	63.72	62.17	59.41
28	59.47	56.46	55.38	56.82	59.65	66.2	70.53	72.97	73.39	73.28	72.73	**73.78**	71.83	72.77	72.69	73.19	**73.44**	**74.05**	73.13	71.7	69.19	67.26	66.23	63.67

Appendix D Traffic Data Used as Input to the Noise Model

495 NEXT

Noise Measurements - Field Traffic Counts

Site M01

Raw Field Counts

Site	M01	
	495 NB	60
Duration (min)	15	
Auto	1010	60
MT	56	60
HT	85	60

Site	M01	
	495 SB	60
Duration (min)	15	
Auto	1331	60
MT	28	60
HT	87	60

Site	M01	
	495 NB Onramp	40
Duration (min)	15	
Auto	250	40
MT	5	40
HT	0	0

Hourly Volumes

Site	M01	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	4040	60
MT	224	60
HT	340	60

	M01	
Roadway	495 SB	60
Duration (min)	60	
Auto	5324	60
MT	112	60
HT	348	60

	M01	
Roadway	495 NB Onramp	40
Duration (min)	60	
Auto	1000	40
MT	20	40
HT	0	0

495 NEXT

Noise Measurements - Field Traffic Counts

Site M02

Raw Field Counts

Site	M02	
	495 NB	60
Duration (min)	15	
Auto	865	60
MT	70	60
HT	89	60

Site	M02	
	495 NB Onramp	40
Duration (min)	15	
Auto	235	40
MT	2	40
HT	0	0

Site	M02	
	495 SB	60
Duration (min)	15	
Auto	975	60
MT	60	60
HT	91	60
Site	M02	
	495 SB Offramp	45
Duration (min)	15	
Auto	363	45
MT	10	45
HT	1	45

Hourly Volumes

Site	M02	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	3460	60
MT	280	60
HT	356	60

	M02	
Roadway	495 NB Onramp	40
Duration (min)	60	
Auto	940	40
MT	8	40
HT	0	0

	M02	
Roadway	495 SB	60
Duration (min)	60	
Auto	3900	60
MT	240	60
HT	364	60
	M02	
Roadway	495 SB Offramp	45
Duration (min)	60	
Auto	1452	45
MT	40	45
HT	4	45

495 NEXT

Noise Measurements - Field Traffic Counts

Site M03

Raw Field Counts

Site	M03	
	495 NB	60
Duration (min)	15	
Auto	938	60
MT	45	60
HT	77	60

Site	M03	
	495 SB	60
Duration (min)	15	
Auto	999	60
MT	50	60
HT	56	60

Site	M03	
	495 SB Offramp	45
Duration (min)	15	
Auto	303	45
MT	6	45
HT	0	0

Hourly Volumes

Site	M03	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	3752	60
MT	180	60
HT	308	60

	M03	
Roadway	495 SB	60
Duration (min)	60	
Auto	3996	60
MT	200	60
HT	224	60

	M03	
Roadway	495 SB Offramp	45
Duration (min)	60	
Auto	1212	45
MT	24	45
HT	0	0

495 NEXT

Noise Measurements - Field Traffic Counts

Site M04

Raw Field Counts

Site	M04	
	495 NB	60
Duration (min)	15	
Auto	1178	60
MT	163	60
HT	65	60

Site	M04	
	495 NB Offramp	40
Duration (min)	15	
Auto	452	40
MT	25	40
HT	0	0

Site	M04	
	495 SB	60
Duration (min)	15	
Auto	1330	60
MT	149	60
HT	83	60
Site	M04	
	495 SB Offramp	45
Duration (min)	15	
Auto	367	45
MT	6	45
HT	1	45

Hourly Volumes

Site	M04	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	4712	60
MT	652	60
HT	260	60

	M04	
Roadway	495 NB Offramp	40
Duration (min)	60	
Auto	1808	40
MT	100	40
HT	0	0

	M04	
Roadway	495 SB	60
Duration (min)	60	
Auto	5320	60
MT	596	60
HT	332	60
	M04	
Roadway	495 SB Offramp	45
Duration (min)	60	
Auto	1468	45
MT	24	45
HT	4	45

495 NEXT

Noise Measurements - Field Traffic Counts

Site M05

Raw Field Counts

Site	M05	
	495 NB	60
Duration (min)	15	
Auto	1045	60
MT	49	60
HT	83	60

Site	M05	
	495 SB	60
Duration (min)	15	
Auto	1027	60
MT	43	60
HT	73	60

Site	M05	
	495 SB Offramp	45
Duration (min)	15	
Auto	345	45
MT	6	45
HT	0	0

Hourly Volumes

Site	M05	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	4180	60
MT	196	60
HT	332	60

	M05	
Roadway	495 SB	60
Duration (min)	60	
Auto	4108	60
MT	172	60
HT	292	60

	M05	
Roadway	495 SB Offramp	45
Duration (min)	60	
Auto	1380	45
MT	24	45
HT	0	0

495 NEXT

Noise Measurements - Field Traffic Counts

Site M06_M07

Raw Field Counts

Site	M06/M07	
	495 NB	60
Duration (min)	15	
Auto	1042	60
MT	48	60
HT	81	60

Site	M06/M07	
	495 SB	60
Duration (min)	15	
Auto	1000	60
MT	42	60
HT	89	60

Hourly Volumes

Site	M06/M07	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	4168	60
MT	192	60
HT	324	60

	M06/M07	
Roadway	495 SB	60
Duration (min)	60	
Auto	4000	60
MT	168	60
HT	356	60

495 NEXT

Noise Measurements - Field Traffic Counts

Site M09

Raw Field Counts

Site	M09	
	Georgetown Pike EB	35
Duration (min)	5	
Auto	15	35
MT	1	35
HT	0	0

Site	M09	
	Georgetown Pike WB	35
Duration (min)	5	
Auto	46	35
MT	0	0
HT	0	0

Hourly Volumes

Site	M09	**Speed**
Roadway	Georgetown Pike EB	35
Duration (min)	60	
Auto	180	35
MT	12	35
HT	0	0

	M09	
Roadway	Georgetown Pike WB	35
Duration (min)	60	
Auto	552	35
MT	0	0
HT	0	0

495 NEXT

Noise Measurements - Field Traffic Counts

Site M10

Raw Field Counts

Site	M10	
	495 NB	55
Duration (min)	15	
Auto	1082	55
MT	128	55
HT	113	55

Site	M10	
	495 NB Onramp	40
Duration (min)	15	
Auto	156	40
MT	19	40
HT	0	0

Site	M10	
	495 SB	60
Duration (min)	15	
Auto	1107	60
MT	115	60
HT	110	60
Site	M10	
	Georgetown Pike EB	35
Duration (min)	15	
Auto	210	35
MT	24	35
HT	4	35

Site	M10	
	Georgetown Pike WB	35
Duration (min)	15	
Auto	89	35
MT	11	35
HT	5	35

Hourly Volumes

Site	M10	**Speed**
Roadway	495 NB	55
Duration (min)	60	
Auto	4328	55
MT	512	55
HT	452	55

	M10	
Roadway	495 NB Onramp	40
Duration (min)	60	
Auto	624	40
MT	76	40
HT	0	0

	M10	
Roadway	495 SB	60
Duration (min)	60	
Auto	4428	60
MT	460	60
HT	440	60
	M10	
Roadway	Georgetown Pike EB	35
Duration (min)	60	
Auto	840	35
MT	96	35
HT	16	35

	M10	
Roadway	Georgetown Pike WB	35
Duration (min)	60	
Auto	356	35
MT	44	35
HT	20	35

495 NEXT

Noise Measurements - Field Traffic Counts

Site M12

Raw Field Counts

Site	M12	
	495 NB	60
Duration (min)	15	
Auto	1133	60
MT	189	60
HT	63	60

Site	M12	
	495 SB	60
Duration (min)	15	
Auto	1048	60
MT	171	60
HT	57	60

Hourly Volumes

Site	M12	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	4532	60
MT	756	60
HT	252	60

	M12	
Roadway	495 SB	60
Duration (min)	60	
Auto	4192	60
MT	684	60
HT	228	60

495 NEXT

Noise Measurements - Field Traffic Counts

Site M13

Raw Field Counts

Site	M13	
	495 NB	35
Duration (min)	15	
Auto	1100	35
MT	42	35
HT	70	35

Site	M13	
	495 SB	60
Duration (min)	15	
Auto	1419	60
MT	45	60
HT	76	60

Hourly Volumes

Site	M13	**Speed**
Roadway	495 NB	35
Duration (min)	60	
Auto	4400	35
MT	168	35
HT	280	35

	M13	
Roadway	495 SB	60
Duration (min)	60	
Auto	5676	60
MT	180	60
HT	304	60

495 NEXT

Noise Measurements - Field Traffic Counts

Site M14

Raw Field Counts

Site	M14	
	495 NB	60
Duration (min)	15	
Auto	1598	60
MT	197	60
HT	98	60

Site	M14	
	495 SB	60
Duration (min)	15	
Auto	1187	60
MT	166	60
HT	53	60

Hourly Volumes

Site	M14	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	6392	60
MT	788	60
HT	392	60

	M14	
Roadway	495 SB	60
Duration (min)	60	
Auto	4748	60
MT	664	60
HT	212	60

495 NEXT

Noise Measurements - Field Traffic Counts

Site M16

Raw Field Counts

Site	M16	
	495 NB	60
Duration (min)	15	
Auto	901	60
MT	112	60
HT	96	60

Site	M16	
	495 SB	60
Duration (min)	15	
Auto	881	60
MT	114	60
HT	97	60

Hourly Volumes

Site	M16	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	3604	60
MT	448	60
HT	384	60

	M16	
Roadway	495 SB	60
Duration (min)	60	
Auto	3524	60
MT	456	60
HT	388	60

495 NEXT

Noise Measurements - Field Traffic Counts

Site M17

Raw Field Counts

Site	M17	
	495 NB	60
Duration (min)	15	
Auto	1100	60
MT	116	60
HT	80	60

Site	M17	
	495 SB	60
Duration (min)	15	
Auto	1106	60
MT	117	60
HT	72	60

Hourly Volumes

Site	M17	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	4400	60
MT	464	60
HT	320	60

	M17	
Roadway	495 SB	60
Duration (min)	60	
Auto	4424	60
MT	468	60
HT	288	60

495 NEXT

Noise Measurements - Field Traffic Counts

Site M19

Raw Field Counts

Site	M19	
	495 NB	60
Duration (min)	15	
Auto	991	60
MT	120	60
HT	96	60

Site	M19	
	495 SB	60
Duration (min)	15	
Auto	1174	60
MT	113	60
HT	93	60

Site	M19	
	Old Dominion EB	40
Duration (min)	15	
Auto	55	40
MT	6	40
HT	1	40
Site	M19	
	Old Dominion WB	40
Duration (min)	15	
Auto	49	40
MT	3	40
HT	0	0

Hourly Volumes

Site	M19	Speed
Roadway	495 NB	60
Duration (min)	60	
Auto	3964	60
MT	480	60
HT	384	60

	M19	
Roadway	495 SB	60
Duration (min)	60	
Auto	4696	60
MT	452	60
HT	372	60

	M19	
Roadway	Old Dominion EB	40
Duration (min)	60	
Auto	220	40
MT	24	40
HT	4	40
	M19	
Roadway	Old Dominion WB	40
Duration (min)	60	
Auto	196	40
MT	12	40
HT	0	0

495 NEXT

Noise Measurements - Field Traffic Counts

Site M23

Raw Field Counts

Site	M23	
	495 NB	60
Duration (min)	5	
Auto	395	60
MT	15	60
HT	17	60

Site	M23	
	495 SB	60
Duration (min)	15	
Auto	1089	60
MT	43	60
HT	59	60

Hourly Volumes

Site	M23	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	4740	60
MT	180	60
HT	204	60

	M23	
Roadway	495 SB	60
Duration (min)	60	
Auto	4356	60
MT	172	60
HT	236	60

495 NEXT

Noise Measurements - Field Traffic Counts

Site M24

Raw Field Counts

Site	M24	
	495 NB	60
Duration (min)	15	
Auto	1245	60
MT	165	60
HT	82	60

Site	M24	
	495 SB	60
Duration (min)	15	
Auto	1120	60
MT	103	60
HT	83	60

Site	M24	
	Old Dominion EB	40
Duration (min)	15	
Auto	65	40
MT	1	40
HT	4	40
Site	M24	
	Old Dominion WB	40
Duration (min)	15	
Auto	69	40
MT	6	40
HT	2	40

Hourly Volumes

Site	M24	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	4980	60
MT	660	60
HT	328	60

	M24	
Roadway	495 SB	60
Duration (min)	60	
Auto	4480	60
MT	412	60
HT	332	60

	M24	
Roadway	Old Dominion EB	40
Duration (min)	60	
Auto	260	40
MT	4	40
HT	16	40
	M24	
Roadway	Old Dominion WB	40
Duration (min)	60	
Auto	276	40
MT	24	40
HT	8	40

495 NEXT

Noise Measurements - Field Traffic Counts

Site M25

Raw Field Counts

Site	M25	
	495 NB	30
Duration (min)	15	
Auto	952	30
MT	98	30
HT	84	30

Site	M25	
	495 NB Express	60
Duration (min)	15	
Auto	105	60
MT	6	60
HT	0	0

Site	M25	
	495 NB Onramp	30
Duration (min)	15	
Auto	86	30
MT	9	30
HT	0	0
Site	M25	
	495 SB	60
Duration (min)	15	
Auto	1276	60
MT	115	60
HT	78	60

Hourly Volumes

Site	M25	**Speed**
Roadway	495 NB	30
Duration (min)	60	
Auto	3808	30
MT	392	30
HT	336	30

	M25	
Roadway	495 NB Express	60
Duration (min)	60	
Auto	420	60
MT	24	60
HT	0	0

	M25	
Roadway	495 NB Onramp	30
Duration (min)	60	
Auto	344	30
MT	36	30
HT	0	0
	M25	
Roadway	495 SB	60
Duration (min)	60	
Auto	5104	60
MT	460	60
HT	312	60

495 NEXT

Noise Measurements - Field Traffic Counts

Site M26

Raw Field Counts

Site	M26	
	495 NB	30
Duration (min)	15	
Auto	968	30
MT	85	30
HT	60	30

Site	M26	
	495 NB Onramp	30
Duration (min)	15	
Auto	42	30
MT	1	30
HT	0	0

Site	M26	
	495 NB Express	60
Duration (min)	15	
Auto	111	60
MT	11	60
HT	0	0
Site	M26	
	495 SB	60
Duration (min)	15	
Auto	1502	60
MT	128	60
HT	56	60

Site	M26	
	495 SB Express	60
Duration (min)	15	
Auto	180	60
MT	10	60
HT	0	0

Site	M26	
	Old Dominion EB	40
Duration (min)	15	
Auto	85	40
MT	4	40
HT	0	0

Site	M26	
	Old Dominion WB	40
Duration (min)	15	
Auto	152	40
MT	5	40
HT	2	40

Hourly Volumes

Site	M26	Speed
Roadway	495 NB	30
Duration (min)	60	
Auto	3872	30
MT	340	30
HT	240	30

	M26	
Roadway	495 NB Onramp	30
Duration (min)	60	
Auto	168	30
MT	4	30
HT	0	0

	M26	
Roadway	495 NB Express	60
Duration (min)	60	
Auto	444	60
MT	44	60
HT	0	0
	M26	
Roadway	495 SB	60
Duration (min)	60	
Auto	6008	60
MT	512	60
HT	224	60

	M26	
Roadway	495 SB Express	60
Duration (min)	60	
Auto	720	60
MT	40	60
HT	0	0

	M26	
Roadway	Old Dominion EB	40
Duration (min)	60	
Auto	340	40
MT	16	40
HT	0	0

	M26	
Roadway	Old Dominion WB	40
Duration (min)	60	
Auto	608	40
MT	20	40
HT	8	40

495 NEXT

Noise Measurements - Field Traffic Counts

Site M27

Raw Field Counts

Site	M27	
	495 NB	60
Duration (min)	15	
Auto	855	60
MT	27	60
HT	47	60

Site	M27	
	495 NB Toll	60
Duration (min)	15	
Auto	129	60
MT	5	60
HT	0	0

Site	M27	
	495 SB	60
Duration (min)	15	
Auto	1144	60
MT	20	60
HT	53	60
Site	M27	
	495 SB Toll	60
Duration (min)	15	
Auto	156	60
MT	3	60
HT	1	60

Hourly Volumes

Site	M27	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	3420	60
MT	108	60
HT	188	60

	M27	
Roadway	495 NB Toll	60
Duration (min)	60	
Auto	516	60
MT	20	60
HT	0	0

	M27	
Roadway	495 SB	60
Duration (min)	60	
Auto	4576	60
MT	80	60
HT	212	60
	M27	
Roadway	495 SB Toll	60
Duration (min)	60	
Auto	624	60
MT	12	60
HT	4	60

495 NEXT

Noise Measurements - Field Traffic Counts

Site M28

Raw Field Counts

Site	M28	
	495 NB	60
Duration (min)	15	
Auto	1035	60
MT	118	60
HT	67	60

Site	M28	
	495 NB Express	60
Duration (min)	15	
Auto	92	60
MT	14	60
HT	1	60

Site	M28	
	495 NB Onramp	30
Duration (min)	15	
Auto	78	30
MT	14	30
HT	1	30
Site	M28	
	495 SB	60
Duration (min)	15	
Auto	1162	60
MT	117	60
HT	73	60

Hourly Volumes

Site	M28	**Speed**
Roadway	495 NB	60
Duration (min)	60	
Auto	4140	60
MT	472	60
HT	268	60

	M28	
Roadway	495 NB Express	60
Duration (min)	60	
Auto	368	60
MT	56	60
HT	4	60

	M28	
Roadway	495 NB Onramp	30
Duration (min)	60	
Auto	312	30
MT	56	30
HT	4	30
	M28	
Roadway	495 SB	60
Duration (min)	60	
Auto	4648	60
MT	468	60
HT	292	60

495 NEXT

EXISTING 2018

Loudest Hour: 17:00

Link #	Segment	Link Name/Start & End Point		ENTRADA TRAFFIC Veh.	ENTRADA TRAFFIC Speed
1	FGN49526701	I-495 NB-Route 123 On-Ramp to DTR WB Off-Ramp	Autos	3292	61
1	FGN49526701	I-495 NB-Route 123 On-Ramp to DTR WB Off-Ramp	MT	110	61
1	FGN49526701	I-495 NB-Route 123 On-Ramp to DTR WB Off-Ramp	HT	110	61
2	FGN49526702	I-495 NB-DTR WB Off-Ramp to DAAR On-Ramp	Autos	3292	61
2	FGN49526702	I-495 NB-DTR WB Off-Ramp to DAAR On-Ramp	MT	110	61
2	FGN49526702	I-495 NB-DTR WB Off-Ramp to DAAR On-Ramp	HT	110	61
3	FGN49526703	I-495 NB-DAAR On-Ramp to DTR WB On-Ramp	Autos	3106	61
3	FGN49526703	I-495 NB-DAAR On-Ramp to DTR WB On-Ramp	MT	3	61
3	FGN49526703	I-495 NB-DAAR On-Ramp to DTR WB On-Ramp	HT	3	61
4	FGN49526704	I-495 NB-DTR WB On-Ramp to Jones Branch/NB Express On-Ramp	Autos	3367	61
4	FGN49526704	I-495 NB-DTR WB On-Ramp to Jones Branch/NB Express On-Ramp	MT	3	61
4	FGN49526704	I-495 NB-DTR WB On-Ramp to Jones Branch/NB Express On-Ramp	HT	3	61
5	FGN49526705	I-495 NB-Jones Branch/NB Express On-Ramp to Georgetown Pike Off-Ramp	Autos	3367	61
5	FGN49526705	I-495 NB-Jones Branch/NB Express On-Ramp to Georgetown Pike Off-Ramp	MT	3	61
5	FGN49526705	I-495 NB-Jones Branch/NB Express On-Ramp to Georgetown Pike Off-Ramp	HT	3	61
6	FSN49526705A	I-495 NB-Shoulder Start to Georgetown Pike Off-Ramp	Autos	3367	61
6	FSN49526705A	I-495 NB-Shoulder Start to Georgetown Pike Off-Ramp	MT	3	61
6	FSN49526705A	I-495 NB-Shoulder Start to Georgetown Pike Off-Ramp	HT	3	61
7	FGN49519301	I-495 NB-Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	Autos	3367	61
7	FGN49519301	I-495 NB-Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	MT	3	61
7	FGN49519301	I-495 NB-Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	HT	3	61
8	FSN49519301A	I-495 NB-Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	Autos	3367	61
8	FSN49519301A	I-495 NB-Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	MT	3	61
8	FSN49519301A	I-495 NB-Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	HT	3	61
9	FGN49519302	I-495 NB-Georgetown Pike On-Ramp to George Washington Memorial Parkway Off Ramp	Autos	3367	61
9	FGN49519302	I-495 NB-Georgetown Pike On-Ramp to George Washington Memorial Parkway Off Ramp	MT	3	61
9	FGN49519302	I-495 NB-Georgetown Pike On-Ramp to George Washington Memorial Parkway Off Ramp	HT	3	61
10	FSN49519302A	I-495 NB-Georgetown Pike On-Ramp to George Washington Memorial Parkway Off Ramp	Autos	3367	61
10	FSN49519302A	I-495 NB-Georgetown Pike On-Ramp to George Washington Memorial Parkway Off Ramp	MT	3	61
10	FSN49519302A	I-495 NB-Georgetown Pike On-Ramp to George Washington Memorial Parkway Off Ramp	HT	3	61
11	FGN495GWP01	I-495 NB-George Washington Memorial Parkway Off Ramp to George Washington Memorial Parkway On Ramp	Autos	4972	59
11	FGN495GWP01	I-495 NB-George Washington Memorial Parkway Off Ramp to George Washington Memorial Parkway On Ramp	MT	5	59
11	FGN495GWP01	I-495 NB-George Washington Memorial Parkway Off Ramp to George Washington Memorial Parkway On Ramp	HT	5	59
12	FGN495GWP02	I-495 NB-George Washington Memorial Parkway On Ramp to Clara Barton Off-Ramp	Autos	5955	52
12	FGN495GWP02	I-495 NB-George Washington Memorial Parkway On Ramp to Clara Barton Off-Ramp	MT	245	52
12	FGN495GWP02	I-495 NB-George Washington Memorial Parkway On Ramp to Clara Barton Off-Ramp	HT	145	52
13	FGS495CBP01	I-495 SB-Clara Barton On-Ramp to George Washington Memorial Parkway/CD Off-Ramp	Autos	6561	44
13	FGS495CBP01	I-495 SB-Clara Barton On-Ramp to George Washington Memorial Parkway/CD Off-Ramp	MT	410	44
13	FGS495CBP01	I-495 SB-Clara Barton On-Ramp to George Washington Memorial Parkway/CD Off-Ramp	HT	300	44
14	FGS495GWP01	I-495 SB-CD Off-Ramp to CD On-Ramp/Georgetown Pike Off-Ramp	Autos	4116	58
14	FGS495GWP01	I-495 SB-CD Off-Ramp to CD On-Ramp/Georgetown Pike Off-Ramp	MT	360	58
14	FGS495GWP01	I-495 SB-CD Off-Ramp to CD On-Ramp/Georgetown Pike Off-Ramp	HT	290	58
15	CGS495GWP01	I-495 C-D Road SB-CD Off-Ramp to George Washington Memorial Parkway EB Off-Ramp	Autos	2444	50
15	CGS495GWP01	I-495 C-D Road SB-CD Off-Ramp to George Washington Memorial Parkway EB Off-Ramp	MT	50	50
15	CGS495GWP01	I-495 C-D Road SB-CD Off-Ramp to George Washington Memorial Parkway EB Off-Ramp	HT	10	50
16	CGS495GWP02	I-495 C-D Road SB-George Washington Memorial Parkway EB Off-Ramp to George Washington Memorial Parkway WB On-Ramp	Autos	1035	51
16	CGS495GWP02	I-495 C-D Road SB-George Washington Memorial Parkway EB Off-Ramp to George Washington Memorial Parkway WB On-Ramp	MT	45	51
16	CGS495GWP02	I-495 C-D Road SB-George Washington Memorial Parkway EB Off-Ramp to George Washington Memorial Parkway WB On-Ramp	HT	5	51
17	CGS495GWP03	I-495 C-D Road SB-George Washington Memorial Parkway WB On-Ramp to CD On-Ramp/Georgetown Pike Off-Ramp	Autos	1926	54
17	CGS495GWP03	I-495 C-D Road SB-George Washington Memorial Parkway WB On-Ramp to CD On-Ramp/Georgetown Pike Off-Ramp	MT	60	54
17	CGS495GWP03	I-495 C-D Road SB-George Washington Memorial Parkway WB On-Ramp to CD On-Ramp/Georgetown Pike Off-Ramp	HT	5	54
18	FGS49519301	I-495 SB-CD On-Ramp/Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	Autos	5073	55
18	FGS49519301	I-495 SB-CD On-Ramp/Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	MT	370	55
18	FGS49519301	I-495 SB-CD On-Ramp/Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	HT	290	55
19	FGS49519302	I-495 SB-Georgetown Pike On-Ramp to 495 SB Express	Autos	5463	52
19	FGS49519302	I-495 SB-Georgetown Pike On-Ramp to 495 SB Express	MT	380	52
19	FGS49519302	I-495 SB-Georgetown Pike On-Ramp to 495 SB Express	HT	310	52
20	FGS49526701	I-495 SB-495 SB Express to 495 SB Express to DTR WB Off-Ramp	Autos	4479	57
20	FGS49526701	I-495 SB-495 SB Express to 495 SB Express to DTR WB Off-Ramp	MT	355	57
20	FGS49526701	I-495 SB-495 SB Express to 495 SB Express to DTR WB Off-Ramp	HT	300	57
21	FGS49526702	I-495 SB-495 SB Express to DTR WB Off-Ramp to 495 SB General Purpose to DTR WB Off-Ramp	Autos	2234	62
21	FGS49526702	I-495 SB-495 SB Express to DTR WB Off-Ramp to 495 SB General Purpose to DTR WB Off-Ramp	MT	325	62
21	FGS49526702	I-495 SB-495 SB Express to DTR WB Off-Ramp to 495 SB General Purpose to DTR WB Off-Ramp	HT	270	62
22	FGS49526703	I-495 SB-495 SB General Purpose to DTR WB Off-Ramp to 495 SB General Purpose to DTR EB Off-Ramp	Autos	2008	62
22	FGS49526703	I-495 SB-495 SB General Purpose to DTR WB Off-Ramp to 495 SB General Purpose to DTR EB Off-Ramp	MT	325	62
22	FGS49526703	I-495 SB-495 SB General Purpose to DTR WB Off-Ramp to 495 SB General Purpose to DTR EB Off-Ramp	HT	270	62
23	FGS49526704	I-495 SB-495 SB General Purpose to DTR EB Off-Ramp to DAAR On-Ramp/Route 123 WB Off Ramp	Autos	2948	61
23	FGS49526704	I-495 SB-495 SB General Purpose to DTR EB Off-Ramp to DAAR On-Ramp/Route 123 WB Off Ramp	MT	340	61
23	FGS49526704	I-495 SB-495 SB General Purpose to DTR EB Off-Ramp to DAAR On-Ramp/Route 123 WB Off Ramp	HT	285	61
24	FHN49526701	I-495 Express NB-Route 123 On-Ramp to Jones Branch Off-Ramp	Autos	1080	71
24	FHN49526701	I-495 Express NB-Route 123 On-Ramp to Jones Branch Off-Ramp	MT	55	71
24	FHN49526701	I-495 Express NB-Route 123 On-Ramp to Jones Branch Off-Ramp	HT	5	71
25	FHN49526702	I-495 Express NB-Jones Branch Off-Ramp to DTR WB Off-Ramp	Autos	1060	71
25	FHN49526702	I-495 Express NB-Jones Branch Off-Ramp to DTR WB Off-Ramp	MT	55	71
25	FHN49526702	I-495 Express NB-Jones Branch Off-Ramp to DTR WB Off-Ramp	HT	5	71
26	FHN49526703	I-495 Express NB-DTR WB Off-Ramp to Jones Branch On-Ramp	Autos	475	71
26	FHN49526703	I-495 Express NB-DTR WB Off-Ramp to Jones Branch On-Ramp	MT	45	71
26	FHN49526703	I-495 Express NB-DTR WB Off-Ramp to Jones Branch On-Ramp	HT	5	71
27	FHN49526704	I-495 Express NB-Jones Branch On-Ramp to Reduction to 2 lanes	Autos	955	71

