

APPENDIX J
NOISE ANALYSIS TECHNICAL REPORT
May 2020

U.S. Department of Transportation
Federal Highway Administration

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

ES

EXECUTIVE SUMMARY

ES.1 Overview

The Federal Highway Administration (FHWA), as the Lead Federal Agency, and the Maryland Department of Transportation State Highway Administration (MDOT SHA), as the Local Project Sponsor, are preparing an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) for the I-495 & I-270 Managed Lanes Study (Study). The Study is evaluating potential transportation improvements to portions of the I-495 and I-270 corridors in Montgomery and Prince George's County, Maryland, and Fairfax County, Virginia.

The purpose of this Noise Technical Report is to present an assessment of potential direct impacts of the Build Alternatives to the noise environment and is being prepared to support and inform the EIS. The proposed improvements are classified as a Type I project, as defined in Title 23 of the Code of Federal Regulations Part 772 (23 CFR 772), therefore impacted noise sensitive areas are eligible for consideration of noise abatement[1]. The objective of this report is to present the predicted loudest-hour build traffic noise levels, to determine if these noise levels cause a traffic noise impact, and, if so, to determine where noise barriers are likely to be feasible and reasonable within the study area.

I-495 and I-270 in Maryland are the two most heavily traveled freeways in the National Capital Region, each with Average Annual Daily Traffic (AADT) volume up to 260,000 vehicles per day in 2016 (MDOT SHA, 2017). I-495 is the only circumferential route in the region that provides interregional connections to many radial routes in the region, such as I-270, US 29 (Colesville Road), I-95, the Baltimore-Washington Parkway, US 50 (John Hanson Highway), and MD 5 (Branch Avenue). I-270 is the only freeway link between I-495 and the fast-growing northwest suburbs in northern Montgomery County and the suburban area in Frederick County. In addition to heavy commuter traffic demand, I-495 is merged with I-95 in Maryland for 25 miles around the east side of Washington DC providing connectivity along the East Coast. Seven alternatives are being evaluated and compared in the technical reports supporting the EIS. In general, the alternatives include the addition of one or two additional through travel lanes, which will be managed as either Express Toll Lanes, High-Occupancy Toll Lanes, High-Occupancy Vehicle Lanes, or Reversible Lanes.

[1] Section 772.5 (1 through 8) define the types of projects that are classified as a Type I Project. The I-495 and I-270 Managed Lanes Study proposes the addition of through-traffic lanes, including the addition of HOV and HOT lanes. This qualifies this study as a Type I Project according to 772.5 (3).

ES.2 Land Uses and Methodology

The study area was divided into 133 noise sensitive areas (NSAs) in accordance with the MDOT SHA and FHWA noise policies and guidance. Geographically, 92 of the NSAs are located along I-495, 37 are located along I-270, two are located along I-95 and two are located along MD 295 adjacent to the respective interchanges with I-495. The NSAs are comprised of areas of different land use activity categories which share a common noise environment and have been combined into a single NSA. There are several existing Type I barriers within the study area. Any existing noise barrier or portion of barrier falling within the limits of disturbance (LOD) for the Build Alternatives is assumed to be demolished and relocated during construction to accommodate roadway widening and/or storm water management ponds. Since the existing barriers are presently in place, need for barriers and the cost effectiveness for the replacement barriers has been previously determined. Replacement barriers have been analyzed to verify there is no decrease in performance, and if necessary, recommendations to increase the height or length of the barriers has been included to ensure this. Modifications to existing barriers will be re-evaluated during the final design process.

All prediction modeling was performed using FHWA's TNM v2.5. The TNM seeks to simulate the noise environment by considering variable inputs for traffic (including autos, medium trucks, heavy trucks, buses, and motorcycles), variable inputs of traffic speed for each vehicle type, variable inputs for roadway design, (including roadway width, horizontal and vertical alignment), variable inputs for terrain lines and propagation features (such as building rows, ground zones, and tree zones), and inclusion of traffic control measures including stop lights and stop signs. The preliminary access locations were included in this noise analysis. Modifications to the managed lane access points following input from the Counties will be considered in the updated noise analysis in support of the FEIS/ROD.