27	FHN49526704	I-495 Express NB-Jones Branch On-Ramp to Reduction to 2 lanes	MT	50	71
27	FHN49526704	I-495 Express NB-Jones Branch On-Ramp to Reduction to 2 lanes	HT	5	71
28	FHN49526705	I-495 Express NB-Reduction to 2 lanes to I-495 NB General Purpose	Autos	911	71
28	FHN49526705	I-495 Express NB-Reduction to 2 lanes to I-495 NB General Purpose	MT	90	71
28	FHN49526705	I-495 Express NB-Reduction to 2 lanes to I-495 NB General Purpose	HT	10	71
29	FHS49526701	I-495 Express SB-I-495 SB General Purpose to DTR WB Off-Ramp	Autos	980	71
29	FHS49526701	I-495 Express SB-I-495 SB General Purpose to DTR WB Off-Ramp	MT	25	71
29	FHS49526701	I-495 Express SB-I-495 SB General Purpose to DTR WB Off-Ramp	HT	10	71
30	FHS49526702	I-495 Express SB-DTR WB Off-Ramp to Jones Branch Off-Ramp	Autos	930	71
30	FHS49526702	I-495 Express SB-DTR WB Off-Ramp to Jones Branch Off-Ramp	MT	25	71
30	FHS49526702	I-495 Express SB-DTR WB Off-Ramp to Jones Branch Off-Ramp	HT	10	71
31	FHS49526703	I-495 Express SB-Jones Branch Off-Ramp to Jones Branch On-Ramp	Autos	885	71
31	FHS49526703	I-495 Express SB-Jones Branch Off-Ramp to Jones Branch On-Ramp	MT	25	71
31	FHS49526703	I-495 Express SB-Jones Branch Off-Ramp to Jones Branch On-Ramp	HT	10	71
32	FHS49526704	I-495 Express SB-Jones Branch On-Ramp to DTR EB General Purpose On-Ramp	Autos	1270	71
32	FHS49526704	I-495 Express SB-Jones Branch On-Ramp to DTR EB General Purpose On-Ramp	MT	25	71
32	FHS49526704	I-495 Express SB-Jones Branch On-Ramp to DTR EB General Purpose On-Ramp	HT	10	71
33	FGE26749501	VA-267 EB-DTR EB General Purpose to 495 SB Off-Ramp to DTR EB to 495 NB General Purpose/495 SB Express Off-Ramp	Autos	4203	61
33	FGE26749501	VA-267 EB-DTR EB General Purpose to 495 SB Off-Ramp to DTR EB to 495 NB General Purpose/495 SB Express Off-Ramp	MT	185	61
33	FGE26749501	VA-267 EB-DTR EB General Purpose to 495 SB Off-Ramp to DTR EB to 495 NB General Purpose/495 SB Express Off-Ramp	HT	85	61
34	FGE26749502	VA-267 EB-DTR EB to 495 NB General Purpose/495 SB Express Off-Ramp to Reduction to 2 lanes	Autos	2803	61
34	FGE26749502	VA-267 EB-DTR EB to 495 NB General Purpose/495 SB Express Off-Ramp to Reduction to 2 lanes	MT	155	61
34	FGE26749502	VA-267 EB-DTR EB to 495 NB General Purpose/495 SB Express Off-Ramp to Reduction to 2 lanes	HT	70	61
35	FGE26749503	VA-267 EB-Reduction to 2 lanes to 495 SB General Purpose On-Ramp	Autos	2020	60
35	FGE26749503	VA-267 EB-Reduction to 2 lanes to 495 SB General Purpose On-Ramp	MT	125	60
35	FGE26749503	VA-267 EB-Reduction to 2 lanes to 495 SB General Purpose On-Ramp	HT	40	60
36	FGE26749504	VA-267 EB-495 SB General Purpose On-Ramp to Route 123 SB Off-Ramp	Autos	2244	61
36	FGE26749504	VA-267 EB-495 SB General Purpose On-Ramp to Route 123 SB Off-Ramp	MT	125	61
36	FGE26749504	VA-267 EB-495 SB General Purpose On-Ramp to Route 123 SB Off-Ramp	HT	40	61
37	FGE26712301	VA-267 EB-Route 123 SB Off-Ramp to Route 123 SB On-Ramp	Autos	2087	60
37	FGE26712301	VA-267 EB-Route 123 SB Off-Ramp to Route 123 SB On-Ramp	MT	115	60
37	FGE26712301	VA-267 EB-Route 123 SB Off-Ramp to Route 123 SB On-Ramp	HT	30	60
38	FGE26712302	VA-267 EB-Route 123 SB On-Ramp to Route 123 NB Off-Ramp	Autos	2104	62
38	FGE26712302	VA-267 EB-Route 123 SB On-Ramp to Route 123 NB Off-Ramp	MT	115	62
38	FGE26712302	VA-267 EB-Route 123 SB On-Ramp to Route 123 NB Off-Ramp	HT	30	62
39	FGE26712303	VA-267 EB-Route 123 NB Off-Ramp to Route 123 NB On-Ramp	Autos	1448	61
39	FGE26712303	VA-267 EB-Route 123 NB Off-Ramp to Route 123 NB On-Ramp	MT	115	61
39	FGE26712303	VA-267 EB-Route 123 NB Off-Ramp to Route 123 NB On-Ramp	HT	2	61
40	FGW26712301	VA-267 WB-Route 123 NB Off-Ramp to Route 123 SB Off-Ramp	Autos	1114	62
40	FGW26712301	VA-267 WB-Route 123 NB Off-Ramp to Route 123 SB Off-Ramp	MT	80	62
40	FGW26712301	VA-267 WB-Route 123 NB Off-Ramp to Route 123 SB Off-Ramp	HT	10	62
41	FGW26712302	VA-267 WB-Route 123 SB Off-Ramp to Route 123 SB On-Ramp	Autos	960	62
41	FGW26712302	VA-267 WB-Route 123 SB Off-Ramp to Route 123 SB On-Ramp	MT	80	62
41	FGW26712302	VA-267 WB-Route 123 SB Off-Ramp to Route 123 SB On-Ramp	HT	10	62
42	FGW26712303	VA-267 WB-Route 123 SB On-Ramp to 495 NB General Purpose Off-Ramp	Autos	2059	62
42	FGW26712303	VA-267 WB-Route 123 SB On-Ramp to 495 NB General Purpose Off-Ramp	MT	110	62
42	FGW26712303	VA-267 WB-Route 123 SB On-Ramp to 495 NB General Purpose Off-Ramp	HT	20	62
43	FGW26749501	VA-267 WB-495 NB General Purpose Off-Ramp to 495 SB General Purpose On-Ramp	Autos	1805	61
43	FGW26749501	VA-267 WB-495 NB General Purpose Off-Ramp to 495 SB General Purpose On-Ramp	MT	105	61
43	FGW26749501	VA-267 WB-495 NB General Purpose Off-Ramp to 495 SB General Purpose On-Ramp	HT	20	61
44	FGW26749502	VA-267 WB-495 SB General Purpose On-Ramp to 495 NB General Purpose On-Ramp	Autos	3235	60
44	FGW26749502	VA-267 WB-495 SB General Purpose On-Ramp to 495 NB General Purpose On-Ramp	MT	120	60
44	FGW26749502	VA-267 WB-495 SB General Purpose On-Ramp to 495 NB General Purpose On-Ramp	HT	35	60
45	FGW26749503	VA-267 WB-495 NB General Purpose On-Ramp to 495 NB Express/495 SB Express On-Ramp	Autos	5479	56
45	FGW26749503	VA-267 WB-495 NB General Purpose On-Ramp to 495 NB Express/495 SB Express On-Ramp	MT	150	56
45	FGW26749503	VA-267 WB-495 NB General Purpose On-Ramp to 495 NB Express/495 SB Express On-Ramp	HT	65	56
46	FGE267A01	DAAR EB-495 SB General Purpose/495 NB General Purpose Off-Ramp to DTR EB General Purpose Merge	Autos	494	62
46	FGE267A01	DAAR EB-495 SB General Purpose/495 NB General Purpose Off-Ramp to DTR EB General Purpose Merge	MT	15	62
46	FGE267A01	DAAR EB-495 SB General Purpose/495 NB General Purpose Off-Ramp to DTR EB General Purpose Merge	HT	1	62
47	FGW267A01	DAAR WB-DAAR WB Start to DAAR End of Study Area	Autos	416	62
47	FGW267A01	DAAR WB-DAAR WB Start to DAAR End of Study Area	MT	45	62
47	FGW267A01	DAAR WB-DAAR WB Start to DAAR End of Study Area	HT	1	62
48	A	I-495 Ramp NB-495 NB Express to Jones Branch	Autos	20	40
48	A	I-495 Ramp NB-495 NB Express to Jones Branch	MT	0	0
48	A	I-495 Ramp NB-495 NB Express to Jones Branch	HT	0	0
49	B	I-495 Ramp NB-Jones Branch to 495 NB	Autos	480	50
49	B	I-495 Ramp NB-Jones Branch to 495 NB	MT	5	50
49	B	I-495 Ramp NB-Jones Branch to 495 NB	HT	1	50
50	C	I-495 Ramp NB-495 NB Express to DAAR	Autos	584	49
50	C	I-495 Ramp NB-495 NB Express to DAAR	MT	10	49
50	C	I-495 Ramp NB-495 NB Express to DAAR	HT	1	49
51	D	I-495 Ramp NB-495 NB General Purpose to DAAR	Autos	1430	44
51	D	I-495 Ramp NB-495 NB General Purpose to DAAR	MT	15	44
51	D	I-495 Ramp NB-495 NB General Purpose to DAAR	HT	15	44
52	E	I-495 Ramp NB-DTR WB to 495 NB General Purpose	Autos	255	50
52	E	I-495 Ramp NB-DTR WB to 495 NB General Purpose	MT	5	50
52	E	I-495 Ramp NB-DTR WB to 495 NB General Purpose	HT	0	50
53	F	I-495 Ramp NB-DAAR to 495 NB General Purpose	Autos	989	47
53	F	I-495 Ramp NB-DAAR to 495 NB General Purpose	MT	40	47
53	F	I-495 Ramp NB-DAAR to 495 NB General Purpose	HT	30	47
54	G	I-495 Ramp SB-495 SB General Purpose to DTR WB	Autos	2245	47
54	G	I-495 Ramp SB-495 SB General Purpose to DTR WB	MT	30	47
54	G	I-495 Ramp SB-495 SB General Purpose to DTR WB	HT	30	47
55	H	I-495 Ramp SB-495 SB Express to DTR WB	Autos	50	35
55	H	I-495 Ramp SB-495 SB Express to DTR WB	MT	0	0

55	H	I-495 Ramp SB-495 SB Express to DTR WB	HT	0	0
56	I	I-495 Ramp SB-495 SB General Purpose to DTR EB	Autos	224	35
56	I	I-495 Ramp SB-495 SB General Purpose to DTR EB	MT	0	35
56	I	I-495 Ramp SB-495 SB General Purpose to DTR EB	HT	0	35
57	J	I-495 Ramp SB-DTR EB to 495 SB Express	Autos	708	49
57	J	I-495 Ramp SB-DTR EB to 495 SB Express	MT	15	49
57	J	I-495 Ramp SB-DTR EB to 495 SB Express	HT	1	49
58	K	I-495 Ramp SB-DTR EB to 495 SB General Purpose	Autos	690	50
58	K	I-495 Ramp SB-DTR EB to 495 SB General Purpose	MT	15	50
58	K	I-495 Ramp SB-DTR EB to 495 SB General Purpose	HT	15	50
59	L	I-495 Ramp SB-DAAR to 496 SB General Purpose	Autos	245	50
59	L	I-495 Ramp SB-DAAR to 496 SB General Purpose	MT	0	50
59	L	I-495 Ramp SB-DAAR to 496 SB General Purpose	HT	0	50
60	M	I-495 Ramp SB-495 SB Express to Jones Branch	Autos	45	40
60	M	I-495 Ramp SB-495 SB Express to Jones Branch	MT	0	0
60	M	I-495 Ramp SB-495 SB Express to Jones Branch	HT	0	0
61	N	I-495 Ramp SB-Jones Branch to 495 SB Express	Autos	384	50
61	N	I-495 Ramp SB-Jones Branch to 495 SB Express	MT	0	50
61	N	I-495 Ramp SB-Jones Branch to 495 SB Express	HT	0	50
62	O	I-495 Ramp NB-495 NB General Purpose to Georgetown Pike	Autos	181	35
62	O	I-495 Ramp NB-495 NB General Purpose to Georgetown Pike	MT	5	35
62	O	I-495 Ramp NB-495 NB General Purpose to Georgetown Pike	HT	0	35
63	P	I-495 Ramp NB-Georgetown Pike to 495 NB General Purpose	Autos	809	35
63	P	I-495 Ramp NB-Georgetown Pike to 495 NB General Purpose	MT	25	35
63	P	I-495 Ramp NB-Georgetown Pike to 495 NB General Purpose	HT	15	35
64	Q	I-495 Ramp SB-Georgetown Pike to 495 SB General Purpose	Autos	390	40
64	Q	I-495 Ramp SB-Georgetown Pike to 495 SB General Purpose	MT	10	40
64	Q	I-495 Ramp SB-Georgetown Pike to 495 SB General Purpose	HT	20	40
65	R	I-495 Ramp SB-495 SB General Purpose to Georgetown Pike	Autos	390	40
65	R	I-495 Ramp SB-495 SB General Purpose to Georgetown Pike	MT	10	40
65	R	I-495 Ramp SB-495 SB General Purpose to Georgetown Pike	HT	20	40
66	S	I-495 Ramp SB-SB CD Road to 495 SB General Purpose	Autos	949	48
66	S	I-495 Ramp SB-SB CD Road to 495 SB General Purpose	MT	10	48
66	S	I-495 Ramp SB-SB CD Road to 495 SB General Purpose	HT	1	48
67	T	I-495 Ramp SB-GWP WB to 495 SB General Purpose	Autos	889	40
67	T	I-495 Ramp SB-GWP WB to 495 SB General Purpose	MT	15	40
67	T	I-495 Ramp SB-GWP WB to 495 SB General Purpose	HT	1	40
68	U	I-495 Ramp SB-495 SB General Purpose/CD Road to GWP EB	Autos	889	40
68	U	I-495 Ramp SB-495 SB General Purpose/CD Road to GWP EB	MT	15	40
68	U	I-495 Ramp SB-495 SB General Purpose/CD Road to GWP EB	HT	1	40
69	V	I-495 Ramp NB-495 NB General Purpose to GWP EB	Autos	889	40
69	V	I-495 Ramp NB-495 NB General Purpose to GWP EB	MT	15	40
69	V	I-495 Ramp NB-495 NB General Purpose to GWP EB	HT	1	40
70	W	I-495 Ramp NB-GWP WB to 495 NB General Purpose	Autos	889	40
70	W	I-495 Ramp NB-GWP WB to 495 NB General Purpose	MT	15	40
70	W	I-495 Ramp NB-GWP WB to 495 NB General Purpose	HT	1	40
71	X	I-495 Ramp SB-Clara Barton to 495 SB General Purpose	Autos	889	40
71	X	I-495 Ramp SB-Clara Barton to 495 SB General Purpose	MT	15	40
71	X	I-495 Ramp SB-Clara Barton to 495 SB General Purpose	HT	1	40
72	Y	I-495 Ramp NB-495 NB General Purpose to Clara Barton	Autos	889	40
72	Y	I-495 Ramp NB-495 NB General Purpose to Clara Barton	MT	15	40
72	Y	I-495 Ramp NB-495 NB General Purpose to Clara Barton	HT	1	40
73	Z	VA-267 Ramp WB-DTR EB to 495 NB General Purpose	Autos	889	40
73	Z	VA-267 Ramp WB-DTR EB to 495 NB General Purpose	MT	15	40
73	Z	VA-267 Ramp WB-DTR EB to 495 NB General Purpose	HT	1	40
74	AA	VA-267 Ramp EB-DTR EB to Route 123 SB	Autos	351	50
74	AA	VA-267 Ramp EB-DTR EB to Route 123 SB	MT	0	0
74	AA	VA-267 Ramp EB-DTR EB to Route 123 SB	HT	0	0
75	AB	VA-267 Ramp EB-Route 123 SB to DTR EB	Autos	20	35
75	AB	VA-267 Ramp EB-Route 123 SB to DTR EB	MT	0	0
75	AB	VA-267 Ramp EB-Route 123 SB to DTR EB	HT	0	0
76	AC	VA-267 Ramp WB-Route 123 SB to DTR WB	Autos	19	35
76	AC	VA-267 Ramp WB-Route 123 SB to DTR WB	MT	1	35
76	AC	VA-267 Ramp WB-Route 123 SB to DTR WB	HT	0	35
77	AD	VA-267 Ramp WB-DTR WB to Route 123 SB	Autos	155	25
77	AD	VA-267 Ramp WB-DTR WB to Route 123 SB	MT	0	25
77	AD	VA-267 Ramp WB-DTR WB to Route 123 SB	HT	0	25
78	AE	VA-267 Ramp EB-DTR EB to Route 123 NB	Autos	654	24
78	AE	VA-267 Ramp EB-DTR EB to Route 123 NB	MT	1	24
78	AE	VA-267 Ramp EB-DTR EB to Route 123 NB	HT	30	24
79	AF	VA-267 Ramp EB-Route 123 NB to DTR EB	Autos	235	25
79	AF	VA-267 Ramp EB-Route 123 NB to DTR EB	MT	0	25
79	AF	VA-267 Ramp EB-Route 123 NB to DTR EB	HT	0	25
80	AG	VA-267 Ramp WB-DTR WB to Route 123 NB	Autos	70	25
80	AG	VA-267 Ramp WB-DTR WB to Route 123 NB	MT	0	25
80	AG	VA-267 Ramp WB-DTR WB to Route 123 NB	HT	0	25
81	AGE69401	Lewinsville Road EB-Snow Meadow Lane to Windy Hill Road	Autos	1123	3
81	AGE69401	Lewinsville Road EB-Snow Meadow Lane to Windy Hill Road	MT	20	3
81	AGE69401	Lewinsville Road EB-Snow Meadow Lane to Windy Hill Road	HT	47	3
82	AGW69401	Lewinsville Road WB-Windy Hill Road to Snow Meadow Lane	Autos	710	31
82	AGW69401	Lewinsville Road WB-Windy Hill Road to Snow Meadow Lane	MT	10	31
82	AGW69401	Lewinsville Road WB-Windy Hill Road to Snow Meadow Lane	HT	10	31
83	AGE73801	Old Dominion Drive EB-500 west of I-495 to 500 east of I-495	Autos	293	35
83	AGE73801	Old Dominion Drive EB-500 west of I-495 to 500 east of I-495	MT	5	35
83	AGE73801	Old Dominion Drive EB-500 west of I-495 to 500 east of I-495	HT	12	35

84	AGW73801	Old Dominion Drive WB-500 east of I-495 to 500 west of I-495	Autos	646	33
84	AGW73801	Old Dominion Drive WB-500 east of I-495 to 500 west of I-495	MT	10	33
84	AGW73801	Old Dominion Drive WB-500 east of I-495 to 500 west of I-495	HT	9	33
85	AGNBHR01	Balls Hill Road NB-Thrasher Road to Georgetown Pike	Autos	265	35
85	AGNBHR01	Balls Hill Road NB-Thrasher Road to Georgetown Pike	MT	5	35
85	AGNBHR01	Balls Hill Road NB-Thrasher Road to Georgetown Pike	HT	1	35
86	AGSBHR01	Balls Hill Road SB-Georgetown Pike to Thrasher Road	Autos	269	35
86	AGSBHR01	Balls Hill Road SB-Georgetown Pike to Thrasher Road	MT	5	35
86	AGSBHR01	Balls Hill Road SB-Georgetown Pike to Thrasher Road	HT	1	35
87	AGE19301	Georgetown Pike EB-West of I-495 to On/off ramps to I-495 SB	Autos	475	35
87	AGE19301	Georgetown Pike EB-West of I-495 to On/off ramps to I-495 SB	MT	10	35
87	AGE19301	Georgetown Pike EB-West of I-495 to On/off ramps to I-495 SB	HT	20	35
88	AGW19301	Georgetown Pike WB-On/off ramps to I-495 SB to West of I-495	Autos	868	20
88	AGW19301	Georgetown Pike WB-On/off ramps to I-495 SB to West of I-495	MT	15	20
88	AGW19301	Georgetown Pike WB-On/off ramps to I-495 SB to West of I-495	HT	13	20
89	AGE19302	Georgetown Pike EB-On/off ramps to I-495 SB to On/off ramps to I-495 NB	Autos	797	35
89	AGE19302	Georgetown Pike EB-On/off ramps to I-495 SB to On/off ramps to I-495 NB	MT	15	35
89	AGE19302	Georgetown Pike EB-On/off ramps to I-495 SB to On/off ramps to I-495 NB	HT	33	35
90	AGW19302	Georgetown Pike WB-On/off ramps to I-495 NB to On/off ramps to I-495 SB	Autos	439	35
90	AGW19302	Georgetown Pike WB-On/off ramps to I-495 NB to On/off ramps to I-495 SB	MT	5	35
90	AGW19302	Georgetown Pike WB-On/off ramps to I-495 NB to On/off ramps to I-495 SB	HT	6	35
91	AGE19303	Georgetown Pike EB-On/off ramps to I-495 NB to Balls Hill Road	Autos	455	35
91	AGE19303	Georgetown Pike EB-On/off ramps to I-495 NB to Balls Hill Road	MT	10	35
91	AGE19303	Georgetown Pike EB-On/off ramps to I-495 NB to Balls Hill Road	HT	1	35
92	AGW19303	Georgetown Pike WB-Balls Hill Road to On/off ramps to I-495 NB	Autos	898	35
92	AGW19303	Georgetown Pike WB-Balls Hill Road to On/off ramps to I-495 NB	MT	15	35
92	AGW19303	Georgetown Pike WB-Balls Hill Road to On/off ramps to I-495 NB	HT	7	35
93	AGE19304	Georgetown Pike EB-Balls Hill Road to Dead Run Drive	Autos	250	35
93	AGE19304	Georgetown Pike EB-Balls Hill Road to Dead Run Drive	MT	5	35
93	AGE19304	Georgetown Pike EB-Balls Hill Road to Dead Run Drive	HT	0	35
94	AGW19304	Georgetown Pike WB-Dead Run Drive to Balls Hill Road	Autos	586	35
94	AGW19304	Georgetown Pike WB-Dead Run Drive to Balls Hill Road	MT	10	35
94	AGW19304	Georgetown Pike WB-Dead Run Drive to Balls Hill Road	HT	4	35
95	AGEGWP01	George Washington Memorial Parkway EB-On/Off ramps to I-495 to George Washington Memorial Parkway	Autos	1440	30
95	AGEGWP01	George Washington Memorial Parkway EB-On/Off ramps to I-495 to George Washington Memorial Parkway	MT	30	30
95	AGEGWP01	George Washington Memorial Parkway EB-On/Off ramps to I-495 to George Washington Memorial Parkway	HT	2	30
96	AGWGWP01	George Washington Memorial Parkway WB-George Washington Memorial Parkway to On/Off ramps to I-495	Autos	2579	17
96	AGWGWP01	George Washington Memorial Parkway WB-George Washington Memorial Parkway to On/Off ramps to I-495	MT	45	17
96	AGWGWP01	George Washington Memorial Parkway WB-George Washington Memorial Parkway to On/Off ramps to I-495	HT	3	17
97	AGN12301	Route 123 NB-Anderson Road to Lewinsville Road	Autos	2295	4
97	AGN12301	Route 123 NB-Anderson Road to Lewinsville Road	MT	45	4
97	AGN12301	Route 123 NB-Anderson Road to Lewinsville Road	HT	2	4
98	AGS12301	Route 123 SB-Lewinsville Road to Anderson Road	Autos	1438	31
98	AGS12301	Route 123 SB-Lewinsville Road to Anderson Road	MT	25	31
98	AGS12301	Route 123 SB-Lewinsville Road to Anderson Road	HT	11	31
99	AGNCBR01	Chain Bridge Road NB-Colonial Lane to DTR	Autos	190	35
99	AGNCBR01	Chain Bridge Road NB-Colonial Lane to DTR	MT	5	35
99	AGNCBR01	Chain Bridge Road NB-Colonial Lane to DTR	HT	0	0
100	AGSCBR01	Chain Bridge Road SB-DTR to Colonial Lane	Autos	183	35
100	AGSCBR01	Chain Bridge Road SB-DTR to Colonial Lane	MT	5	35
100	AGSCBR01	Chain Bridge Road SB-DTR to Colonial Lane	HT	1	35
101	AGEJBR01	Jones Branch Connector EB-Off-Ramp to SB 495 to HOT Ramps Signal	Autos	864	23
101	AGEJBR01	Jones Branch Connector EB-Off-Ramp to SB 495 to HOT Ramps Signal	MT	5	23
101	AGEJBR01	Jones Branch Connector EB-Off-Ramp to SB 495 to HOT Ramps Signal	HT	1	23
102	AGWJBR01	Jones Branch Connector WB-HOT Ramps Signal to Jones Brach Drive	Autos	60	35
102	AGWJBR01	Jones Branch Connector WB-HOT Ramps Signal to Jones Brach Drive	MT	0	0
102	AGWJBR01	Jones Branch Connector WB-HOT Ramps Signal to Jones Brach Drive	HT	0	0

495 NEXT

BUILD 2045

Loudest Hour: 11:00

Link #	Segment	Link Name/Start & End Point		ENTRADA TRAFFIC Total Volume Veh.	Speed
2	CDR	I-495 Ramp_R Ramp-495 SB General Purpose to Georgetown Pike	Autos	118	50
2	CDR	I-495 Ramp_R Ramp-495 SB General Purpose to Georgetown Pike	MT	3	50
2	CDR	I-495 Ramp_R Ramp-495 SB General Purpose to Georgetown Pike	HT	7	50
3	CGS495GWP01	I-495 C-D Road_CGS495GWP01 Ramp-CD Off-Ramp to George Washington Memorial Parkway EB Off-Ramp	Autos	815	54
3	CGS495GWP01	I-495 C-D Road_CGS495GWP01 Ramp-CD Off-Ramp to George Washington Memorial Parkway EB Off-Ramp	MT	128	54
3	CGS495GWP01	I-495 C-D Road_CGS495GWP01 Ramp-CD Off-Ramp to George Washington Memorial Parkway EB Off-Ramp	HT	256	54
5	FGN495GWP01	I-495 FGN495GWP01 NB-George Washington Memorial Parkway Off Ramp to George Washington Memorial Parkway On Ramp	Autos	4749	56
5	FGN495GWP01	I-495 FGN495GWP01 NB-George Washington Memorial Parkway Off Ramp to George Washington Memorial Parkway On Ramp	MT	258	56
5	FGN495GWP01	I-495 FGN495GWP01 NB-George Washington Memorial Parkway Off Ramp to George Washington Memorial Parkway On Ramp	HT	515	56
6	FGN495GWP02	I-495 FGN495GWP02 NB-George Washington Memorial Parkway On Ramp to Clara Barton Off-Ramp	Autos	5623	51
6	FGN495GWP02	I-495 FGN495GWP02 NB-George Washington Memorial Parkway On Ramp to Clara Barton Off-Ramp	MT	256	51
6	FGN495GWP02	I-495 FGN495GWP02 NB-George Washington Memorial Parkway On Ramp to Clara Barton Off-Ramp	HT	511	51
7	FGN49519301	I-495 FGN49519301 NB-Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	Autos	4912	55
7	FGN49519301	I-495 FGN49519301 NB-Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	MT	312	55
7	FGN49519301	I-495 FGN49519301 NB-Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	HT	624	55
8	FGN49519302	I-495 FGN49519302 NB-Georgetown Pike On-Ramp to George Washington Memorial Parkway Off Ramp	Autos	5328	58
8	FGN49519302	I-495 FGN49519302 NB-Georgetown Pike On-Ramp to George Washington Memorial Parkway Off Ramp	MT	338	58
8	FGN49519302	I-495 FGN49519302 NB-Georgetown Pike On-Ramp to George Washington Memorial Parkway Off Ramp	HT	677	58
9	FGS49519303	I-495_FGS49519303 SB-Lane Addition to 495 SB Express	Autos	6370	43
9	FGS49519303	I-495_FGS49519303 SB-Lane Addition to 495 SB Express	MT	346	43
9	FGS49519303	I-495_FGS49519303 SB-Lane Addition to 495 SB Express	HT	691	43
10	FGN49526704	I-495 NB GP FGN49526704 NB-NB C-D Road On-Ramp to Georgetown Pike Off-Ramp	Autos	5067	59
10	FGN49526704	I-495 NB GP FGN49526704 NB-NB C-D Road On-Ramp to Georgetown Pike Off-Ramp	MT	543	59
10	FGN49526704	I-495 NB GP FGN49526704 NB-NB C-D Road On-Ramp to Georgetown Pike Off-Ramp	HT	422	59
11	FGS495CBP01	I-495 FGS495CBP01 SB-Clara Barton On-Ramp to George Washington Memorial Parkway/CD Off-Ramp	Autos	6415	47
11	FGS495CBP01	I-495 FGS495CBP01 SB-Clara Barton On-Ramp to George Washington Memorial Parkway/CD Off-Ramp	MT	211	47
11	FGS495CBP01	I-495 FGS495CBP01 SB-Clara Barton On-Ramp to George Washington Memorial Parkway/CD Off-Ramp	HT	423	47
12	FGS495GWP01	I-495_FGS495GWP01 SB-CD Off-Ramp to Reduction to 3 lanes	Autos	5901	51
12	FGS495GWP01	I-495_FGS495GWP01 SB-CD Off-Ramp to Reduction to 3 lanes	MT	219	51
12	FGS495GWP01	I-495_FGS495GWP01 SB-CD Off-Ramp to Reduction to 3 lanes	HT	437	51
13	FGS49519301	I-495 FGS49519301 SB-CD On-Ramp/Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	Autos	5258	55
13	FGS49519301	I-495 FGS49519301 SB-CD On-Ramp/Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	MT	195	55
13	FGS49519301	I-495 FGS49519301 SB-CD On-Ramp/Georgetown Pike Off-Ramp to Georgetown Pike On-Ramp	HT	389	55
14	FGS49519302	I-495 FGS49519302 SB-Georgetown Pike On-Ramp to 495 SB Express	Autos	6104	46
14	FGS49519302	I-495 FGS49519302 SB-Georgetown Pike On-Ramp to 495 SB Express	MT	304	46
14	FGS49519302	I-495 FGS49519302 SB-Georgetown Pike On-Ramp to 495 SB Express	HT	608	46
15	FGS49519303	I-495 FGS49519303 SB-Georgetown Pike to SR 267 EB Off-Ramp	Autos	5943	43
15	FGS49519303	I-495 FGS49519303 SB-Georgetown Pike to SR 267 EB Off-Ramp	MT	415	43
15	FGS49519303	I-495 FGS49519303 SB-Georgetown Pike to SR 267 EB Off-Ramp	HT	553	43
16	FHN495GWP01	I-495 Express_FHN495GWP01 NB-MD Express Lane Start to Widening to 2 lanes	Autos	1730	70
16	FHN495GWP01	I-495 Express_FHN495GWP01 NB-MD Express Lane Start to Widening to 2 lanes	MT	102	70
16	FHN495GWP01	I-495 Express_FHN495GWP01 NB-MD Express Lane Start to Widening to 2 lanes	HT	204	70
17	FHN495GWP02	I-495 Express_FHN495GWP02 NB-Widening to 2 lanes to George Washington Memorial Parkway WB On-Ramp	Autos	2455	64
17	FHN495GWP02	I-495 Express_FHN495GWP02 NB-Widening to 2 lanes to George Washington Memorial Parkway WB On-Ramp	MT	266	64
17	FHN495GWP02	I-495 Express_FHN495GWP02 NB-Widening to 2 lanes to George Washington Memorial Parkway WB On-Ramp	HT	237	64
18	FHN49526705	I-495 Express FHN49526705 NB-Reduction to 2 lanes to I-495 NB General Purpose	Autos	1855	70
18	FHN49526705	I-495 Express FHN49526705 NB-Reduction to 2 lanes to I-495 NB General Purpose	MT	101	70
18	FHN49526705	I-495 Express FHN49526705 NB-Reduction to 2 lanes to I-495 NB General Purpose	HT	201	70
19	FHS495CBP01	I-495 Express_FHS495CBP01 SB-Clara Barton Interchange to George Washington Memorial Parkway EB Off-Ramp	Autos	2077	68
19	FHS495CBP01	I-495 Express_FHS495CBP01 SB-Clara Barton Interchange to George Washington Memorial Parkway EB Off-Ramp	MT	122	68
19	FHS495CBP01	I-495 Express_FHS495CBP01 SB-Clara Barton Interchange to George Washington Memorial Parkway EB Off-Ramp	HT	244	68
20	FHS495GWP01	I-495 Express_FHS495GWP01 SB-George Washington Memorial Parkway EB Off-Ramp to Reduction to 1 lane	Autos	1311	71
20	FHS495GWP01	I-495 Express_FHS495GWP01 SB-George Washington Memorial Parkway EB Off-Ramp to Reduction to 1 lane	MT	57	71
20	FHS495GWP01	I-495 Express_FHS495GWP01 SB-George Washington Memorial Parkway EB Off-Ramp to Reduction to 1 lane	HT	57	71
21	FHS49519301	I-495 SB HOT FHS49519301 SB-GWMP to I-495 SB GP/Route 267 EB/WB Off-Ramps	Autos	1431	71
21	FHS49519301	I-495 SB HOT FHS49519301 SB-GWMP to I-495 SB GP/Route 267 EB/WB Off-Ramps	MT	62	71
21	FHS49519301	I-495 SB HOT FHS49519301 SB-GWMP to I-495 SB GP/Route 267 EB/WB Off-Ramps	HT	62	71
22	GWMPXG	I-495 NB GP GWMPXG Ramp-Off-Ramp to NB HOT	Autos	5067	59
22	GWMPXG	I-495 NB GP GWMPXG Ramp-Off-Ramp to NB HOT	MT	543	59
22	GWMPXG	I-495 NB GP GWMPXG Ramp-Off-Ramp to NB HOT	HT	422	59
23	GWPXA	I-495 Express Ramp_GWPXA Ramp-I-495 SB Express Lanes to George Washington Memorial Parkway EB	Autos	412	50
23	GWPXA	I-495 Express Ramp_GWPXA Ramp-I-495 SB Express Lanes to George Washington Memorial Parkway EB	MT	0	0
23	GWPXA	I-495 Express Ramp_GWPXA Ramp-I-495 SB Express Lanes to George Washington Memorial Parkway EB	HT	0	0
24	GWPXB	I-495 Express Ramp_GWPXB Ramp-George Washington Memorial Parkway WB to I-495 NB Express Lanes	Autos	409	50
24	GWPXB	I-495 Express Ramp_GWPXB Ramp-George Washington Memorial Parkway WB to I-495 NB Express Lanes	MT	17	50
24	GWPXB	I-495 Express Ramp_GWPXB Ramp-George Washington Memorial Parkway WB to I-495 NB Express Lanes	HT	0	0
25	GWPXC	I-495 Express Ramp_GWPXC Ramp-I-495 NB HOT to GWMP SB/EB	Autos	108	50
25	GWPXC	I-495 Express Ramp_GWPXC Ramp-I-495 NB HOT to GWMP SB/EB	MT	0	0
25	GWPXC	I-495 Express Ramp_GWPXC Ramp-I-495 NB HOT to GWMP SB/EB	HT	0	0
26	GWPXD	I-495 Express Ramp_GWPXD Ramp-GWMP NB/SB to I-495 SB HOT	Autos	119	50
26	GWPXD	I-495 Express Ramp_GWPXD Ramp-GWMP NB/SB to I-495 SB HOT	MT	0	0
26	GWPXD	I-495 Express Ramp_GWPXD Ramp-GWMP NB/SB to I-495 SB HOT	HT	0	0
27	GWPXF	I-495 Express Ramp_GWPXF Ramp-I-495 SB HOT to I-495 SB GP	Autos	380	49
27	GWPXF	I-495 Express Ramp_GWPXF Ramp-I-495 SB HOT to I-495 SB GP	MT	97	49
27	GWPXF	I-495 Express Ramp_GWPXF Ramp-I-495 SB HOT to I-495 SB GP	HT	167	49
28	GWPXG	I-495 Express Ramp_GWPXG Ramp-I-495 NB GP to I-495 NB HOT (MD) NB	Autos	406	49
28	GWPXG	I-495 Express Ramp_GWPXG Ramp-I-495 NB GP to I-495 NB HOT (MD) NB	MT	119	49

28	GWPXG	I-495 Express Ramp_GWPXG Ramp-I-495 NB GP to I-495 NB HOT (MD) NB	HT	100	49
29	R	I-495 Ramp_R Ramp-495 SB General Purpose to Georgetown Pike	Autos	481	50
29	R	I-495 Ramp_R Ramp-495 SB General Purpose to Georgetown Pike	MT	14	50
29	R	I-495 Ramp_R Ramp-495 SB General Purpose to Georgetown Pike	HT	28	50
30	O	I-495 Ramp O Ramp-495 NB General Purpose to Georgetown Pike	Autos	520	35
30	O	I-495 Ramp O Ramp-495 NB General Purpose to Georgetown Pike	MT	0	0
30	O	I-495 Ramp O Ramp-495 NB General Purpose to Georgetown Pike	HT	0	0
31	P	I-495 Ramp P Ramp-Georgetown Pike to 495 NB General Purpose	Autos	443	40
31	P	I-495 Ramp P Ramp-Georgetown Pike to 495 NB General Purpose	MT	11	40
31	P	I-495 Ramp P Ramp-Georgetown Pike to 495 NB General Purpose	HT	22	40
32	Q	I-495 Ramp Q Ramp-Georgetown Pike to 495 SB General Purpose	Autos	298	40
32	Q	I-495 Ramp Q Ramp-Georgetown Pike to 495 SB General Purpose	MT	37	40
32	Q	I-495 Ramp Q Ramp-Georgetown Pike to 495 SB General Purpose	HT	74	40
33	S	I-495 Ramp S Ramp-SB CD Road to 495 SB General Purpose	Autos	417	49
33	S	I-495 Ramp S Ramp-SB CD Road to 495 SB General Purpose	MT	78	49
33	S	I-495 Ramp S Ramp-SB CD Road to 495 SB General Purpose	HT	156	49
34	T	I-495 Ramp T Ramp-GWP WB to 495 SB General Purpose	Autos	187	40
34	T	I-495 Ramp T Ramp-GWP WB to 495 SB General Purpose	MT	2	40
34	T	I-495 Ramp T Ramp-GWP WB to 495 SB General Purpose	HT	4	40
35	U	I-495 Ramp U Ramp-495 SB General Purpose/CD Road to GWP EB	Autos	6415	47
35	U	I-495 Ramp U Ramp-495 SB General Purpose/CD Road to GWP EB	MT	211	47
35	U	I-495 Ramp U Ramp-495 SB General Purpose/CD Road to GWP EB	HT	423	47
36	V	I-495 Ramp V Ramp-495 NB General Purpose to GWP EB	Autos	267	50
36	V	I-495 Ramp V Ramp-495 NB General Purpose to GWP EB	MT	0	0
36	V	I-495 Ramp V Ramp-495 NB General Purpose to GWP EB	HT	0	0
37	W	I-495 Ramp W Ramp-GWP WB to 495 NB General Purpose	Autos	876	17
37	W	I-495 Ramp W Ramp-GWP WB to 495 NB General Purpose	MT	9	17
37	W	I-495 Ramp W Ramp-GWP WB to 495 NB General Purpose	HT	18	17
38	X	I-495 Ramp X Ramp-Clara Barton to 495 SB General Purpose	Autos	715	30
38	X	I-495 Ramp X Ramp-Clara Barton to 495 SB General Purpose	MT	2	30
38	X	I-495 Ramp X Ramp-Clara Barton to 495 SB General Purpose	HT	5	30
39	Y	I-495 Ramp Y Ramp-495 NB General Purpose to Clara Barton	Autos	379	35
39	Y	I-495 Ramp Y Ramp-495 NB General Purpose to Clara Barton	MT	4	35
39	Y	I-495 Ramp Y Ramp-495 NB General Purpose to Clara Barton	HT	8	35
40	S495_R	I-495 Ramp R Ramp-495 SB General Purpose to Georgetown Pike	Autos	359	50
40	S495_R	I-495 Ramp R Ramp-495 SB General Purpose to Georgetown Pike	MT	10	50
40	S495_R	I-495 Ramp R Ramp-495 SB General Purpose to Georgetown Pike	HT	21	50

Appendix E Noise Measurement Details

HARRIS MILLER MILLER & HANSON INC.

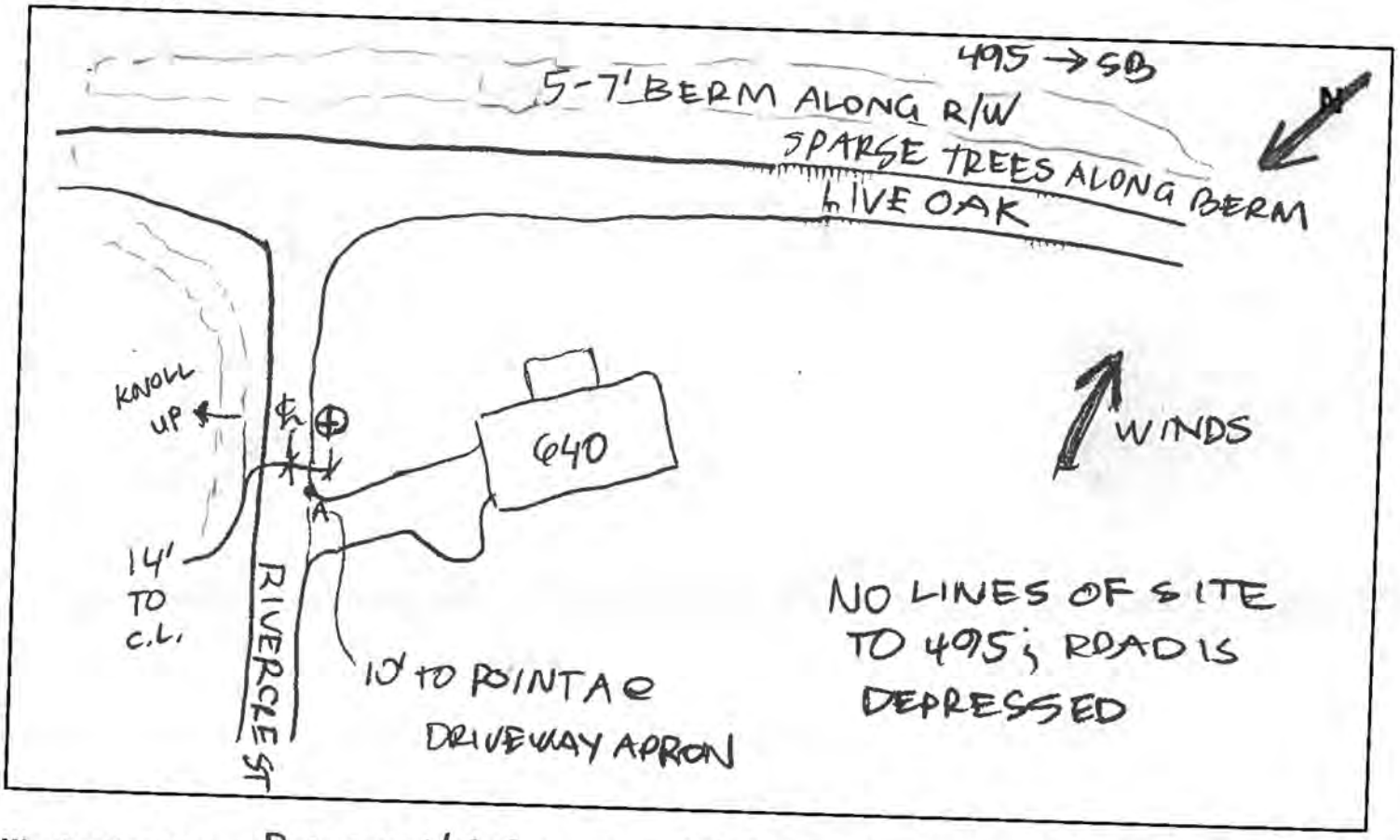
Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

Monitoring Site Log

M01

Site Number: M01 FILE #03
Street Address: 640 LIVE OAK DR @ RIVERCREST DR
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; LOCAL TRAFFIC; WIND IN TREES
BIRDS; AIRCRAFT; INSECTS
Instrument: 2245 #5 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 30 NOV 2021 End Date:
Start Time: 12:20 End Time: 12:50
Calibration: Start: End:

Site Sketch:



Weather Conditions: P. CLOUDY/M. SUNNY; 51°F; 39.7% RH; 27°F DP

GPS Coordinates: 38°57'55" N, 77°10'57" W

Photo Numbers:

Measurement Site M01

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

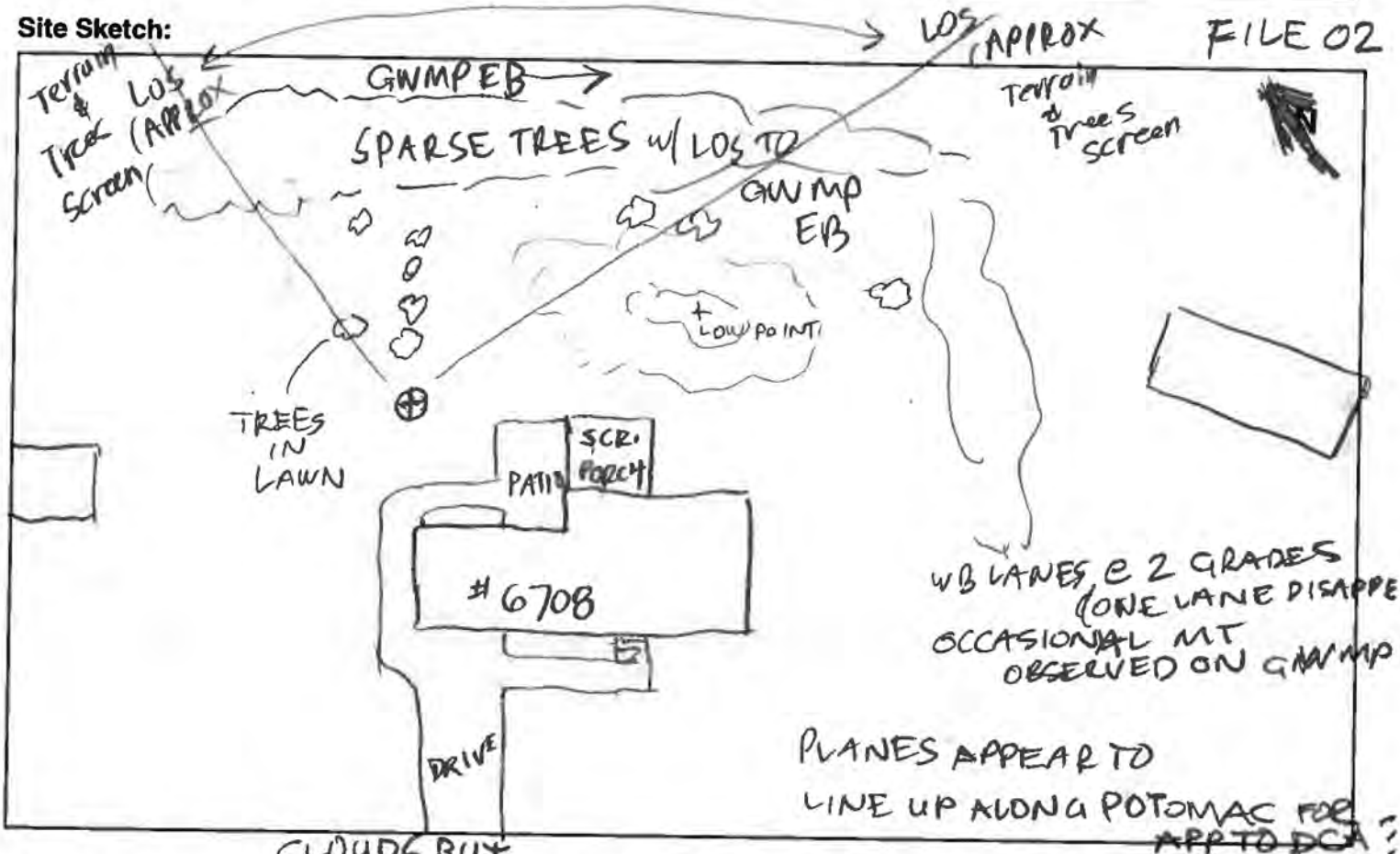
Monitoring Site Log

M02

Site Number: M02
Street Address: 6708 LUPINE LANE
Owner/Description: A/C MARKERS ARE CRUDE; FORGOT TO TURN-OFF A FEW TIM
Noise/Vibe Sources: TRAFFIC ON GWMP; AIRCRAFT; BIRDS; WIND IN TREES/LEAVES

Instrument: _____ S/N: _____
Front End: _____ S/N: _____
Calibrator: _____ S/N: _____
Start Date: 30 NOV 2021 End Date: _____
Start Time: 10:55 End Time: _____
Calibration: Start: _____ End: _____

Site Sketch:



Weather Conditions: CLOUDS BUT SUN BREAKING THRU; WINDS 0-4MPH; 48°F; 46% RH 27°F DP
GPS Coordinates: 38°57'43"N, 77°10'42"W

Photo Numbers:

START 11:25 10 MIN TRAFFIC COUNT GWMPEB

A	MT	HT
179	0	0

Measurement Site M02

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

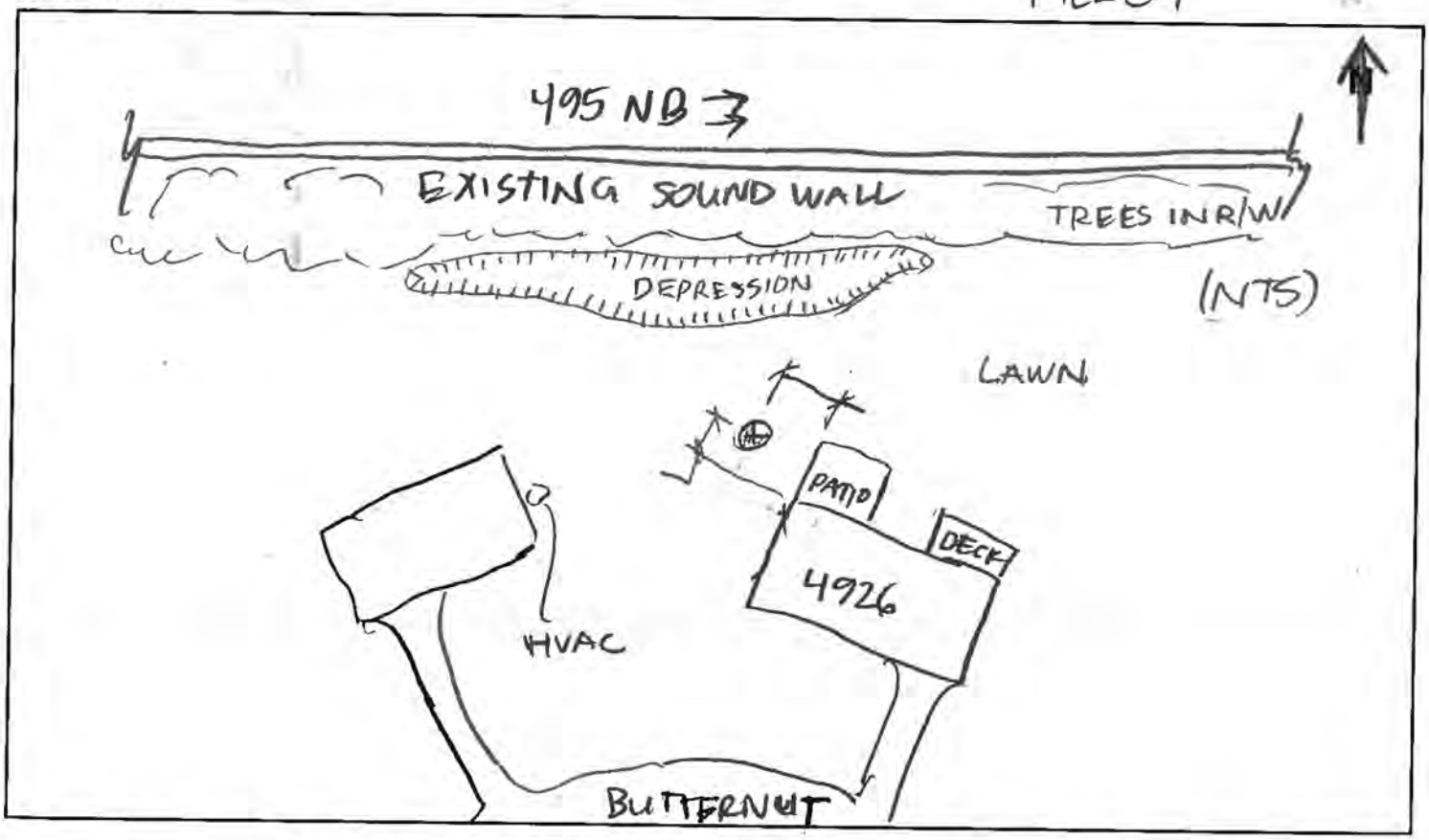
Monitoring Site Log

M03

Site Number: M03
Street Address: 4926 BUTTERNUT CT
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; AIRCRAFT

Instrument: B&K 2245 #5 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 1 DEC 2021 End Date: 1 DEC 2021
Start Time: 11:10 End Time: 11:30
Calibration: Start: End:

Site Sketch: FILE 04



Weather Conditions: SUNNY, CLEAR SKIES; 57°F; 45%RH; 36.6°F DP; 0-28 MPH

GPS Coordinates: 38°57'42" N, 77°11'08" W

Photo Numbers:

Measurement Site M03

HARRIS MILLER MILLER & HANSON INC.

M04/M05

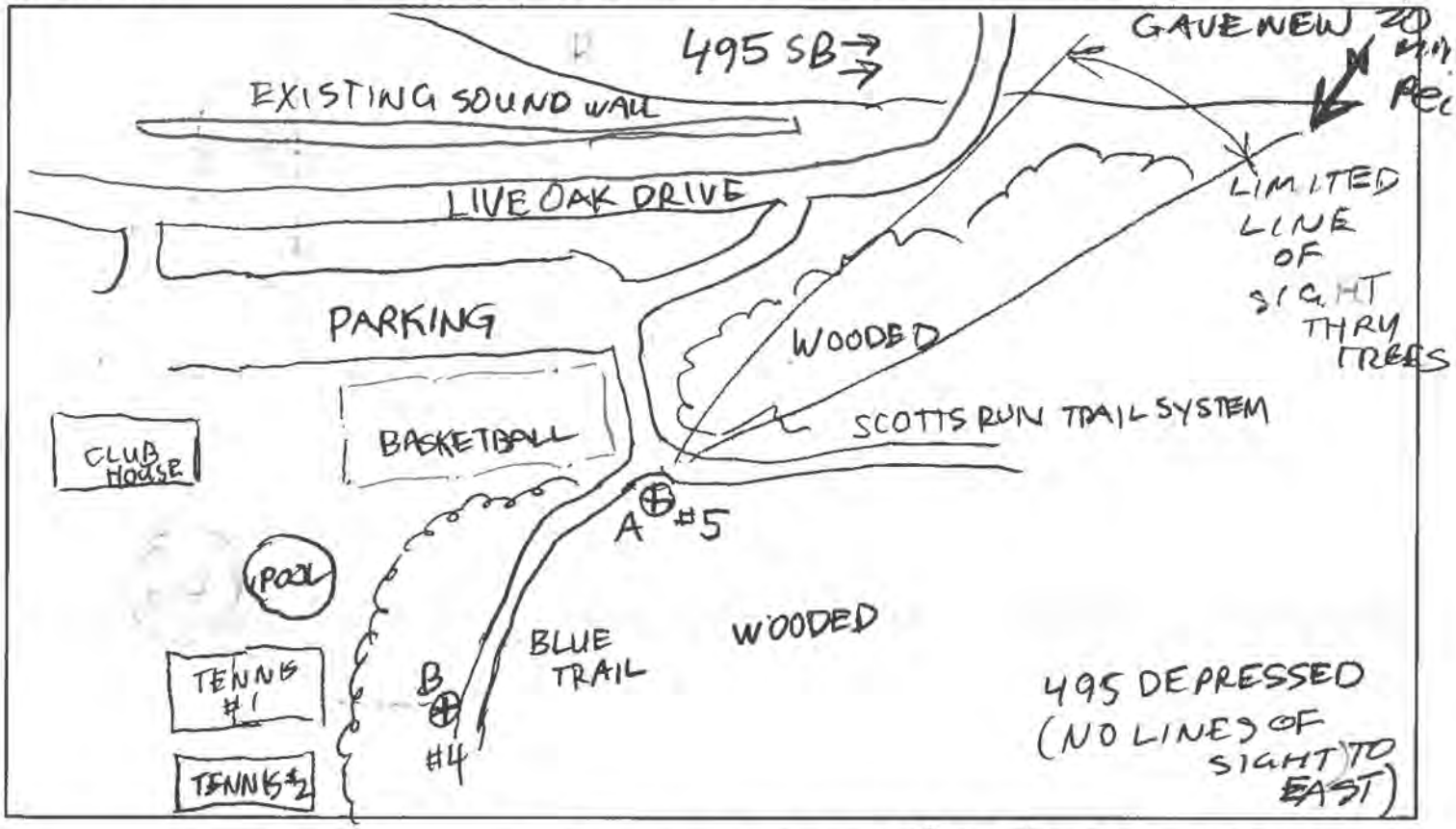
Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

Monitoring Site Log

Site Number: M04A/M04B Records01 & 02
Street Address: SCOTTS RUN TRAIL HEAD
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495 & RAMPS TO/FROM GWMP; BIRDS; TRAIL USERS

Instrument: B&K 2245 #5 / B&K 2245 #4 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 2 DEC 2021 End Date:
Start Time: 805 / 826 & 825 End Time: 825 /
Calibration: Start: End:

Site Sketch: INADVERTENTLY HIT MARKER AT END OF 20 MIN &



Weather Conditions: CLOUDY; 54°F; CALM; 0-1.5MPH; 56% RH 39.8F DP

GPS Coordinates: 38°57'39"N, 77°11'29"W (A)

Photo Numbers: 38°57'40"N, 77°11'29"W (B)

Measurement Site M04

Measurement Site M05

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

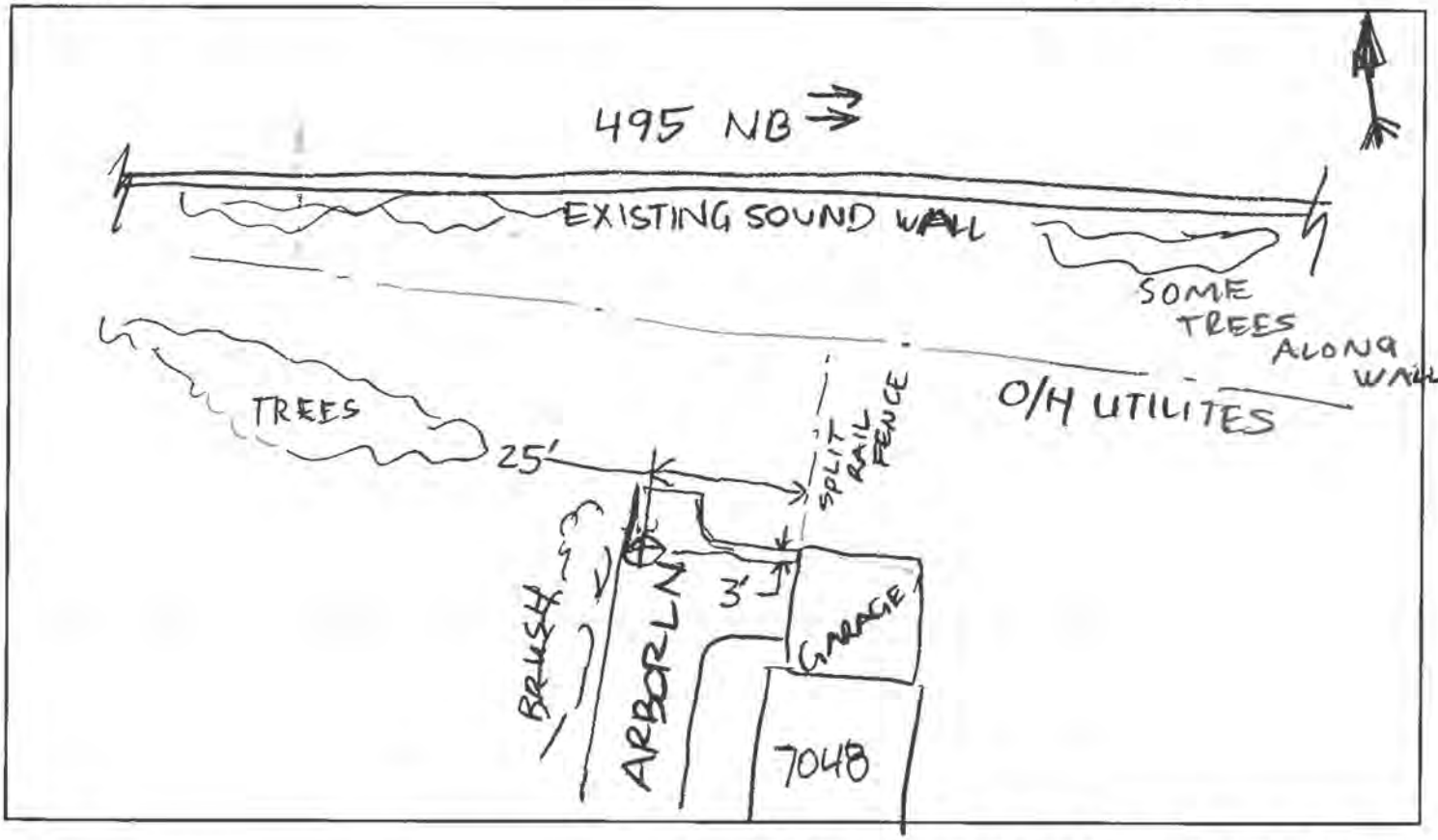
Monitoring Site Log

M06

Site Number: M05
Street Address: 7048 ARBOR LANE
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; BIRDS; AIRCRAFT

Instrument: B&K 2245 KIT #5 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 1 DEC 2021 End Date:
Start Time: 12:10 End Time: 12:30
Calibration: Start: End:

Site Sketch: FILE 05



Weather Conditions: SUNNY; HIGH CLOUDS; 54°F; 43.9% RH; 34.2°F DP; 0-2 MPH

GPS Coordinates: 38°57'37" N, 77°11'19" W

Photo Numbers: ONE UNATTACHED PHOTO FROM SITE M03 WAS ATTACHED TO M05

Measurement Site M06

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

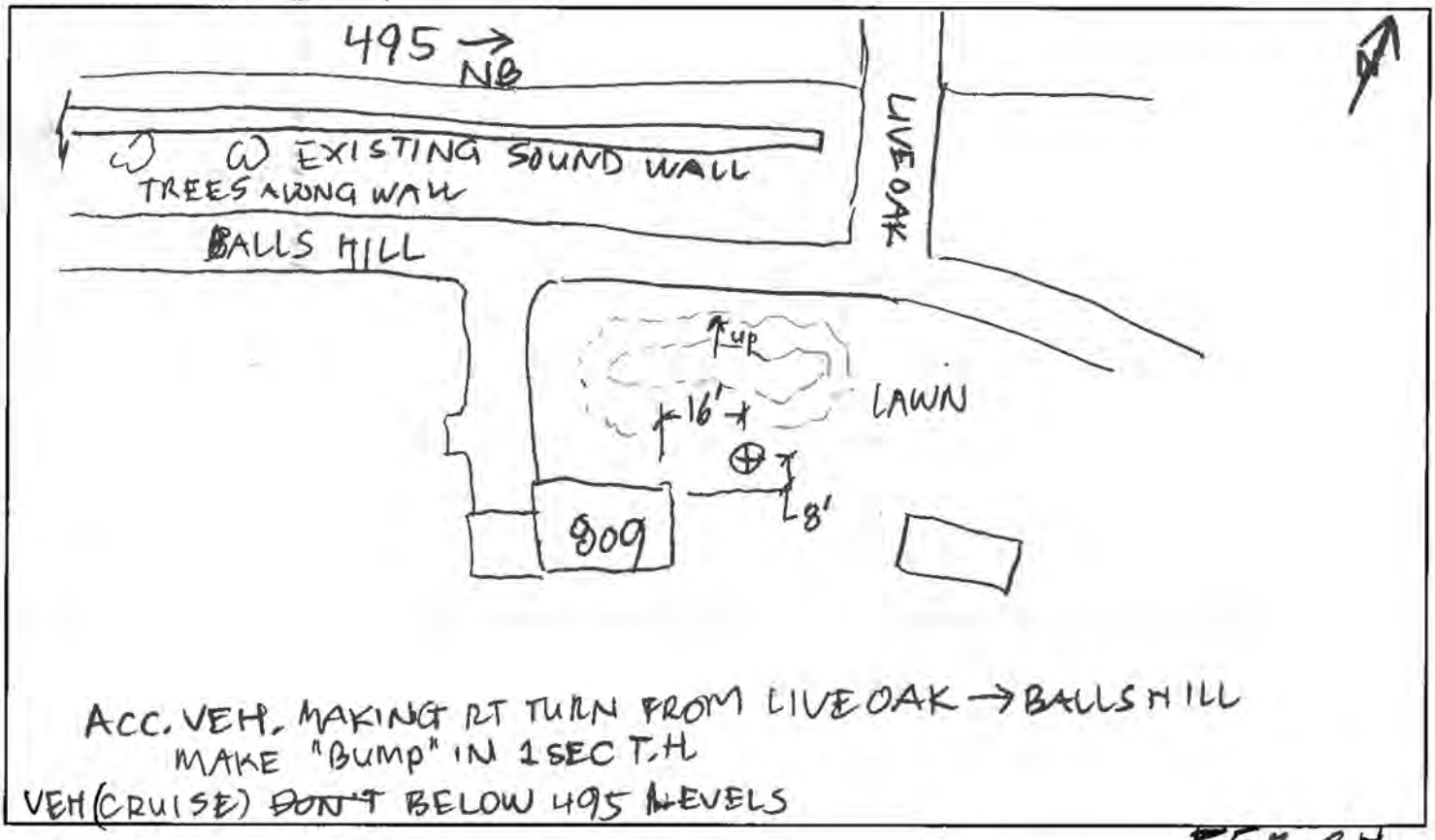
M07

Monitoring Site Log

Site Number: M07
Street Address: 809 BALLS HILL RD
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON I495; BIRDS; HELICOPTER

Instrument: 2245 #5 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 30 NOV 2021 End Date: 30 NOV 21
Start Time: 9:50 AM End Time:
Calibration: Start: 9:50 A.M. End:

Site Sketch: FILE 01



Weather Conditions: OVERCAST; SOME SLEET PRIOR TO MEAS.; 44°F 55% RH 0-2 MPH

GPS Coordinates: 38°57'33" N; 77°11'24" W

Photo Numbers:

Measurement Site M07

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel: Brownlow

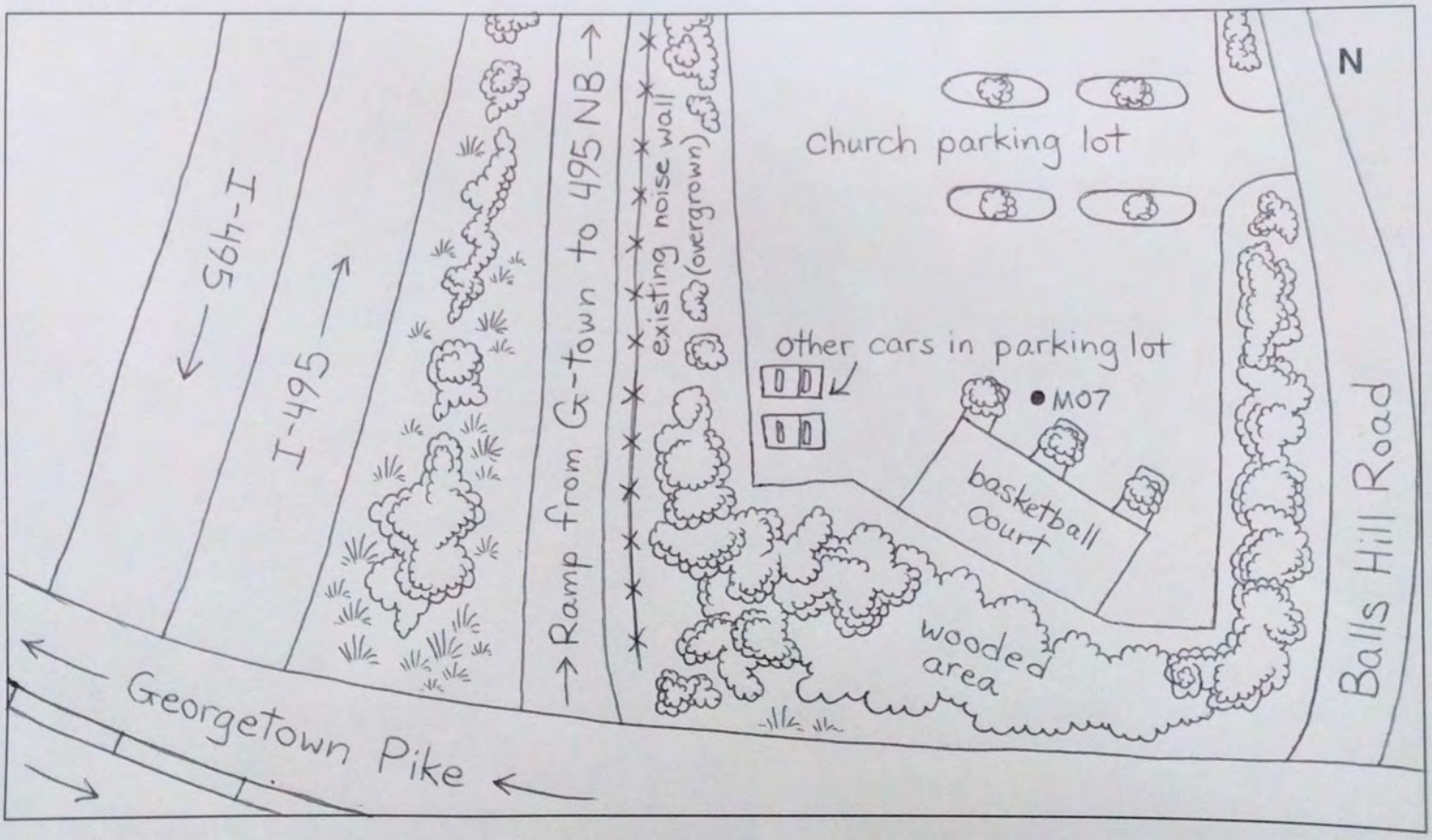
Monitoring Site Log

M08

Site Number: M07
Street Address: 850 Balls Hill Rd
Owner/Description: Holy Trinity Church
Noise/Vibe Sources: Roadway (see event log for single events)

Instrument: 2245 Kit #4 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 11/30/2021 End Date: 11/30/2021
Start Time: 9:50am End Time: 10:20 am
Calibration: Start: End:

Site Sketch:



Weather Conditions: cloudy, light wind, frozen precip sparse

GPS Coordinates:

Photo Numbers:

Measurement Site M08

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

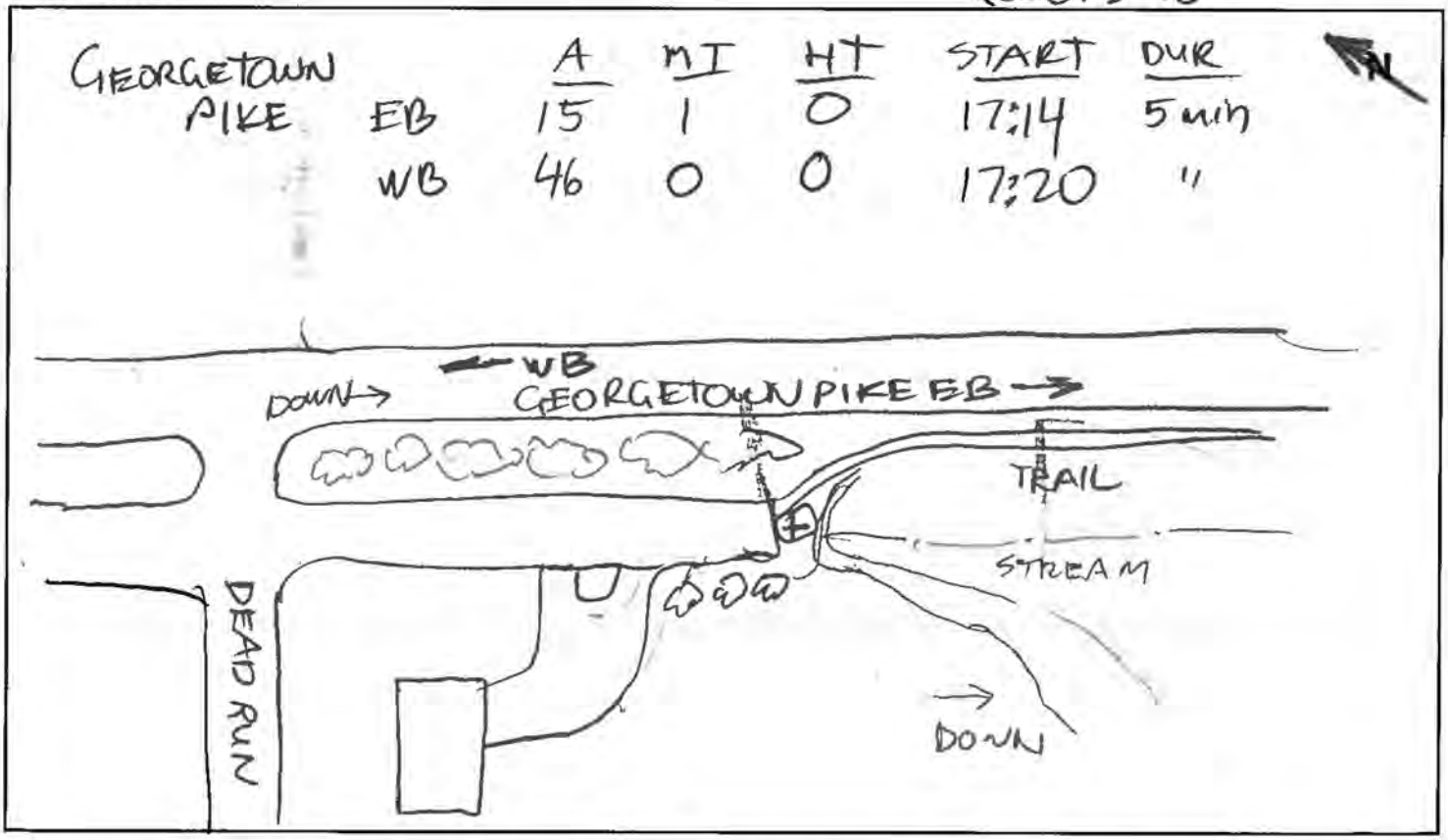
M09

Monitoring Site Log

Site Number: M09
Street Address: EAST OF INTERSECTION AT DEAD RUN DR.
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON GEORGETOWN PIKE; EAST OF INTERSECTION AT DEAD RUN DR.; A/C; HELICOPTER; BUS & LD ALARM PEOPL PARKE M

Instrument: 2245 KIT #5 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 2 DEC 2021 End Date: 2 DEC 2021
Start Time: 16:55 End Time: 17:25
Calibration: Start: End:

Site Sketch: RECORD 10



Weather Conditions: CLOUDY; 0-6 MPH (FROM W); 64°F; 46% RH; 43°F DP

GPS Coordinates: 38°57'11" N, 77°11'21" W (579m)

Photo Numbers: (NO PHOTOS – NO DAYLIGHT)

Measurement Site M09

HARRIS MILLER MILLER & HANSON INC.

M10/M11

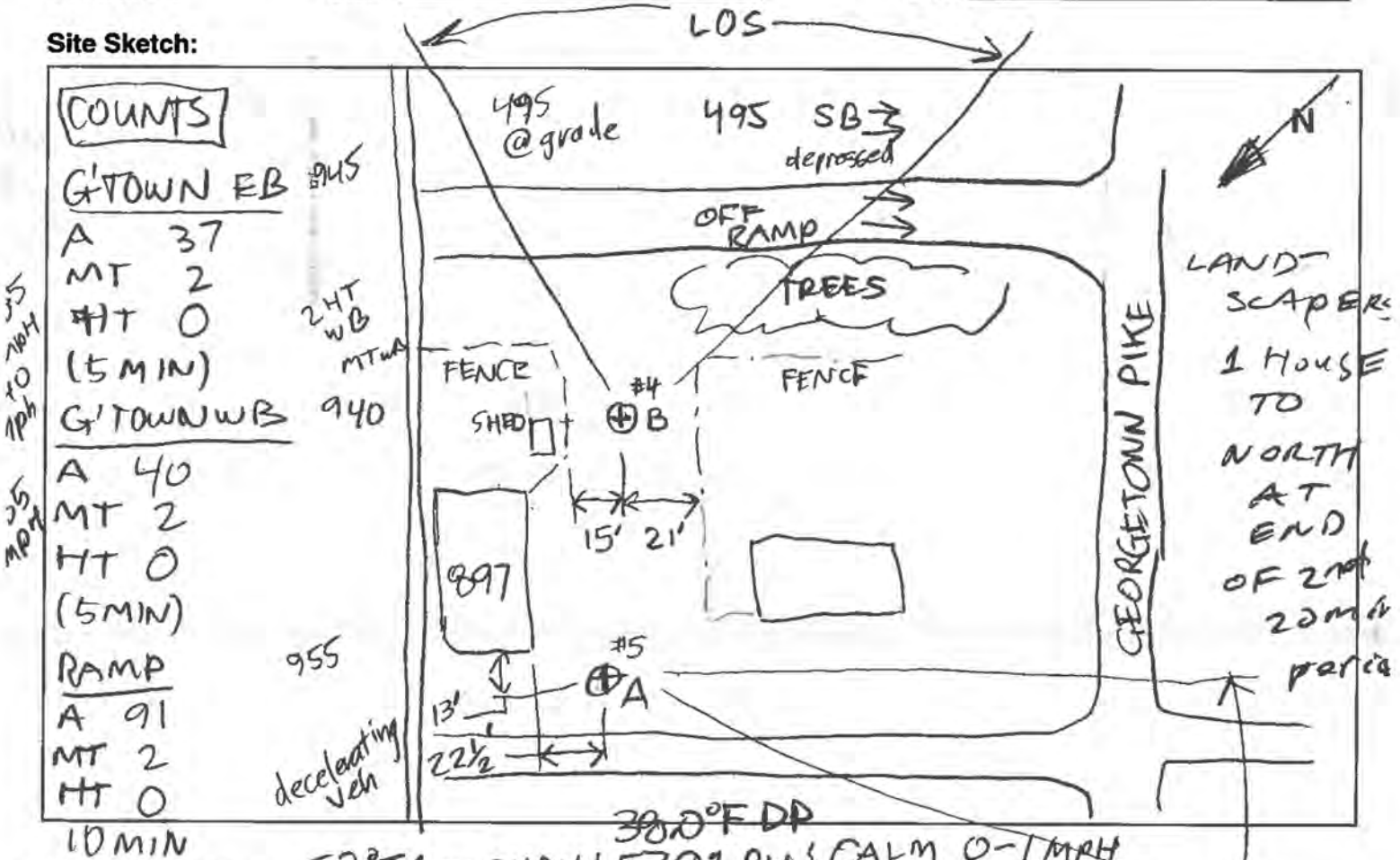
Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

Monitoring Site Log

Site Number: M10A / M10B — RECORDS 03 & 04
Street Address: 897 LINGANORE — BOTH METERS (TWO 20-MIN)
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495 & OFF-RAMP (B); TRAFFIC ON GEORGETOWN PIKE; BIRDS; WIND IN TREES; FALLING LEAVES

Instrument: (A) 2245 #5 / 2245 #4 (B) S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 2 DEC 2021 End Date:
Start Time: 905 End Time: 925
Calibration: Start: End:

Site Sketch:



Weather Conditions: 52°F; CLOUDY; 57.9% RH; CALM 0-1 MPH

GPS Coordinates: (A) 38°57'21" N, 77°11'43" W (photos see iPhone)

Photo Numbers: (B) 38°57'21" N, 77°11'42" W (photos see iPhone)

Measurement Site M10

Measurement Site M11

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

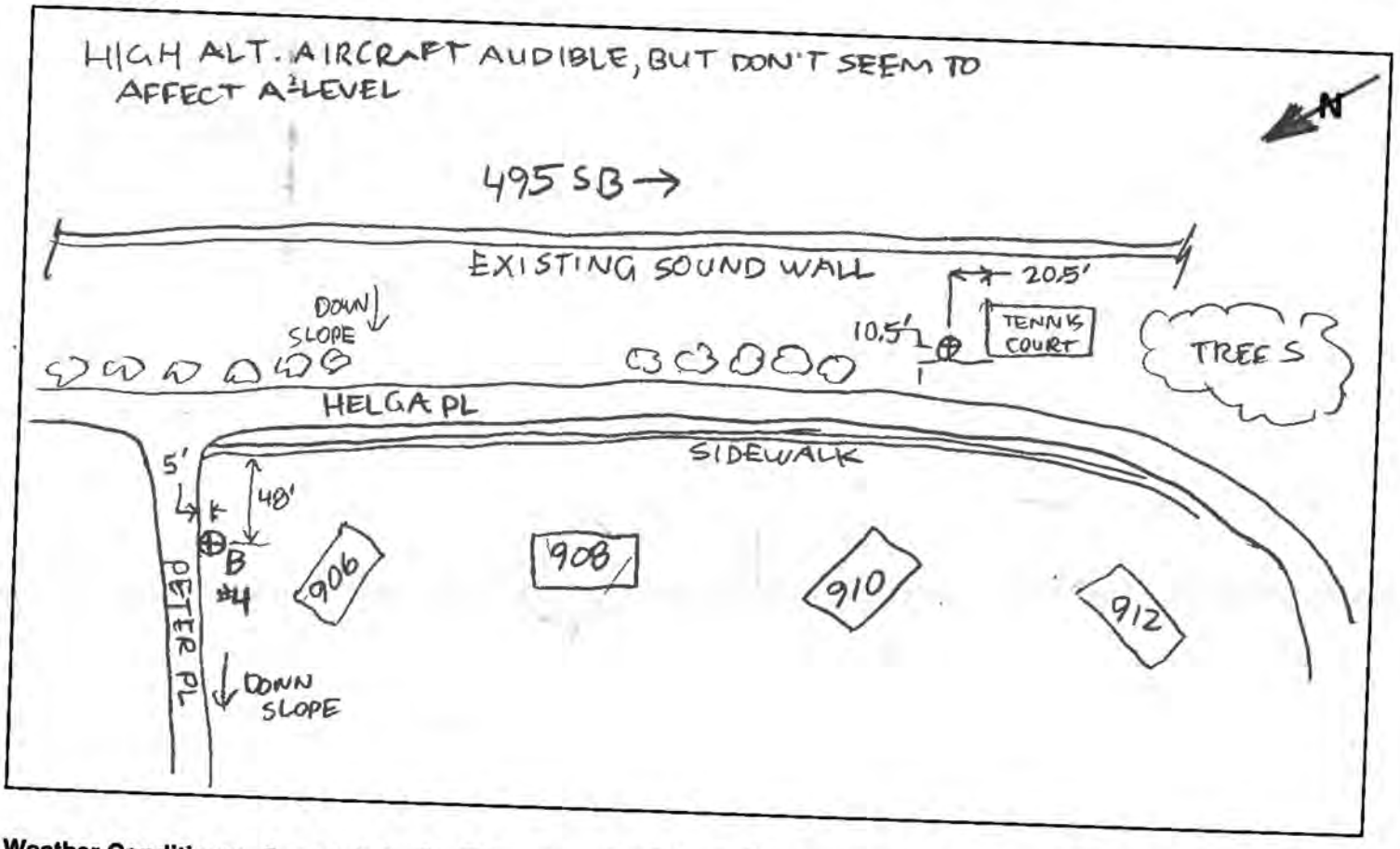
Monitoring Site Log

M12/M13

Site Number: M12A/M12B
Street Address: HELGA PLACE TENNIS CT (A) / CORNER PETER PL & HELGA (B)
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; AIRCRAFT; BIRDS; LOCAL TRAFFIC

Instrument: (A) 2245 KIT #5 / 2245 KIT #4 (B) S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 3 DEC 2021 End Date:
Start Time: 7:50 End Time: 8:20
Calibration: Start: End:

Site Sketch:



Weather Conditions: SUNNY; CLEAR SKIES; 42°F; 62% RH; 30.2°F DP; CALM

GPS Coordinates: (A) 38° 57' 09" N, 77° 11' 47" W (261m)

Photo Numbers: (B) 38° 57' 12" N, 77° 11' 46" W (588m)

Measurement Site M12

Measurement Site M13

HARRIS MILLER MILLER & HANSON INC.

M14/M15

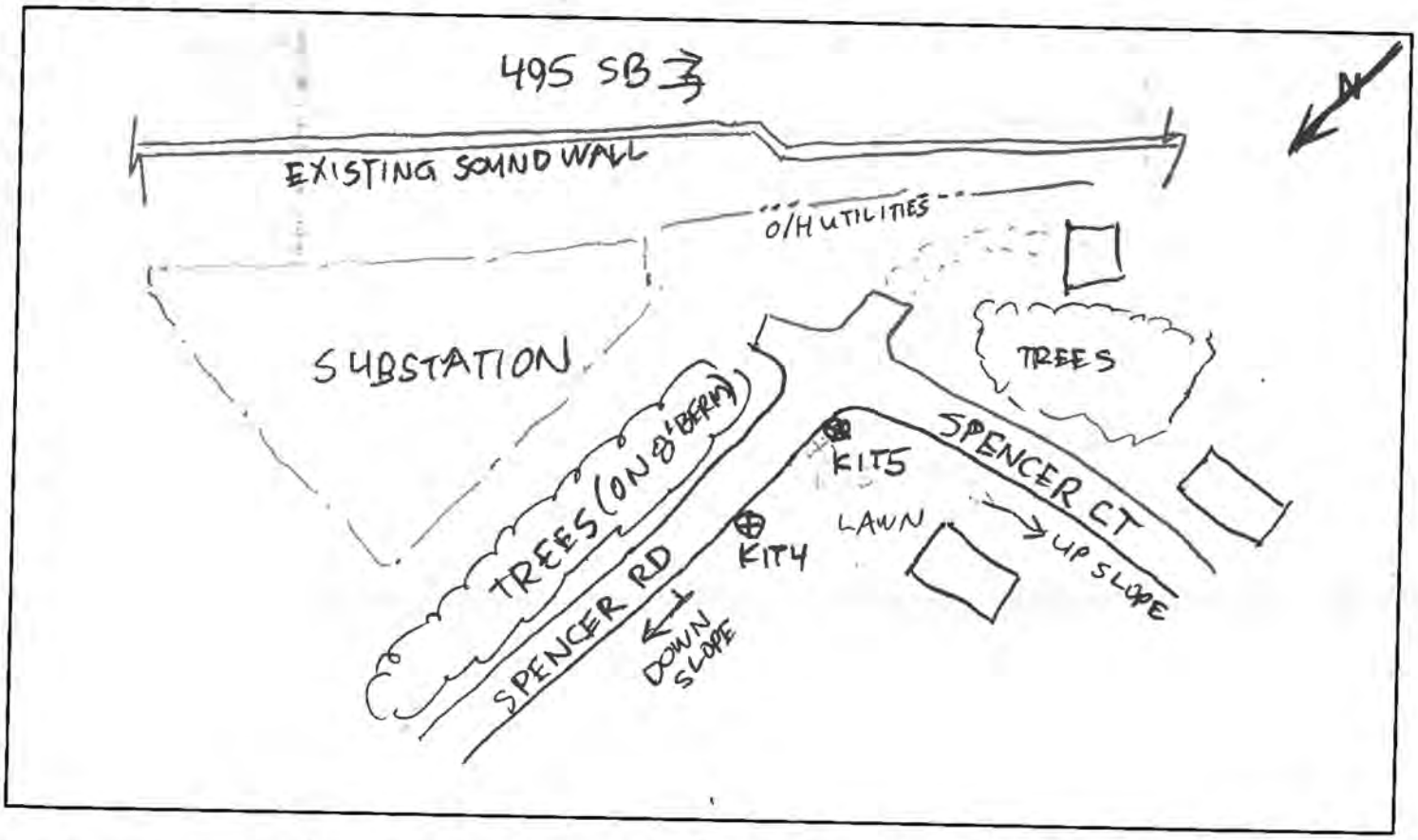
Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

Monitoring Site Log

Site Number: M13A/M13B
Street Address: SPENCER RDe SPENCER CT
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; WIND IN TREES; BIRDS

Instrument: (13A) KIT #5 / KIT #4 (13B) S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 1 DEC 2021 End Date:
Start Time: 14:45 / 14:45 End Time: / 15:15
Calibration: Start: End:

Site Sketch:



Weather Conditions: PARTLY CLOUDY; 55°F; 43% RH; 34.6°F DP; 0-4MPH

GPS Coordinates: 38°56'59"N, 77°12'00"W (KIT5);

Photo Numbers: 38°57'00"N, 77°12'00"W (KIT4)

Measurement Site M14

Measurement Site M15

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

Monitoring Site Log

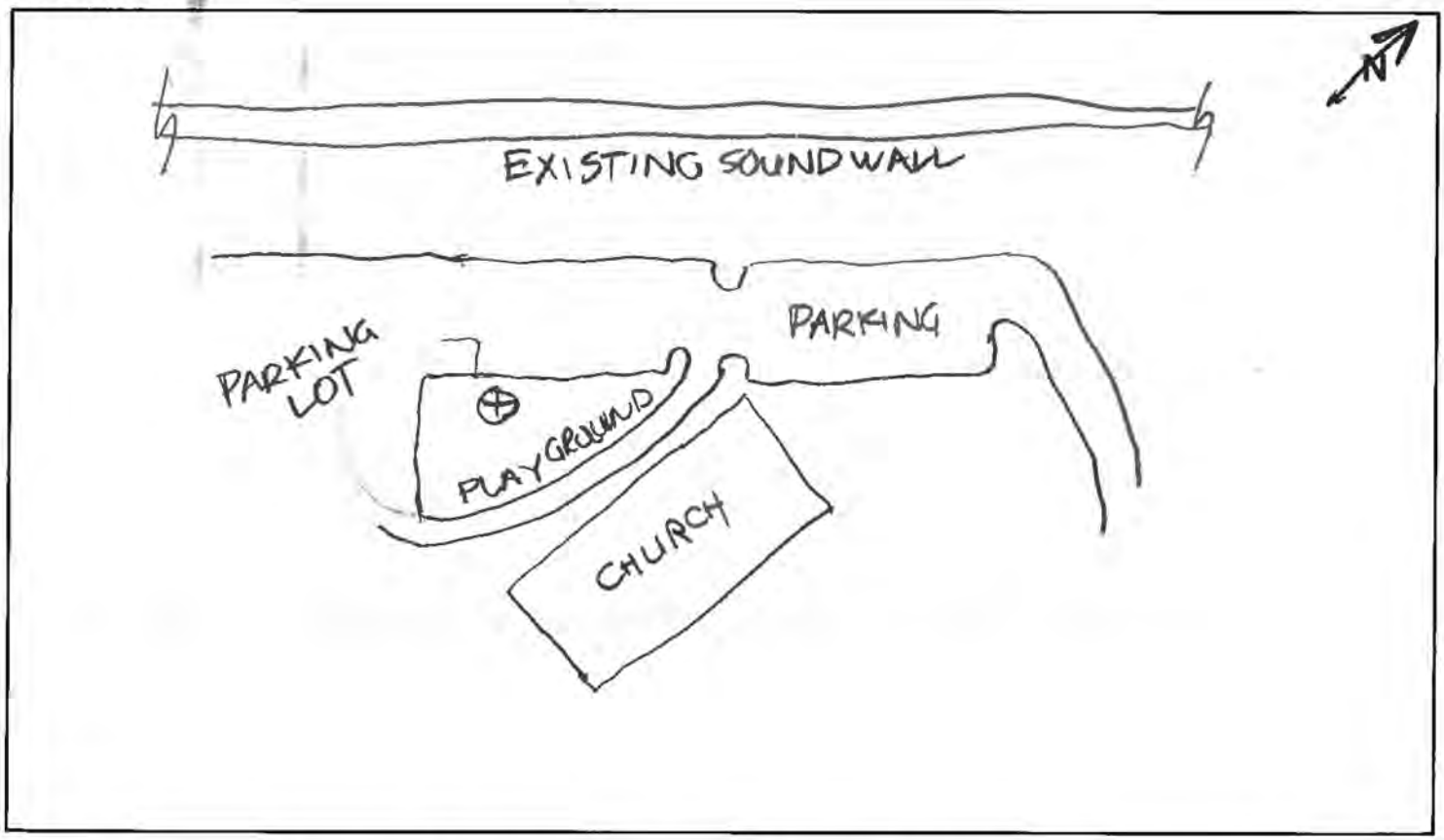
M16

PROJECT 2 / FILE 01

Site Number: M14
Street Address: 1020 BALLS HILL ROAD
Owner/Description:
Noise/Vibe Sources: 495 TRAFFIC; BIRDS

Instrument: 2245 KIT #5' S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 1 DEC 2021 End Date:
Start Time: 0805 End Time: 0825
Calibration: Start: End:

Site Sketch:



Weather Conditions: CLEAR SKIES; SUNNY; 36°F; 73% RH; 0-2.5 MPH (CALM
GPS Coordinates: 38°57'55" N, 77°10'57" W

Photo Numbers:

Measurement Site M16

HARRIS MILLER MILLER & HANSON INC.

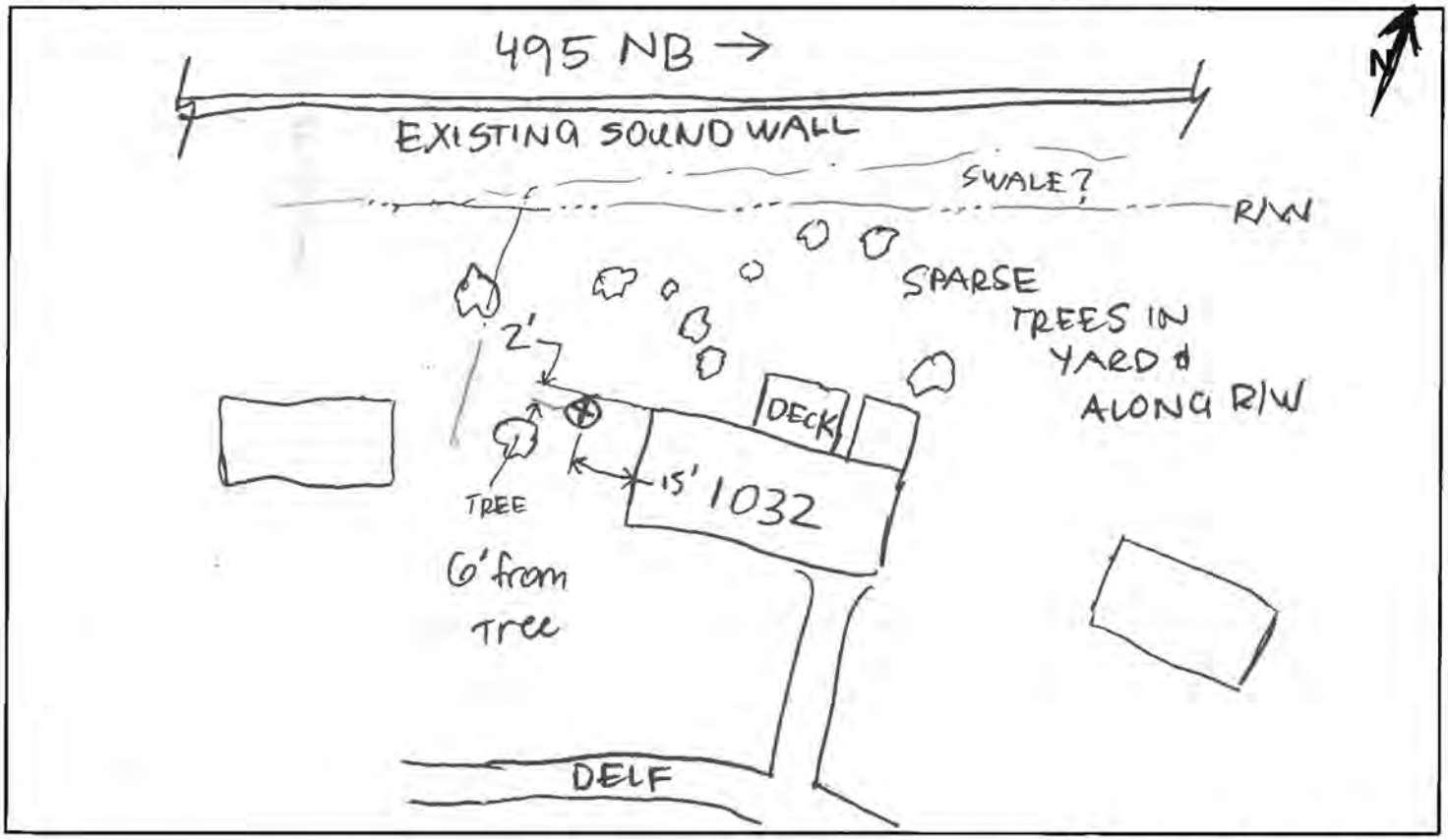
Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

M17

Monitoring Site Log

Site Number: M15
Street Address: 1032 DELF DRIVE
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; BIRDS; MIC LOCATED IN SIDE YARD TO AVOID HVAC UNDER DECK
Instrument: B&K 2245 KIT#5 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 1 DEC 2021 End Date:
Start Time: 905 End Time: 925
Calibration: Start: End:

Site Sketch: FILE 02



Weather Conditions: SUNNY; CLEAR; 43°F; 65% RH; 0-1.5 MPH (CALM) 34.5°F DP

GPS Coordinates: 38° 56' 57" N, 77° 11' 53" W

Photo Numbers:

Measurement Site M17

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel:

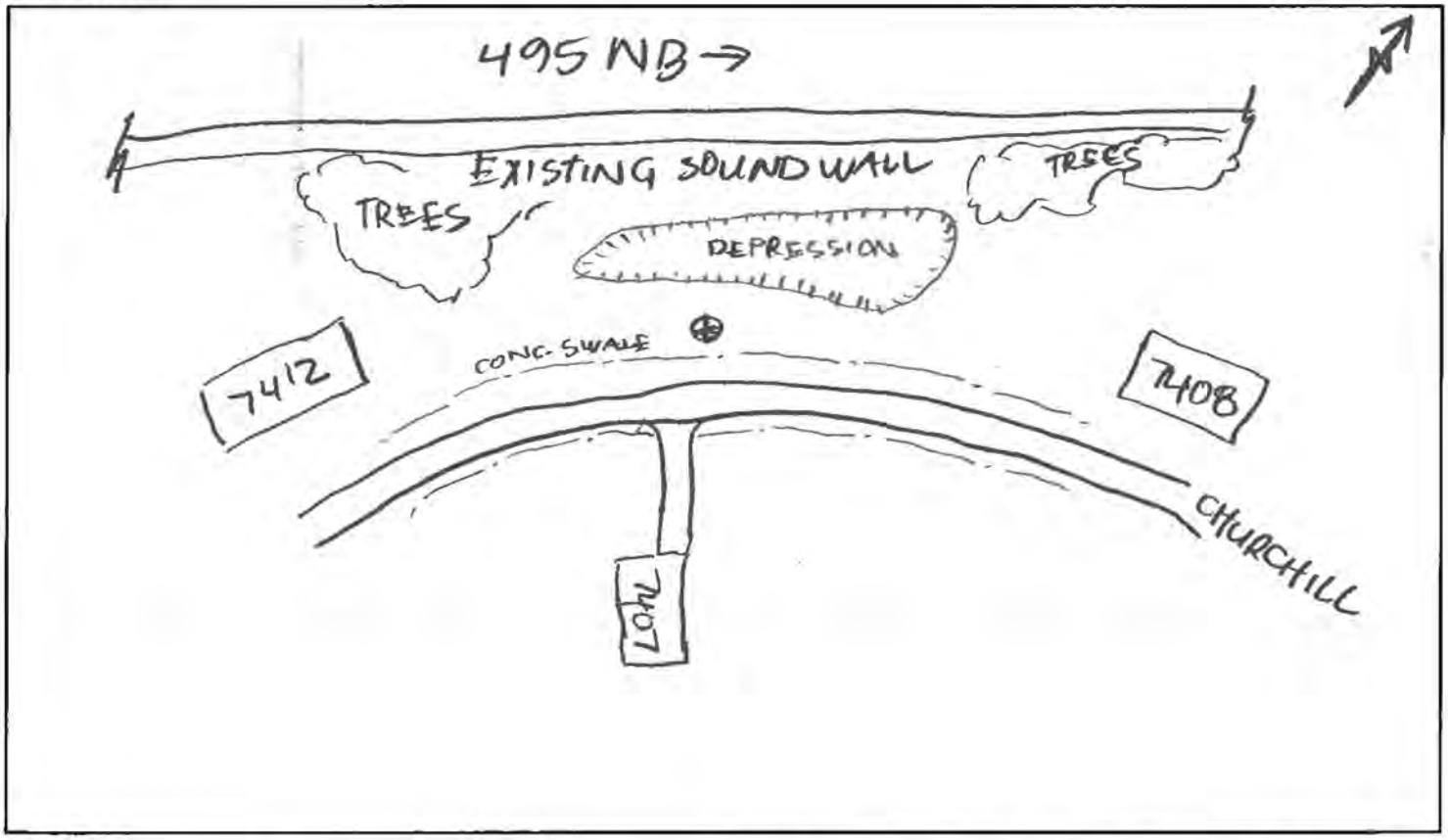
Monitoring Site Log

M18

Site Number: M16
Street Address: 7412/7408 CHURCHILL RD
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; BIRDS; DISTANT AIRCRAFT

Instrument: B&K 2245 KIT#5 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 1 DEC 2021 End Date:
Start Time: 10:00 End Time: 10:20
Calibration: Start: End:

Site Sketch:



Weather Conditions: SUNNY, CLEAR SKIES, 48°F; 50.9% RH; 30.5°F DP; 0-2.5 MPH

GPS Coordinates: 38°56'50" N, 77°12'01" W

Photo Numbers:

Measurement Site M18

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

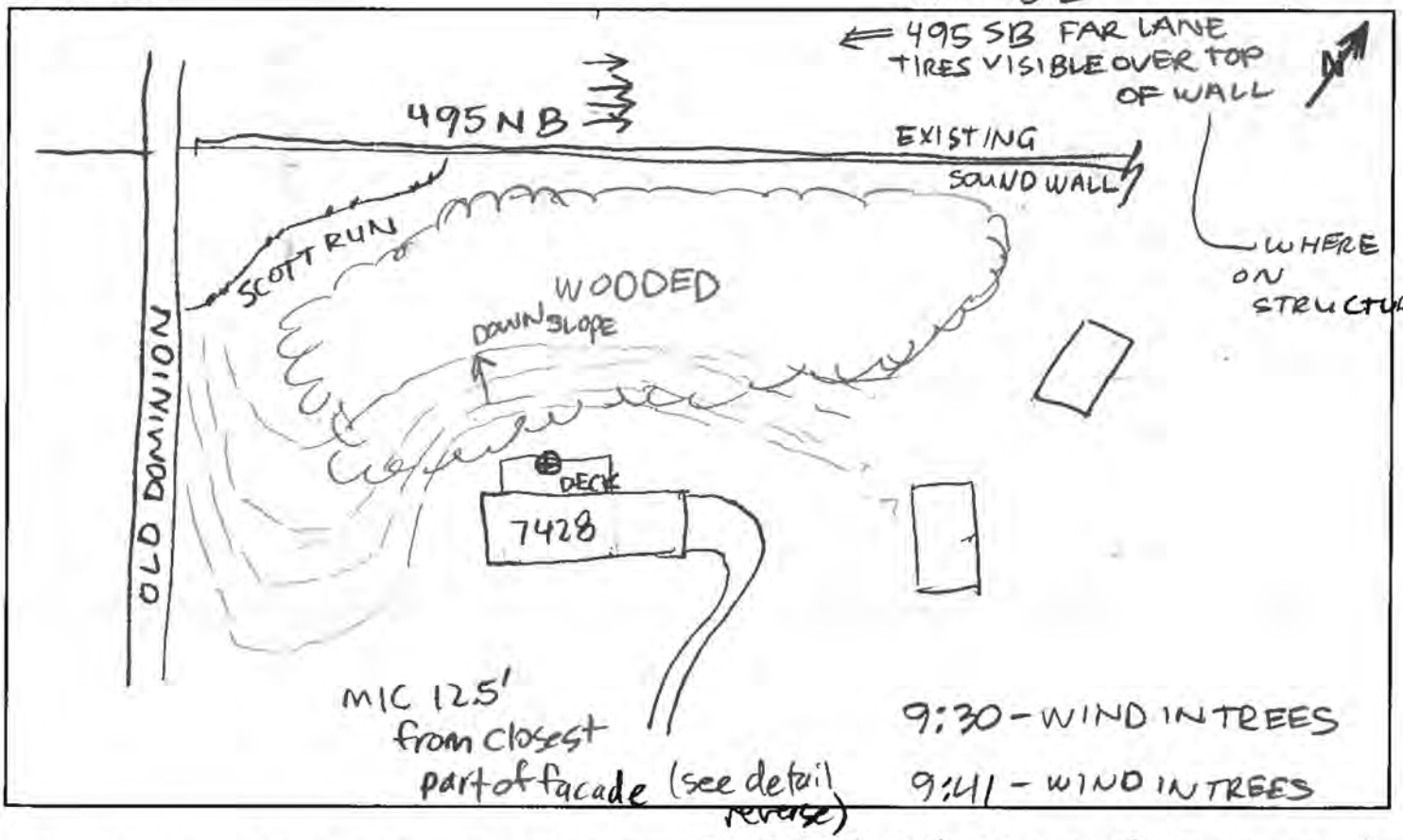
Monitoring Site Log

M19

Site Number: M17
Street Address: 7428 OLD DOMINION DRIVE
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; BIRDS; AIRCRAFT; TRUCKS ON OLD DOMINION; WIND IN TREES

Instrument: 2245 #5 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 3 DEC 2021 End Date: 3 DEC 2021
Start Time: 9:15 End Time: 9:45
Calibration: Start: End:

Site Sketch: RECORD 2



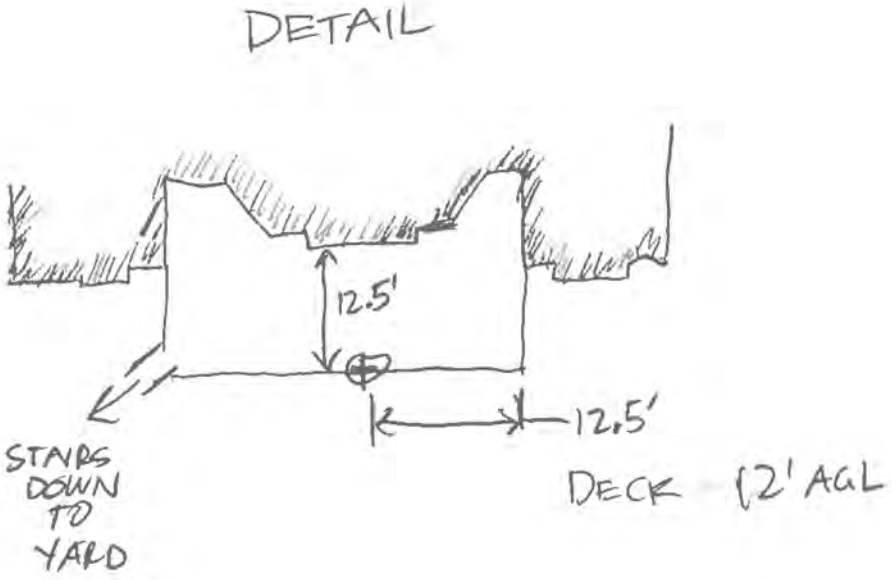
Weather Conditions: PARTLY CLOUDY; 49.7°F; 49.2% RH; 30.6°F DP; 0-3MPH (WE

GPS Coordinates: N 38°56'45"; W 77°12'02" (581 m)

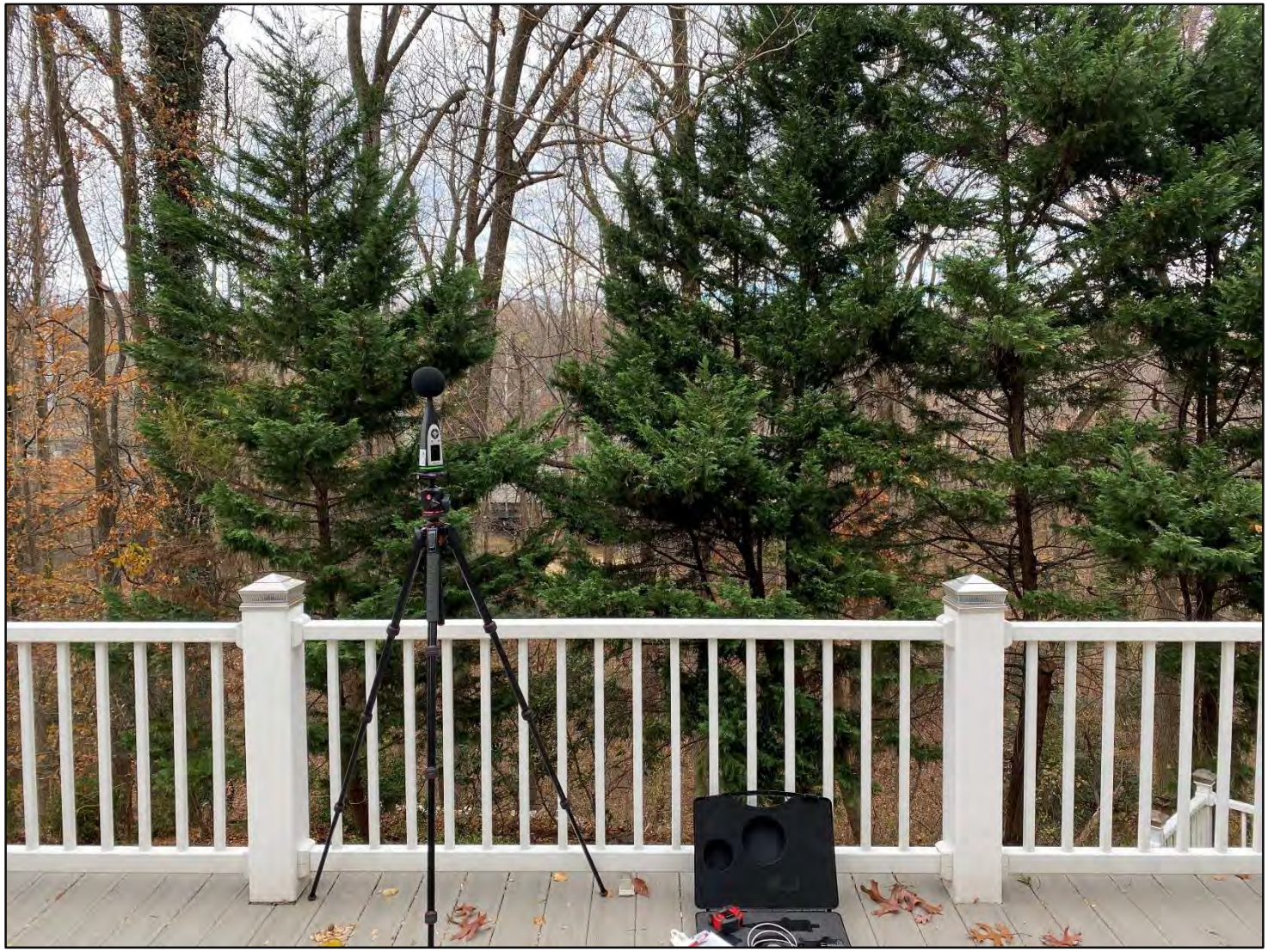
Photo Numbers:

M19

Measurement Site: M17



Measurement Site M19



HARRIS MILLER MILLER & HANSON INC.

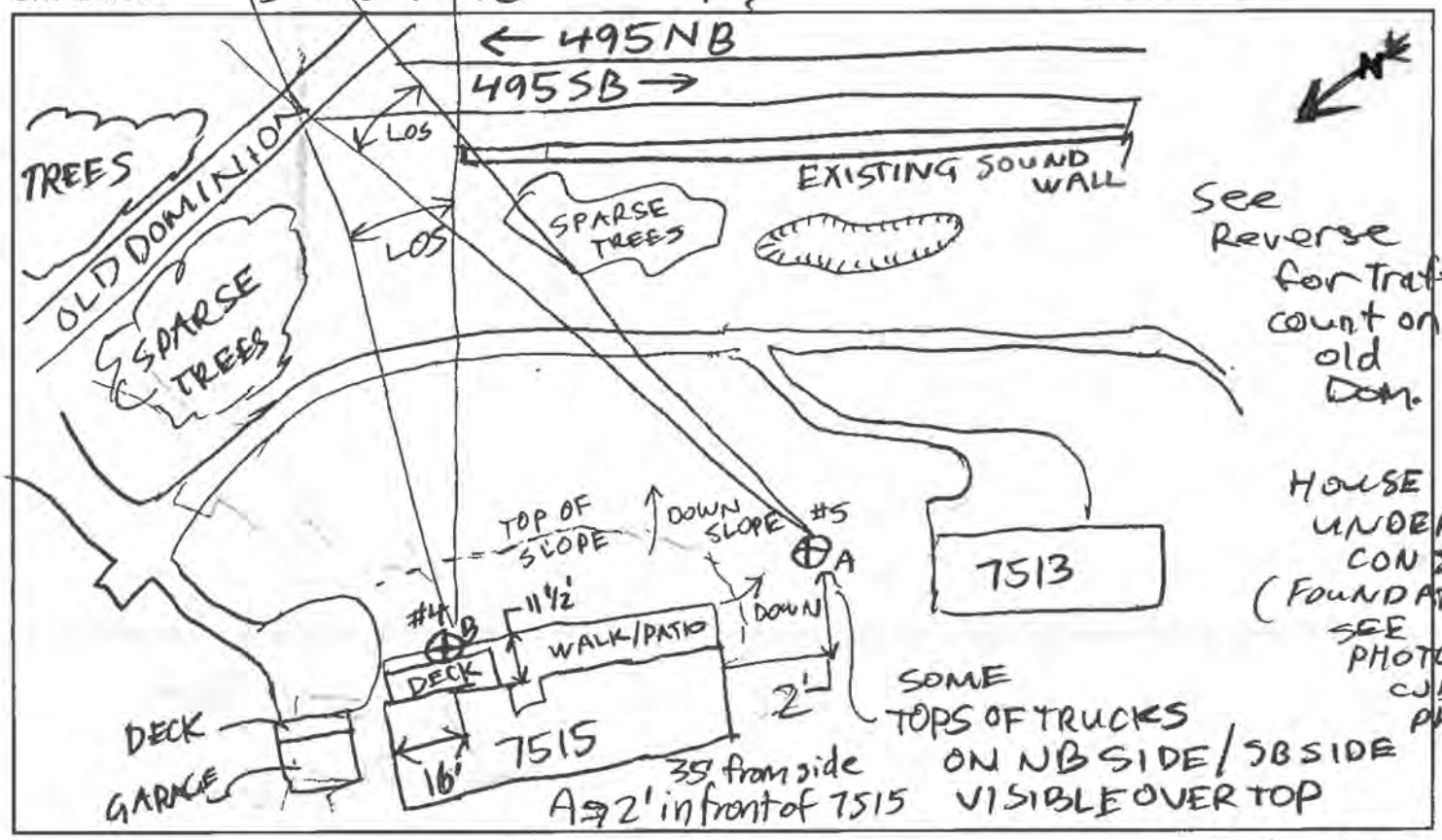
M20/M21

Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

Monitoring Site Log

Site Number: (#5) M19A / M19B (#4)
Street Address: 7515 OLD DOMINION (B); 7513/7515 OLD DOM (A)
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; TRAFFIC ON OLD DOMION; BIRDS
Instrument: (A) 2245 #5 / 2245 #4 (B) S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 2 DEC 2021 End Date:
Start Time: 11:35 End Time: 12:05
Calibration: Start: End:

Site Sketch: #5 ⇒ 5' MIC #4 ⇒ RECORD 05



Weather Conditions: 0-4.3 mph; 61°F; 54% RH, 45°F dp; partly cloudy

GPS Coordinates: (A) 5' AGL 38°56'43"N, 77°12'16" W (579M)

Photo Numbers: (B) 11.4' AGL 38°56'43" N, 77°12'16" W (579m)

Measurement Site: M19A / M19B **M20/M21**

OLD DOMINION

START 11:55 AM — DURATION 5 MIN — WB

A	MT	HT	
14	1	1	MT EB

12:00 PM 5 MIN — EB

A	MT	HT
21	0	0

Measurement Site M20

Measurement Site M21

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

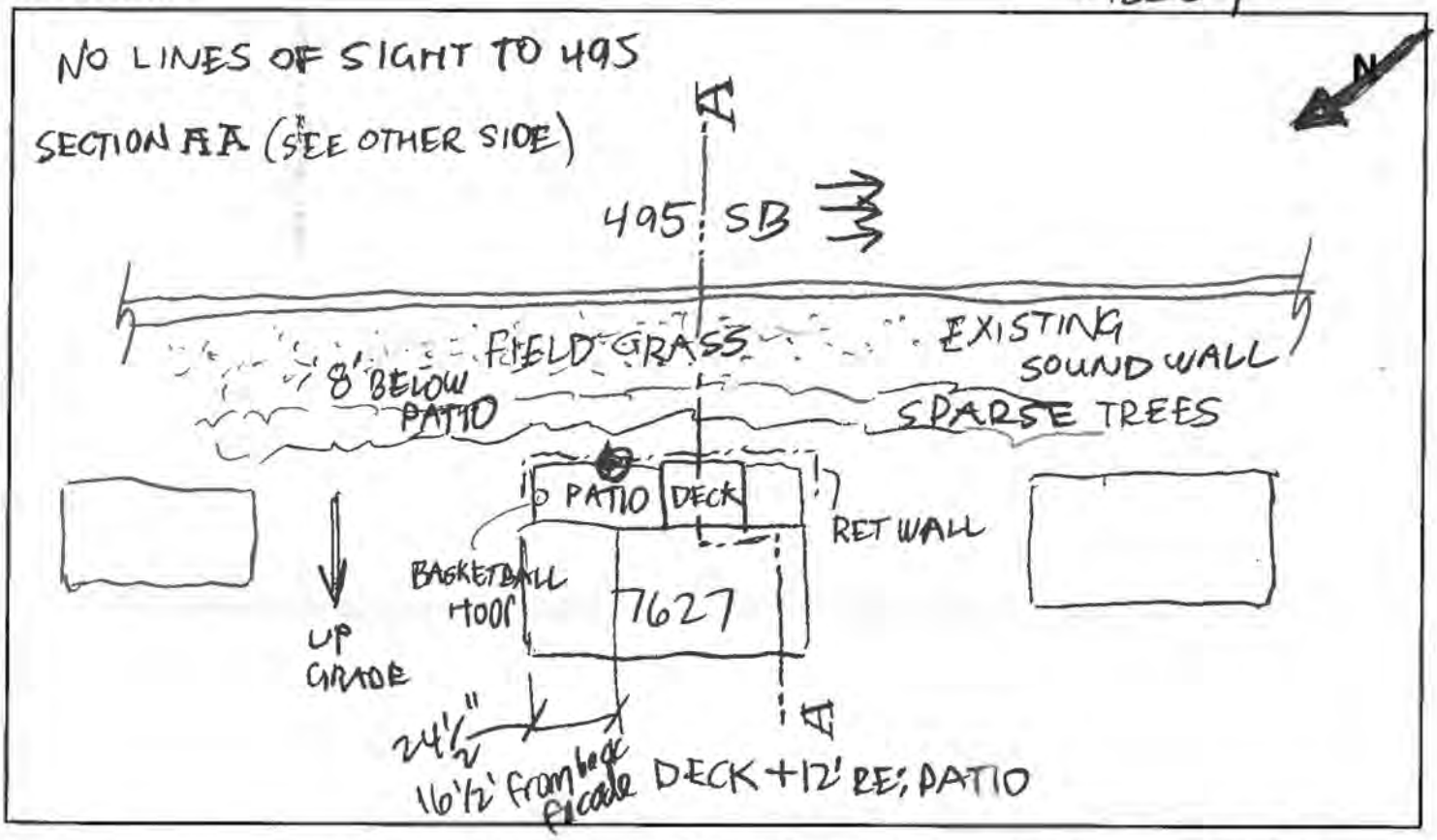
Monitoring Site Log

M22

Site Number: M23
Street Address: 7627 HUNTMASTER LN
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; BIRDS; AIRCRAFT

Instrument: 2245 KIT #5 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 30 NOV 2021 End Date:
Start Time: 15:45 End Time: 16:15
Calibration: Start: End:

Site Sketch: FILE04



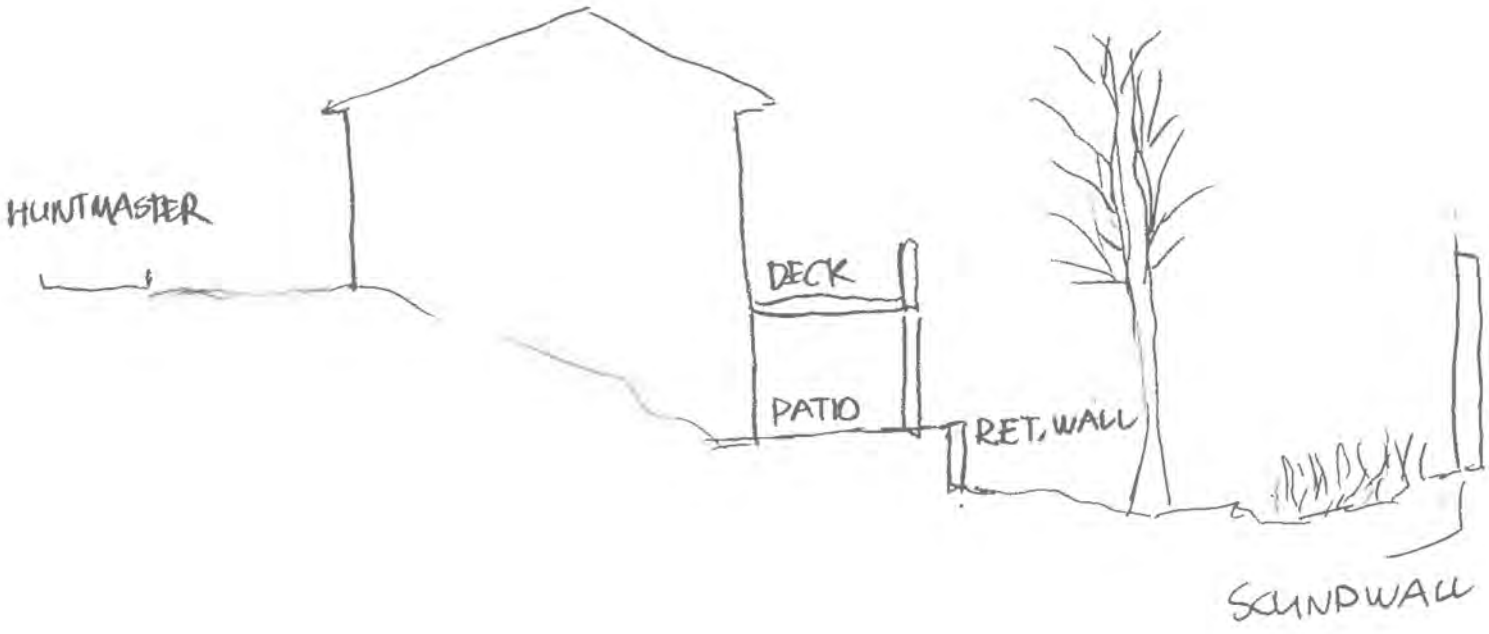
Weather Conditions: SUNNY; 51°F; 42% RH; 29°F DP; 0-1.5 MPH WINDS (CALM)

GPS Coordinates: 38°57'55"N, 77°10'57"W

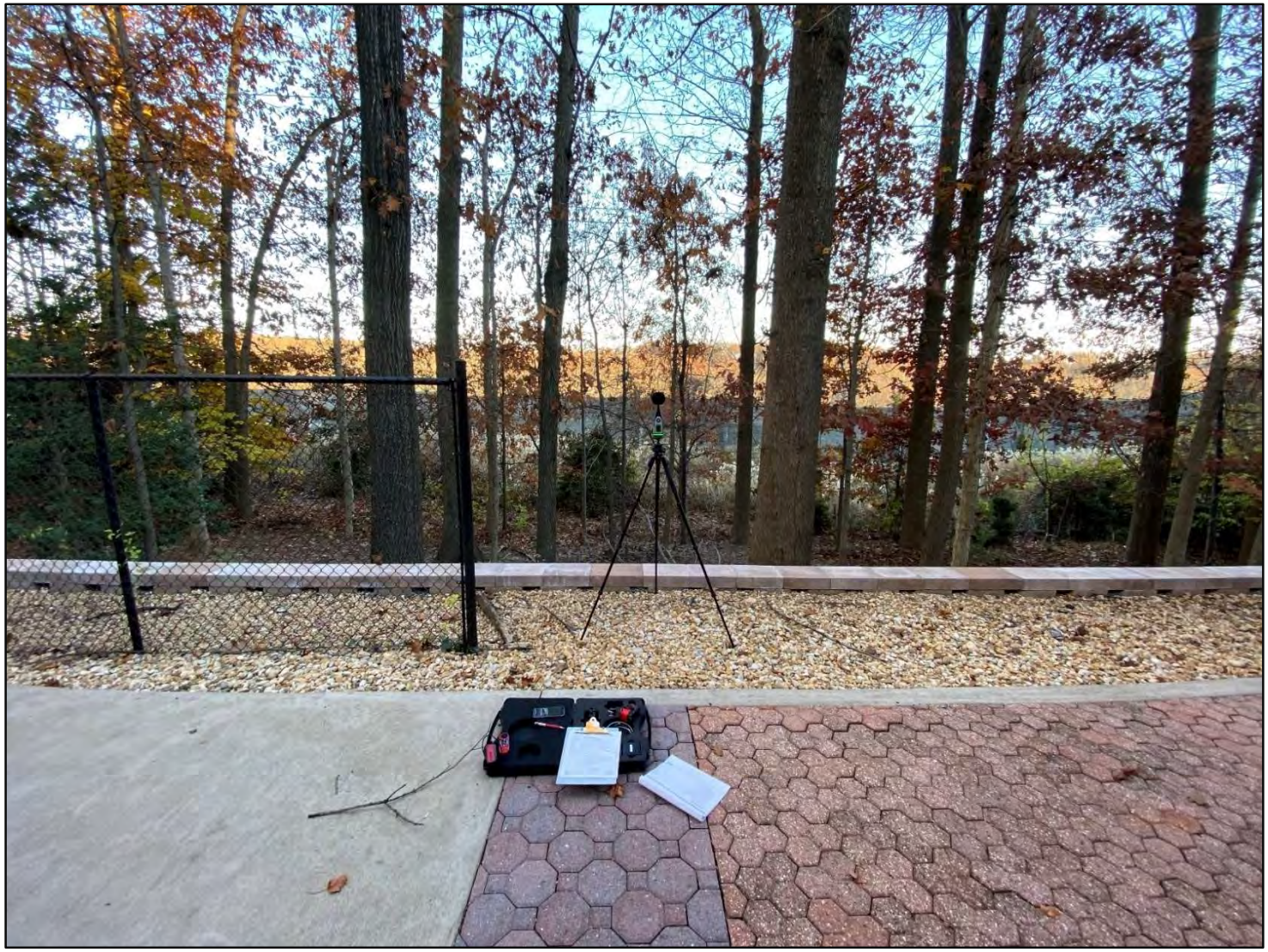
Photo Numbers:

M22

SECTION AA e M23 (NTS)



Measurement Site M22



HARRIS MILLER MILLER & HANSON INC.

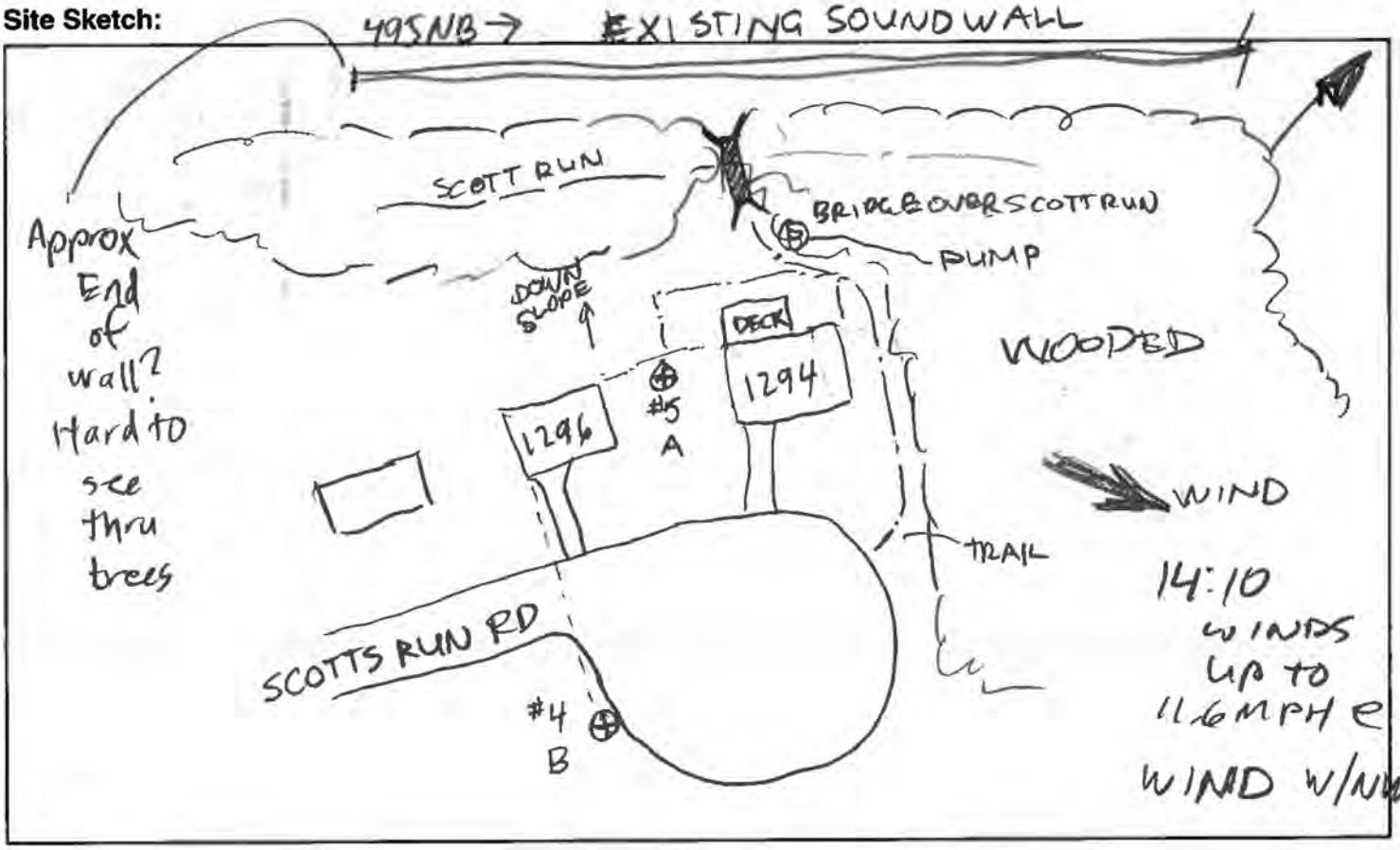
M23/M24

Project: 495 NEXT
Job Num: 312870.000
Personnel:

Monitoring Site Log

Site Number: M24A / M24B
Street Address: 1294 SCOTTS RUN RD / SCOTTS RUN RD CUL-DE-SA
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; WIND IN TREES; 4-WHEELER TO CHECK PUMP; BIRDS
Instrument: (A) 2245 KIT #5 / 2245 KIT #4 (B) S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 2 DEC 2021 End Date:
Start Time: 13:45 End Time: 14:15
Calibration: Start: End:

Site Sketch:



Weather Conditions: SUNNY; 68°F; 45.1% RH, 47.7°F DP; 0-9MPH FROM E
GPS Coordinates: (A) 38°56'26"N, 77°12'12"W ~~806m~~ 576m
Photo Numbers: (B) 38°56'22"N, 77°12'11"W 399m

Measurement Site M23

Measurement Site M24

HARRIS MILLER MILLER & HANSON INC.

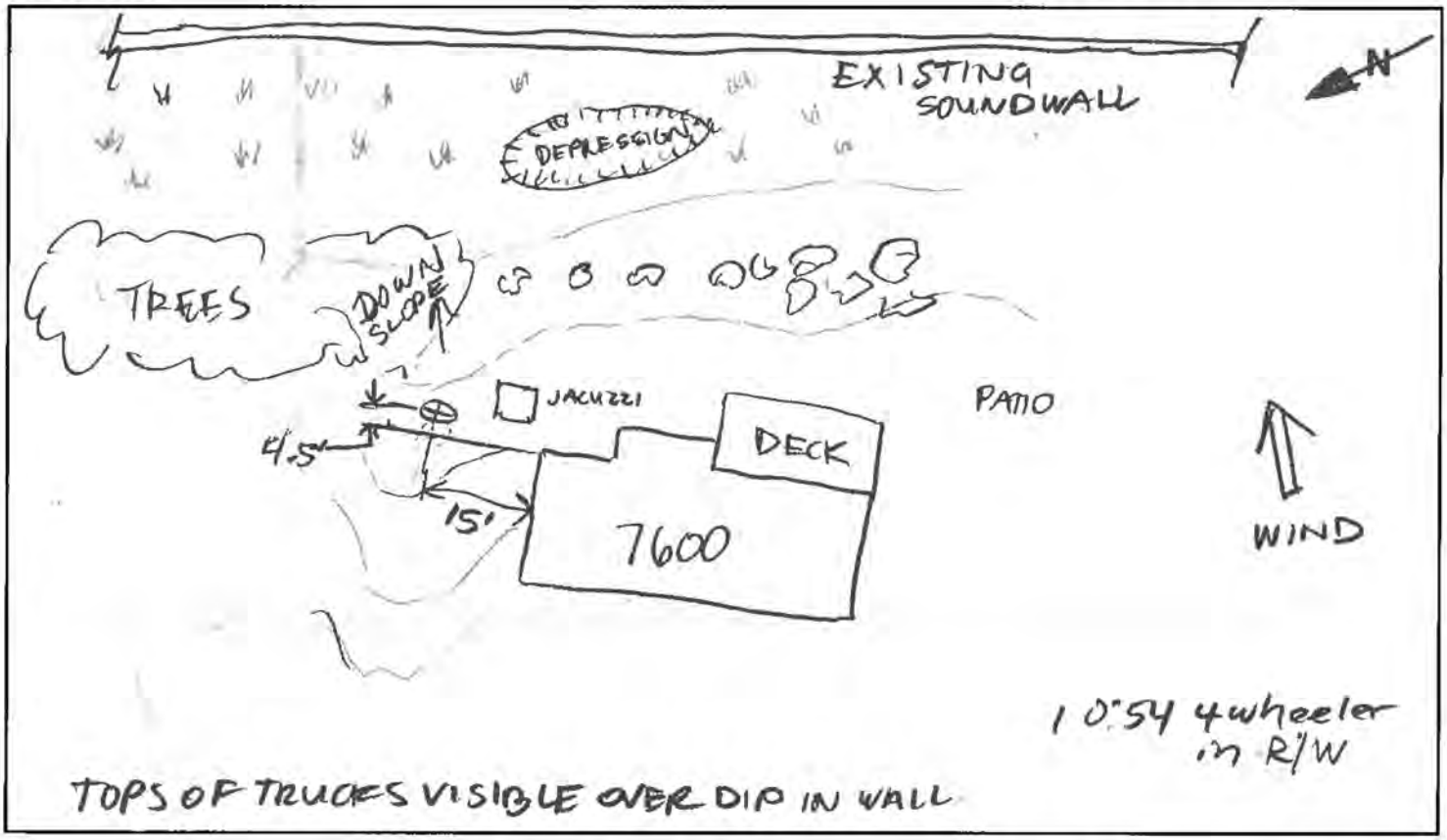
Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

Monitoring Site Log

M25

Site Number: M25
Street Address: 7600 TIMBERLY COURT
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; AIRCRAFT & BIRDS; WIND IN TREES
Instrument: 2245 KIT #5 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 3 DEC 2021 End Date: 3 DEC 2021
Start Time: 10:40 End Time: 11:10
Calibration: Start: End:

Site Sketch: RECORD 03



Weather Conditions: PARTLY CLOUDY; 51°F; 46.7% RH; 32°F DP; WINDS 0-3 MPH FROM WEST

GPS Coordinates: 38°56'45"N, 77°12'02"W (626 m)

Photo Numbers:

Measurement Site M25

HARRIS MILLER MILLER & HANSON INC.

M26/M27

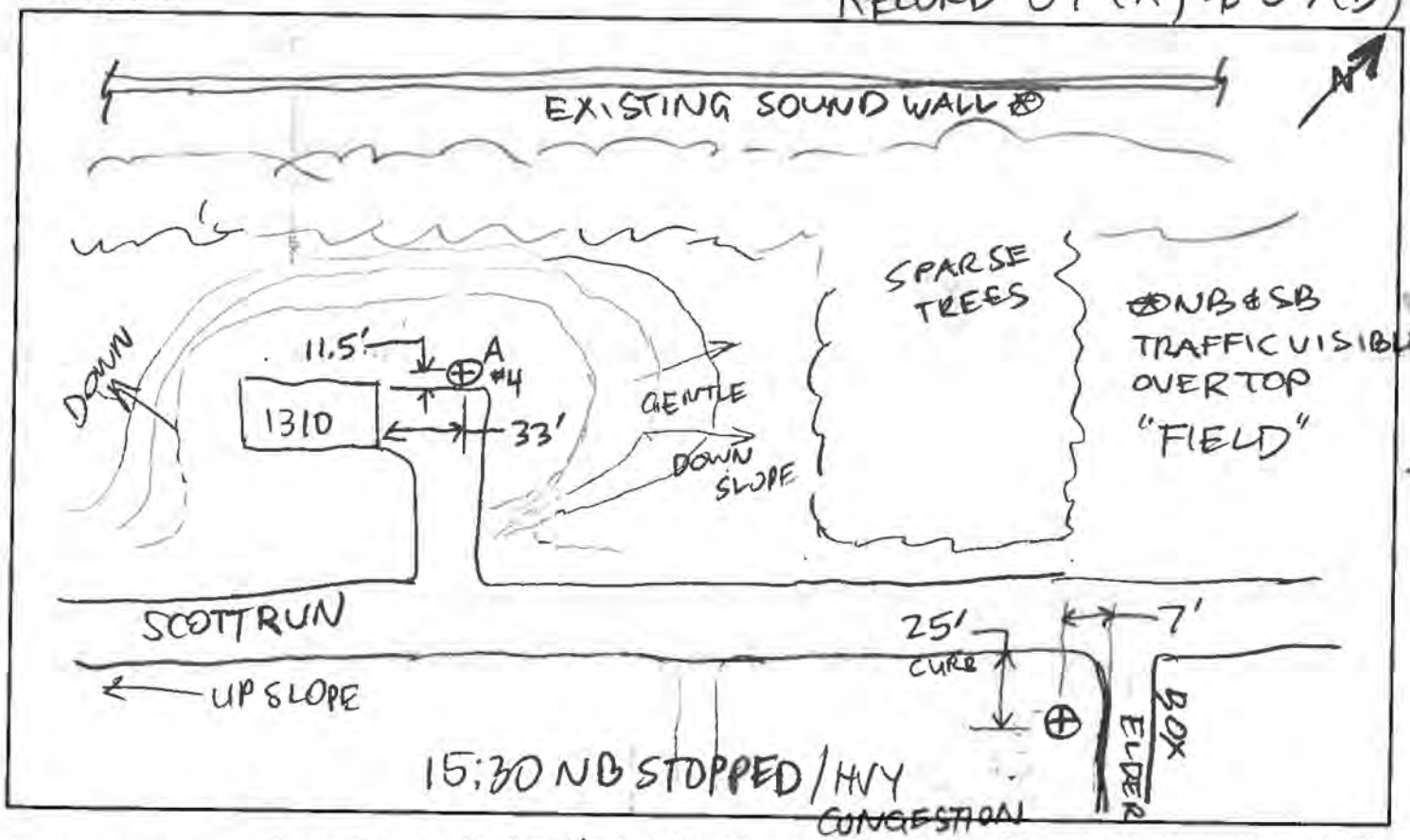
Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

Monitoring Site Log

Site Number: (#4) M26A/M26B (#5)
Street Address: (A) 1310 SCOTT RUN / CORNER OF BOX ELDER & SCOTT RUN (B)
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; WIND IN TREES; BIRDS

Instrument: (A) 2245 #4 / 2245 #5 (B) S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 2 DEC 2021 End Date:
Start Time: 15:15 End Time: 15:45
Calibration: Start: End:

Site Sketch: RECORD 07 (A) & 09 (B)



Weather Conditions: MOSTLY SUNNY; HIGH THIN CLOUDS; 66°F; 43% RH; 42.4°F DP; 0-7 MPH from West

GPS Coordinates: (A) 38°56'11"N, 77°12'21"W (579m)

Photo Numbers: (B) 38°56'12"N; 77°12'19"W (578m)

Measurement Site M26

Measurement Site M27

HARRIS MILLER MILLER & HANSON INC.

Project: 495 NEXT
Job Num: 312870.000
Personnel:

Monitoring Site Log

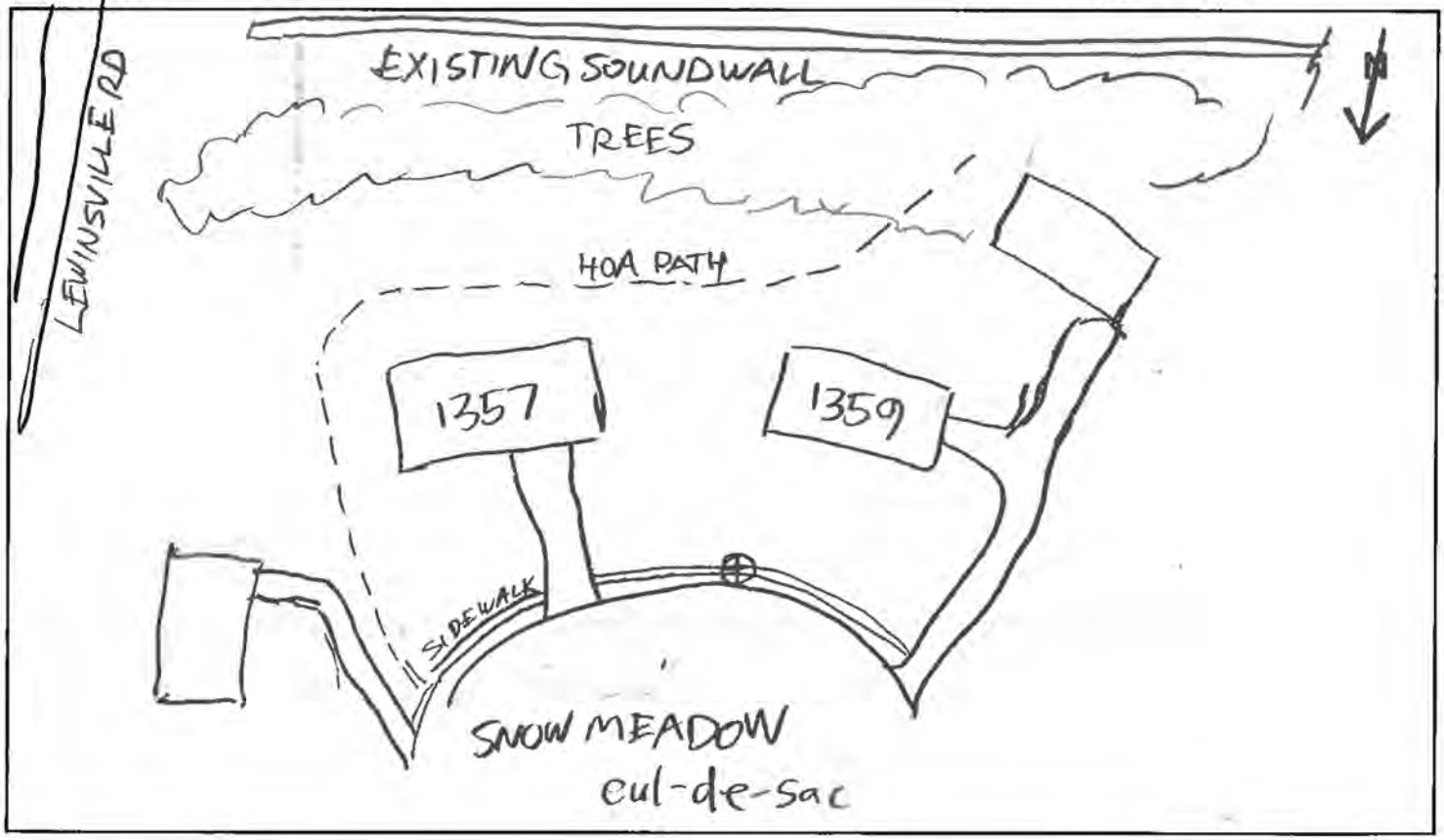
M28

Site Number: M27
Street Address: 1357/1359 SNOW MEADOW LANE
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; BIRDS; COMMUNITY ACTIVITY WIND IN TREES; WORKERS e

Instrument: B&K 2245 KIT#5 S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 1 DEC 2021 End Date: 1 DEC 2021
Start Time: 16:45 End Time: 17:15
Calibration: Start: End:

Site Sketch:

FILE 007



Weather Conditions: OVERCAST; 56°F; 45% RH; 36°F DP; 0-15 MPH

GPS Coordinates: 38°56'09"N, 77°12'36"W

Photo Numbers:

Measurement Site M28

HARRIS MILLER MILLER & HANSON INC.

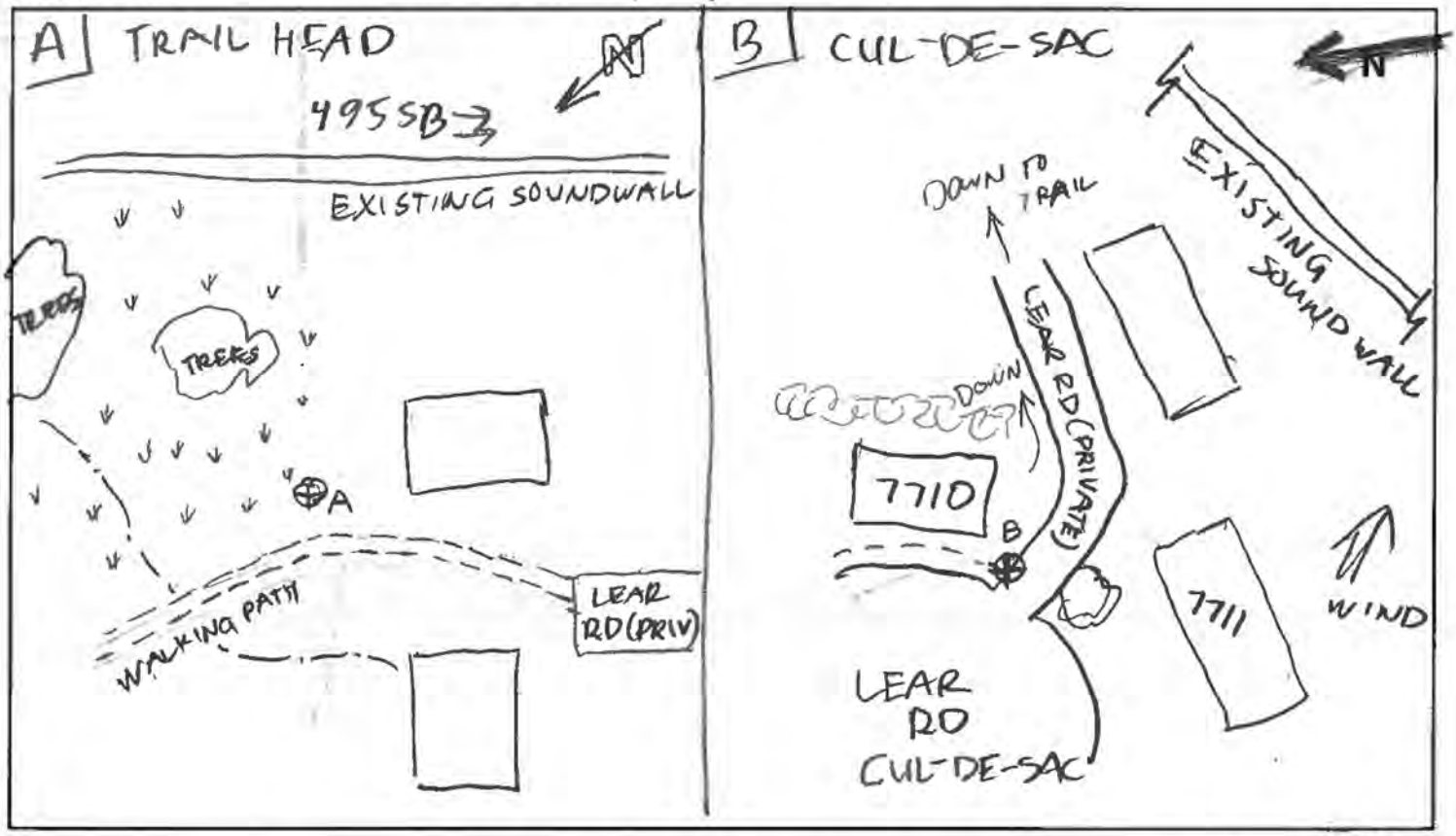
M29/M30

Project: 495 NEXT
Job Num: 312870.000
Personnel: CJB

Monitoring Site Log

Site Number: M28A/M28B
Street Address: (A) LEAR RD TRAILHEAD / LEAR RD CUL-DE-SAC (B)
Owner/Description:
Noise/Vibe Sources: TRAFFIC ON 495; WIND IN TREES; BIRDS; DOG; MAIL TRUCK
Instrument: (A) 2245 #5 / 2245 #4 (B) S/N:
Front End: S/N:
Calibrator: S/N:
Start Date: 3 DEC 2021 End Date:
Start Time: 12:55 End Time: 13:25
Calibration: Start: End:

Site Sketch: RECORD #4 (A)



Weather Conditions: CLOUDY; 55°F; 43% RH; 31.2°F DP; 0-8 MPH (FROM WEST)

GPS Coordinates: (A) 38°56'06"N, 77°12'38"W (581m)

Photo Numbers: (B) 38°56'04"N, 77°12'41"W (588m)

Measurement Site M29

Measurement Site M30

Appendix F VDOT Project Management Response on Alternative Abatement Measures

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COMMONWEALTH of VIRGINIA

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

Stephen C. Brich, P.E.
COMMISSIONER

MEMORANDUM

DATE: September 13, 2019

TO: Josh Kozlowski

FROM: Abi Lerner, PE

PROJECT: UPC 113414 - I-495 Express Lanes Northern Extension Study

SUBJECT: HB 2025 Form Response

The 2009 General Assembly passed Chapter 120 (HB 2577, as amended by HB2025), which amends the Code of Virginia by adding in Article 15 of Chapter 1 of Title 33.1 a section numbered 33.1-223.2:21 (Effective October 1, 2014 Title § 33.2-276), relating to highway noise abatement.

House Bill 2025 States: Requires that whenever the Commonwealth Transportation Board or the Department plan for or undertake any highway construction or improvement project and such project includes or may include the requirement for the mitigation of traffic noise impacts, first consideration should be given to the use of noise reducing design and low noise pavement materials and techniques in lieu of construction of noise walls or sound barriers. Vegetative screening, such as the planting of appropriate conifers, in such a design would be utilized to act as a visual screen if visual screening is required.

In an effort to honor the intent of HB 2025 we are asking for your input (per Chapter VI of Materials Division's Manual of Instruction and Section 2B-3 Determination of Roadway Design of the VDOT Road Design manual (pages 2B-5 and 2B-6)). As part of the Noise Technical Report and technical files, we are seeking your professional opinion by providing comments for the project noted above. Please distribute this memorandum to the appropriate District staff and combine all responses into one response.

Should you have any questions, please contact me at (804) 371-6829. Thank you for your time and consideration regarding this request.

Comment: Is noise reducing design feasible in lieu of construction of noise walls or sound barriers? For example, the roadway alignment can be shifted away from noise sensitive receptors or the roadway can be placed in deep cut? (Location & Design to address)

Response: Noise reduction design is to a large extent not feasible. The project encompasses widening to accommodate an extension of the Express Lanes on I-495 along the existing alignment. This is a constrained environment and there are no feasible options to deviate from the existing alignment or introduce deep cuts for the roadway widening. However, wherever possible, roadway elements may be adjusted to reduce noise impacts.

Comment: Can the project support the use of low noise pavement in lieu of construction of noise walls or sound barriers? (Materials Division to address)

Response: The Virginia Department of Transportation is not authorized by the Federal Highway Administration to use "quiet pavement" at this time as a form of noise mitigation. Upon completion of the Quiet Pavement Pilot Program and approval from FHWA, the use of "quiet pavement" will be given additional consideration. (Virginia Department of Transportation)

Comment: Can landscaping be utilized to act as a visual screen if visual screening is required? (Location & Design to address)

Response: Landscaping may be utilized as a visual screen at selected locations if required. The design team will evaluate options where visual screening through landscaping may be accommodated.

Appendix G Warranted, Feasible and Reasonable Worksheets

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	4-Dec-22
Project No. and UPC:	VDOT Project No. 0495-029-419; UPC 113414
County:	Fairfax
District:	Northern Virginia
Barrier System ID:	Barrier 8/9
Community Name and/or CNE#	CNE F and CNE W
Noise Abatement Category(s)	B and D
Design phase:	Final design

	Warranted	
1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	Yes
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	Yes

	Feasibility	
1	Impacted receptor units	
a.	Number of impacted receptor units:	31
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	31
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	NA
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	NA
4	Will placement of the noise barrier conflict with existing utility locations?	NA

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	107,410 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	31
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	18
d.	Total number of benefited receptors.	49
e.	Surface Area per benefited receptor unit. (ft^2/BR)	2,192 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	4,149 ft
b.	Height range of the proposed noise barrier. (ft)	15 - 37
c.	Average height of the proposed noise barrier. (ft)	27 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$4,511,220
f.	Barrier Material	Absorptive
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	Yes

Additional Reasons for Decision:

This is a partial in-kind replacement of an existing noise barrier that will be physically impacted by the project.

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	4-Dec-22
Project No. and UPC:	VDOT Project No. 0495-029-419; UPC 113414
County:	Fairfax
District:	Northern Virginia
Barrier System ID:	Modified Replacement of Barrier 10 and Barrier 10 Ext
Community Name and/or CNE#	CNE C and CNE E
Noise Abatement Category(s)	B, C
Design phase:	Final design

	Warranted	
1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	Yes
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

	Feasibility	
1	Impacted receptor units	
a.	Number of impacted receptor units:	23
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	22
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	96%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	NA
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	NA
4	Will placement of the noise barrier conflict with existing utility locations?	NA

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	35,309 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	22
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	1
d.	Total number of benefited receptors.	23
e.	Surface Area per benefited receptor unit. (ft^2/BR)	1,535 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	Yes
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	1,860 ft
b.	Height range of the proposed noise barrier. (ft)	7 - 27 ft
c.	Average height of the proposed noise barrier. (ft)	19 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$1,482,978
f.	Barrier Material	Absorptive
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	Yes

Additional Reasons for Decision:

This design is a modified replacement for Noise Barrier 10. The incremental surface area would be 12,839 SF and 12 additional receptors would be benefited. The net SF/BR value would be 1,070, which meets VDOT's criterion of 1,600 SF/BR, and so the replacement would be considered reasonable.

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	19-Dec-22
Project No. and UPC:	VDOT Project No. 0495-029-419; UPC 113414
County:	Fairfax
District:	Northern Virginia
Barrier System ID:	Barrier 13A & Barrier 13A Ext.
Community Name and/or CNE#	CNE H and CNE Y
Noise Abatement Category(s)	B
Design phase:	Final design

	Warranted	
1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	Yes
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	Yes

	Feasibility	
1	Impacted receptor units	
a.	Number of impacted receptor units:	23
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	23
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	NA
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	NA
4	Will placement of the noise barrier conflict with existing utility locations?	NA

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	113,851 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	23
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	32
d.	Total number of benefited receptors.	55
e.	Surface Area per benefited receptor unit. (ft^2/BR)	2,070 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	3,977 ft
b.	Height range of the proposed noise barrier. (ft)	19 - 41
c.	Average height of the proposed noise barrier. (ft)	29 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$4,781,742
f.	Barrier Material	Absorptive
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	Yes

Additional Reasons for Decision:

This is a replacement in-kind of an existing noise barrier that will be physically impacted by the project

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	19-Dec-22
Project No. and UPC:	VDOT Project No. 0495-029-419; UPC 113414
County:	Fairfax
District:	Northern Virginia
Barrier System ID:	Modified Partial Replacement of Barrier 13B
Community Name and/or CNE#	CNE AA and CNE J
Noise Abatement Category(s)	B, C
Design phase:	Final design

	Warranted	
1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	Yes
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

	Feasibility	
1	Impacted receptor units	
a.	Number of impacted receptor units:	20
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	20
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	NA
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	NA
4	Will placement of the noise barrier conflict with existing utility locations?	NA

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	62,207 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	20
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	5
d.	Total number of benefited receptors.	25
e.	Surface Area per benefited receptor unit. (ft^2/BR)	2,488 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	2,273 ft
b.	Height range of the proposed noise barrier. (ft)	16 - 32
c.	Average height of the proposed noise barrier. (ft)	27 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$2,612,694
f.	Barrier Material	Absorptive
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	Yes

Additional Reasons for Decision:

This design is a modified partial replacement for Noise Barrier 13B. The incremental surface area above that required to maintain the existing barrier's sound attenuation line or height above ground, based on site conditions, would be 2,462 SF. The modified replacement benefits 3 additional receptors at 821 SF/BR, which meets VDOT's criterion. The barrier would be considered reasonable.

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	13-Feb-23
Project No. and UPC:	VDOT Project No. 0495-029-419; UPC 113414
County:	Fairfax
District:	Northern Virginia
Barrier System ID:	Barrier C
Community Name and/or CNE#	CNE C
Noise Abatement Category(s)	B, C
Design phase:	Final design

	Warranted	
1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	Yes
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

	Feasibility	
1	Impacted receptor units	
a.	Number of impacted receptor units:	10
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	8
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	80%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	NA
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	NA
4	Will placement of the noise barrier conflict with existing utility locations?	NA

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	14,090 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	8
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	1
d.	Total number of benefited receptors.	9
e.	Surface Area per benefited receptor unit. (ft^2/BR)	1,566 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	Yes
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	984 ft
b.	Height range of the proposed noise barrier. (ft)	13 - 18 ft
c.	Average height of the proposed noise barrier. (ft)	14 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$591,780
f.	Barrier Material	Absorptive
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	Yes

Additional Reasons for Decision:
This barrier would be considered reasonable pending the outcome of the public preference survey.

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	14-Oct-22
Project No. and UPC:	VDOT Project No. 0495-029-419; UPC 113414
County:	Fairfax
District:	Northern Virginia
Barrier System ID:	Barrier G
Community Name and/or CNE#	G
Noise Abatement Category(s)	B
Design phase:	Final design

Warranted

1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	Yes
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

Feasibility

1	Impacted receptor units	
a.	Number of impacted receptor units:	3
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	3
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	NA
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	NA
4	Will placement of the noise barrier conflict with existing utility locations?	NA

Reasonableness

1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	34,983 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	3
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	1
d.	Total number of benefited receptors.	4
e.	Surface Area per benefited receptor unit. (ft^2/BR)	8,746 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	1,165 ft
b.	Height range of the proposed noise barrier. (ft)	30
c.	Average height of the proposed noise barrier. (ft)	30 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$1,469,286
f.	Barrier Material	Absorptive
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision

Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	No

Additional Reasons for Decision:

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	6-Feb-23
Project No. and UPC:	VDOT Project No. 0495-029-419; UPC 113414
County:	Fairfax
District:	Northern Virginia
Barrier System ID:	Barrier O East
Community Name and/or CNE#	O and P
Noise Abatement Category(s)	C and E
Design phase:	Final design

	Warranted	
1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	Yes
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

	Feasibility	
1	Impacted receptor units	
a.	Number of impacted receptor units:	1
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	1
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	NA
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	NA
4	Will placement of the noise barrier conflict with existing utility locations?	NA

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	13,530 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	1
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	3
d.	Total number of benefited receptors.	4
e.	Surface Area per benefited receptor unit. (ft^2/BR)	3,383 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	No
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	615 ft
b.	Height range of the proposed noise barrier. (ft)	22 ft
c.	Average height of the proposed noise barrier. (ft)	22 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$568,260
f.	Barrier Material	Absorptive
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	No

Additional Reasons for Decision:

VDOT Highway Traffic Noise Abatement
Warranted, Feasible, and Reasonable Worksheet

Note: Not all questions apply depending on the design phase which may cause differing answers between preliminary and final design phase. Answers to the questions may change depending on the design phase of the project.

Date:	6-Feb-23
Project No. and UPC:	VDOT Project No. 0495-029-419; UPC 113414
County:	Fairfax
District:	Northern Virginia
Barrier System ID:	Barrier O West
Community Name and/or CNE#	O
Noise Abatement Category(s)	C
Design phase:	Final design

	Warranted	
1	Community Documentation (if applicable)	
a.	Date community was permitted. (Per 23CFR 772 this is the date the building permit was issued).	
b.	Date of approval for the Categorical Exclusion (CE), Record of Decision (ROD), or Finding of No Significant Impact (FONSI):	
c.	Does the date in 1.a precede the date in 1.b? If yes, proceed to Warranted Item 2. If no, consideration of noise abatement is not warranted. Proceed to "Decision" block and answer "no" to warranted question. As the reason for this decision, state that "Community was permitted after the date of approval of CE, ROD, or FONSI, as appropriate."	Yes
2	Criteria requiring consideration of noise abatement	
a.	Project causes design year noise levels to approach or exceed the Noise Abatement Criteria?	Yes
b.	Project causes a substantial noise increase of 10 dB(A) or more?	No

	Feasibility	
1	Impacted receptor units	
a.	Number of impacted receptor units:	9
b.	Number of impacted receptor units receiving 5 dB(A) or more insertion loss (IL):	9
c.	Percentage of impacted receptor units receiving 5 dB(A) or more IL	100%
d.	Is the percentage 50 or greater?	Yes
2	Will placement of the noise barrier cause engineering or safety conflicts, e.g drainage issues or site distance issues?	NA
3	Will placement of the noise barrier restrict access to vehicular or pedestrian travel?	NA
4	Will placement of the noise barrier conflict with existing utility locations?	NA

	Reasonableness	
1	**Surface Area (Square foot)-Benefit Factors**	
a.	Surface Area (Total square foot) of the proposed noise barrier. (ft^2)	21,579 SF
b.	Impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	9
c.	Non-impacted noise sensitive receptor(s) receiving 5 dB(A) IL or more.	5
d.	Total number of benefited receptors.	14
e.	Surface Area per benefited receptor unit. (ft^2/BR)	1,541 SF/BR
f.	Is (1e) less than or equal to the maximum square feet per benefited receptor (MaxSF/BR) value of 1600?	Yes
g.	Does the barrier provide an IL of at least 7 dB(A) for at least one impacted receptor in the design year?	Yes
2	**Additional Noise Barrier Details**	
a.	Length of the proposed noise barrier. (ft)	1,541 ft
b.	Height range of the proposed noise barrier. (ft)	24 ft
c.	Average height of the proposed noise barrier. (ft)	24 ft
d.	Cost per square foot. ($/$ft^2$)	$42/SF
e.	Total Barrier Cost ($)	$906,318
f.	Barrier Material	Absorptive
3	**Community Desires Related to the Barrier**	
	Do at least 50 percent of the benefited receptor unit owner(s) and renters desire the noise barrier? If yes, continue to "decision" block. If no, the barrier can be considered not to be reasonable. Proceed to “decision” block and answer “no” to reasonableness question. As the reason for this decision, state that “The majority of the impacted receptor unit owners do not desire the barrier.”	

Decision	
Is the Noise Barrier(s) WARRANTED?	Yes
Is the Noise Barrier(s) FEASIBLE?	Yes
Is the Noise Barrier(s) REASONABLE?	Yes

Additional Reasons for Decision:

Appendix H Details of the Public Preference Survey

This appendix will provide materials related to the public preference survey upon its completion.

Appendix I Undeveloped Parcels in the Study Area

CITY	STATE	ZIP	OWNER NAME	OWNER ADDRESS	OWNER ADDRESS 2	OWNER CITY	OWNER STATE	OWNER ZIP
MCLEAN	VA	22102	1150 DOMINION LLC	10450 ARTEMEL LN		GREAT FALLS	VA	22066
MCLEAN	VA	22102	1150 DOMINION LLC	10450 ARTEMEL LN		GREAT FALLS	VA	22066
MCLEAN	VA	22102	1150 DOMINION LLC	10450 ARTEMEL LN		GREAT FALLS	VA	22066
MCLEAN	VA	22101	AMANN MICHAEL P, AMANN REGINA	604 RIVERCREST DR		MCLEAN	VA	22101
MCLEAN	VA	22101	AMANN MICHAEL P, AMANN REGINA	604 RIVERCREST DR		MCLEAN	VA	22101
MCLEAN	VA	22101	AMANN MICHAEL P, AMANN REGINA	604 RIVERCREST DR		MCLEAN	VA	22101
MCLEAN	VA	22102	CASSIDY SUSAN B, CASSIDY JAMES J JR	7514 OLD DOMINION DR		MCLEAN	VA	22102
MCLEAN	VA	22102	FLEESON ARDELL T	1359 SNOW MEADOW LN		MCLEAN	VA	22102
MCLEAN	VA	22102	GONZALES PURITA B, AND MANUEL F	6212 STONEHAM LN		MCLEAN	VA	22101
MCLEAN	VA	22101	GRADY GREGORY, AND CAROL L H	666 LIVE OAK DR		MCLEAN	VA	22101
MCLEAN	VA	22101	GUPTA AMBRISH TR, GUPTA JYOTSNA TR	611 S CARLIN SPRINGS RD		ARLINGTON	VA	22204
MCLEAN	VA	22102	HONIGBERG PAUL M, HONIGBERG CAROL (	7635 HUNTMASTER LN		MCLEAN	VA	22102
MCLEAN	VA	22102	JOHNSTON WILLIAM F TR	7405 OLD DOMINION DR		MCLEAN	VA	22101
MCLEAN	VA	22101	NAME WITHHELD BY REQUEST	PO BOX 311		GLADYWYNE	PA	19035
MCLEAN	VA	22102	OLD DOMINION ESTATES LLC	10450 ARTEMEL LN		GREAT FALLS	VA	22066
MCLEAN	VA	22102	POWERS TIPMUNY C	11 CALLE YARDLEY PL		SAN JUAN	PR	00911
MCLEAN	VA	22102	PRESERVE AT SCOTTS RUN HOMEOWNERS	11111 SUNSET HILLS RD	STE 200	RESTON	VA	20190
MCLEAN	VA	22102	SETHI GURPREET SINGH	894 HELGA PL		MCLEAN	VA	22102
MCLEAN	VA	22101	THIARA JASSER DR	13890 BRADDOCK RD	SUITE 201	CENTERVILLE	VA	20121
MCLEAN	VA	22102	TIMBERLY SOUTH, HOMEOWNERS ASSN	1325 TIMBERLY LN		MCLEAN	VA	22102
MCLEAN	VA	22102	WU KUANG-MING	1321 TIMBERLY LN		MCLEAN	VA	22102

Appendix J Gap between Noise Barrier C and Noise Barrier 10 / 10 Extension

HMMH
700 District Avenue, Suite 800
Burlington, MA 01803
781.229.0707

MEMORANDUM

To:	Adam Welschenbach, P.E. and Connor Eggleston, P.E. Rinker Design Associates, P.C. 11100 Endeavor Ct., Ste. 200, Manassas, VA 20109
From:	Tara Cruz and Christopher Bajdek
Date:	February 15, 2023
Subject:	Evaluation of a Noise Barrier for the Gap between Barrier C and Barrier 10 495 Express Lanes Northern Extension (NEXT) Project
Reference:	VDOT UPC 113414/HMMH Project Number 312870.000

Background

Per Section 3.3.7.C in "Part 2 – Technical Requirements" (rev. 4 – 6-Apr-21) of the Request for Proposal, potential Noise Barriers C and 10 identified in the NEXT Environmental Assessment Noise Technical Report (February 2020) were to be evaluated as one continuous noise barrier to minimize the effects of flanking due to the presence of noise-sensitive sites located between the two noise barriers. In the event one continuous noise barrier is not found to be feasible and reasonable, the noise barriers are to be evaluated separately. Given the extent of predicted noise impact in CNE C and CNE E, noise abatement measures would not be warranted along the west side of the I-495/GWMP Interchange, as indicated by the receptor status shown on Sheets 1 and 2 in Figure 4 of the 495 NEXT Noise Abatement Design Report (NADR).

Since one continuous noise barrier between CNE C and E would not be warranted, the in-kind replacement of Noise Barrier 10 and potential Noise Barrier C were evaluated as separate stand-alone noise barriers. The in-kind replacement of Noise Barrier 10 is discussed in Section 4.2 of the 495 NEXT NADR; while the feasibility and reasonableness determination for potential Noise Barrier C is presented in Section 5.1 of the 495 NEXT NADR.

This memorandum presents the evaluation of a noise barrier for the gap between the noise barriers identified above.

Evaluation of Noise Barrier for Gap between Noise Barrier C and Noise Barrier 10

A noise barrier for the gap between Noise Barrier C and Noise Barrier 10 would be a consistent height of 15 feet and have a length of 927 feet, for a surface area of 13,882 square feet. The Gap Noise Barrier would benefit twelve non-impacted recreational receptors associated with the Potomac Heritage Trail, providing noise reductions ranging from 5 to 8 dBA, for an average noise reduction of 6 dBA. The Gap Noise Barrier would have a surface area per benefited receptor of 1,157 square feet. Barrier heights up to 30 feet were evaluated in an attempt to benefit additional receptors located within this gap. However, an increase in barrier height above 15 feet provides little additional noise level reduction and does not result in significant additional benefit to receptors. Therefore, they were not recommended.

Table 1 provides the predicted 2045 noise levels with and without a noise barrier, along with the predicted insertion loss and the benefit/impact status for receptors behind the Gap Noise Barrier. Table 2 provides the sound attenuation line for the Gap Noise Barrier and corresponds to station numbers shown in Figure 5 within Appendix B of the Noise Abatement Design Report. The alignment of the Gap Noise Barrier is shown in Figure A.

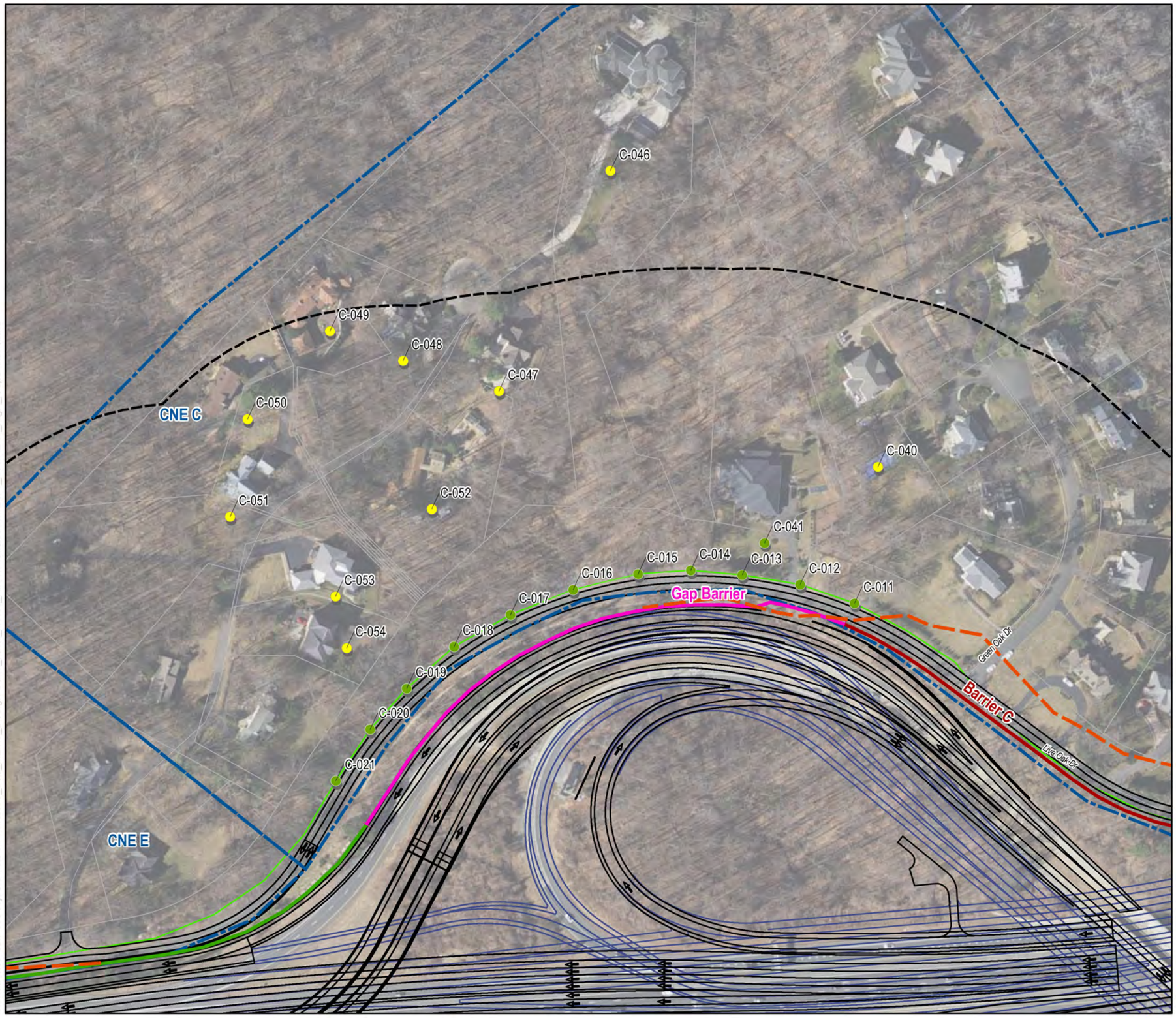
Table 1 Predicted Noise Levels for Receptors behind the Gap Noise Barrier

Rec. ID	Address/Location	No. of Units	FHWA NAC	Floor	2045 Hourly L_{eq} (dBA)			Benefit/ Impact Status
					Without Barrier	With Barrier	Insertion Loss[1]	
C-011	Potomac Heritage Trail	1	C	1	65	58	**7**	No Impact/Benefit
C-012	Potomac Heritage Trail	1	C	1	65	57	**8**	No Impact/Benefit
C-013	Potomac Heritage Trail	1	C	1	63	55	**8**	No Impact/Benefit
C-014	Potomac Heritage Trail	1	C	1	59	53	**6**	No Impact/Benefit
C-015	Potomac Heritage Trail	1	C	1	58	53	**5**	No Impact/Benefit
C-016	Potomac Heritage Trail	1	C	1	57	52	**5**	No Impact/Benefit
C-017	Potomac Heritage Trail	1	C	1	58	53	**5**	No Impact/Benefit
C-018	Potomac Heritage Trail	1	C	1	59	54	**5**	No Impact/Benefit
C-019	Potomac Heritage Trail	1	C	1	61	55	**5**	No Impact/Benefit
C-020	Potomac Heritage Trail	1	C	1	62	57	**5**	No Impact/Benefit
C-021	Potomac Heritage Trail	1	C	1	65	59	**6**	No Impact/Benefit
C-040	7017 Green Oak Dr	1	B	1	58	55	3	No Impact/No Benefit
C-041	654 Live Oak Dr	1	B	1	59	55	**5**	No Impact/Benefit
C-046	658 Live Oak Dr	1	B	1	55	54	1	No Impact/No Benefit
C-047	662 Live Oak Dr	1	B	1	56	54	2	No Impact/No Benefit
C-048	666 Live Oak Dr	1	B	1	55	53	2	No Impact/No Benefit
C-049	668 Live Oak Dr	1	B	1	59	57	2	No Impact/No Benefit
C-050	672 Live Oak Dr	1	B	1	59	58	2	No Impact/No Benefit
C-051	670 Live Oak Dr	1	B	1	64	62	2	No Impact/No Benefit
C-052	664 Live Oak Dr	1	B	1	56	53	3	No Impact/No Benefit
C-053	702 Live Oak Dr	1	B	1	60	57	3	No Impact/No Benefit
C-054	704 Live Oak Dr	1	B	1	62	58	4	No Impact/No Benefit

1.) Rounding of decibels may make some subtractions appear incorrect.
Source: HMMH, 2022.

Table 2 Sound Attenuation Line for the Gap Noise Barrier

Approximate Barrier Station No.	Barrier Coordinates in TNM (NAD83 VA State Plane South US Survey Feet)			Top of Barrier Elevation (feet)	Estimated Height Above Ground (feet)
	East (X)	North (Y)	Ground Elevation		
10+00.0	11,856,037.00	7,036,369.50	223.64	238.64	15
10+74.7	11,856,047.00	7,036,443.50	222.90	237.90	15
11+24.7	11,856,054.00	7,036,493.00	222.50	237.50	15
11+74.4	11,856,065.00	7,036,541.50	222.00	237.00	15
12+24.6	11,856,078.00	7,036,590.00	221.60	236.60	15
12+74.5	11,856,096.00	7,036,636.50	221.10	236.10	15
13+24.6	11,856,119.00	7,036,681.00	220.70	235.70	15
13+74.4	11,856,145.00	7,036,723.50	220.20	235.20	15
14+25.0	11,856,176.00	7,036,763.50	219.80	234.80	15
14+74.3	11,856,208.00	7,036,801.00	219.30	234.30	15
15+24.5	11,856,244.00	7,036,836.00	218.90	233.90	15
15+74.5	11,856,284.00	7,036,866.00	218.50	233.50	15
16+24.7	11,856,325.00	7,036,895.00	218.10	233.10	15
16+74.4	11,856,369.00	7,036,918.00	217.70	232.70	15
17+25.1	11,856,415.00	7,036,939.50	217.30	232.30	15
17+74.6	11,856,462.00	7,036,958.00	214.71	229.71	15
18+00.0	11,856,479.00	7,036,974.00	214.71	229.71	15
18+25.0	11,856,505.00	7,036,980.00	216.92	231.92	15
18+68.9	11,856,554.00	7,036,988.00	221.16	236.16	15
19+31.1	11,856,604.00	7,036,992.50	225.41	240.41	15



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VDOT
Virginia Department of Transportation

Figure A
Location Map for Common Noise Environments, Receptors, Build Contours and Barriers

I-495 Express Lanes Northern Extension Project

Fairfax County, Virginia

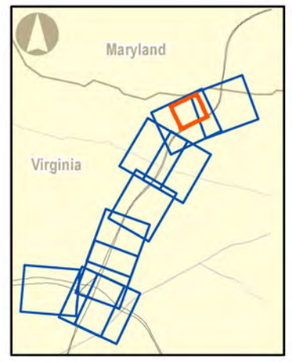
Receiver Site and Number
- Impacted and 5 or 6 dBA Insertion Loss
- Impacted and 7 dBA or more Insertion Loss
- Impacted but Not Benefited
- Benefited but Not Impacted
- Not Benefited or Impacted
- Not Impacted, Benefit Not Determined
- Not Used for the Determination

Top Floor Noise Prediction Result
Bottom Floor Noise Prediction Result

Note: Grouped Receiver Labels are in order of Leader Occurrence.

- M# Measurement Site
- CNE Boundary
- 500' Noise Study Area
- Project Limit
- 66 dBA Noise Contour
- Trails

Noise Barriers
- Feasible and Reasonable
- Feasible and Not Reasonable
- Not Feasible
- Not Reasonable
- Existing Barrier to Remain
- Existing Barrier to be Replaced
- Analyzed Under Supplemental Analysis



0 75 150 Feet

hmmh

Appendix K List of Preparers and Reviewers

This appendix lists the preparers and reviewers of this report.

The preparers are all with Harris Miller & Hanson Inc.:

- Christopher Menge, Project Principal and Technical Advisor
- Christopher Bajdek, Project Manager
- Tara Cruz, Lead Noise Analyst
- Priscilla Brownlow, Noise Analyst
- Henry Echeverria, Noise Analyst
- Hayden Jubera, Noise Analyst
- Dillon Tannler, Noise Analyst
- Michael Hamilton, GIS support
- Avery Pecci, GIS support and report graphics

TNM Certification of HMMH's Project Principal and Technical Advisor, Christopher Menge, is on file in VDOT's offices.

The reviewer for VDOT was Lovejoy "LJ" Muchenje, Highway Traffic Noise Specialist.

Appendix L References and Endnotes

[i] Whitman, Requardt & Associates, LLP, "I-495 Express Lanes Northern Extension – Preliminary Noise Study – Noise Technical Report," February 2020. Available at (accessed on 4/4/2022): http://www.495northernextension.org/documents/pim032020/i-495_next_8a_preliminary_noise_tech_report_appendices_final.pdf

[ii] U.S. Department of Transportation, Federal Highway Administration, and Virginia Department of Transportation, "I-495 Express Lanes Northern Extension Environmental Assessment," February 2020. Available at (accessed on 4/4/2022): http://www.495northernextension.org/documents/pim032020/i-495_next_1_environmental_assessment_final_with_appendices.pdf

[iii] U.S. Department of Transportation, Federal Highway Administration, and Virginia Department of Transportation, "I-495 Express Lanes Northern Extension Revised Environmental Assessment," May 2021. Available at (accessed on 4/4/2022): http://www.495northernextension.org/documents/studies/070121/i-495_next_revised_ea_-_may_2021.pdf

[iv] https://www.usgs.gov/products/data

[v] Available at (accessed on 4/4/2022): http://www.495northernextension.org/documents/studies/070121/fhwa_finding_of_no_significant_impact.pdf

[vi] 23 CFR Part 772, as amended 75 FR 39820, July 13, 2010; Effective date July 13, 2011 – "Procedures for Abatement of Highway Traffic Noise and Construction Noise," Federal Highway Administration, U.S. Department of Transportation. Available at (accessed on 4/4/2022): http://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/

[vii] "Highway Traffic Noise: Analysis and Abatement Guidance," Federal Highway Administration, U.S. DOT, June 2010, revised January 2011. Available at (accessed on 4/4/2022): http://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf

[viii] "Highway Traffic Noise Guidance Manual (Version 8)," Virginia Department of Transportation, updated February 20, 2018.

[ix] See Endnote vii.

[x] Anderson, G.S., C.S.Y. Lee, G.G. Fleming, and C.W. Menge, "FHWA Traffic Noise Model, Version 1.0 User's Guide". Federal Highway Administration Report No. FHWA-PD-96-009, January 1998.

[xi] Based on an email from Connor Eggleston to Christopher Bajdek with the subject "RE: 495NEXT – Noise modeling" and dated 1/19/2022, the following MicroStation roadway design files were downloaded from ProjectWise on 1/24/2022: d115401des_A1.dgn; d115401des_A2.dgn; d115401des_A3.dgn; and d115401des_A4.dgn. The following noise barrier design plans also were obtained from ProjectWise on 1/24/2022: n115401des_A1.dgn; n115401des_A2.dgn; n115401des_A3.dgn; and n115401des_A4.dgn.

[xii] The most recent aerial imagery was obtained from Virginia Geographic Information Network (VGIN) on 12/2/2021 (orthographic imagery collected in Spring 2017 by the VBMP program for the eastern half of Virginia). Topographic data beyond the right-of-way was based on USGS LiDAR data for 2018 and obtained from the National Oceanic and Atmospheric Administration (NOAA) Data Access Viewer for Fairfax County, VA. Parcel data was

obtained from the Fairfax County Open Geospatial Data portal (https://www.fairfaxcounty.gov/maps/open-geospatial-data).

[xiii] FHWA TNM 2.5 files from the preliminary noise analysis were provided by Rinker Design Associates, P.C. See also Endnote i.

[xiv] Available at (accessed on 4/4/2022): https://www.511virginia.org/

[xv] National Cooperative Highway Research Program (NCHRP), "Supplemental Guidance on the Application of FHWA's Traffic Noise Model (TNM)," Transportation Research Board, Washington D.C., 2014.

[xvi] Virginia Department of Transportation, "2020 Road and Bridge Specifications" (accessed 7/5/2022): https://www.virginiadot.org/business/resources/const/VDOT_2020_RB_Specs.pdf

[xvii] Harris Miller Miller & Hanson Inc., "I-66 Spot 2 Improvements Dulles Toll Road to Lee Highway Noise Abatement Design Study - Final Report," VDOT UPC 78828, HMMH Report No. 305000.005, March 2013.

[xviii] International Institute of Noise Control Engineering, "Final Report – Technical Assessment of the Effectiveness of Noise Walls," Noise/News International, September 1999.