The TNM Model validation process reconfirms the model's ability to reproduce the Measured Noise Levels. Measured Noise Levels correspond to ambient measurements taken in conjunction with highway traffic counts. MDOT SHA considers a TNM Model to be properly validated when the Modeled Noise Levels are within $\pm$3 dB(A) of the Measured Noise Levels for most of the receptors.

Impact criteria is defined based upon the Noise Abatement Criteria (NAC) for the identified type of activities or land uses present within each noise sensitive area. The majority of NSAs that MDOT SHA evaluates fall within Activity Categories B and C, which are considered impacted at a noise level of 66 dBA or greater. Activity Category B noise sensitive receptors are defined exclusively as residences. Category C noise sensitive receptors consist of non-residential land uses where frequent outdoor activity exists such as, sporting areas, campgrounds, parks, picnic areas, playgrounds, schools, places of worship, and other recreational areas.

Federal regulation (23 CFR 772) and the MDOT SHA *Highway Noise Abatement Planning and Engineering Guidelines* (April 2020) require that noise abatement be investigated at all NSAs where the build traffic noise levels approach or exceed the FHWA NAC for the defined land use category, or where there are substantial increases (10 dB(A) per the 2020 MDOT SHA Guidelines) from existing to build condition noise levels. For the NSAs that do not approach or exceed the NAC (and therefore are not considered impacted under that criterion), the lowest existing noise level was compared to the worst-case future build condition noise level in order to determine whether a substantial increase impact would occur. No NSAs will experience a substantial increase as a result of any Build Alternative evaluated for this project. Where

noise abatement was warranted for consideration, additional criteria were examined to determine if the abatement is feasible and reasonable. The assessment of noise abatement feasibility, in general, focuses on whether it is physically possible to build an abatement measure (i.e. noise barrier) that achieves a minimally acceptable level of noise reduction. Barrier feasibility considers three primary factors: acoustics (achieve a 5 dBA noise reduction at 70 percent of the impacted receptors), safety & access, and site constraints (construction would require significant grading, ROW, utilities, drainage, or structure costs). Barrier reasonableness considers three primary factors: viewpoints, design goal (achieve a 7 dBA noise reduction at 3 receptors or 50 percent of the impacted receptors, whichever is greater), and cost effectiveness (ranging from 700-2700 square-foot per receptor threshold depending on the scope of the project).

ES.3 Impact Analysis Summary

Since several of the proposed alternatives share similar cross sections and traffic parameters, the noise impact analysis results have been presented by grouping the similar alternatives within each segment of the project.

Of the 92 NSAs along I-495, 86 NSAs contain noise impacts resulting from Alternative 5, with 44 NSAs having levels equal to or exceeding 75 dB(A); 89 NSAs contain noise impacts resulting from Alternatives 8, 9, 10, 13B and 13C, with 64 NSAs having levels equal to or exceeding 75 dB(A). Along I-495, 20 NSA locations currently do not have an existing noise barrier and warrant further consideration of noise abatement due to the construction of the proposed highway improvements: 1-01, 1-02, 1-04, 1-05, 1-10, 1-11, 1-13, 1-14, 1-15, 1-16, 1-17, 1-18, 1-20, 1-21, 1-22, 1-23, 1-26, 1-28, 1-37 and VA-2. Twelve NSAs were identified for consideration of extensions of existing noise barriers: 1-03, 1-06, 1-08, 1-09, 1-12, 1-25, 1-29, 1-33, 1-34, 1-35, 1-36 and VA-3. See maps 1 through 52, 79 and 80.

For the 37 NSAs along I-270 and the spurs the proposed alternatives vary within the corridor and each distinct segment contains a unique combination of proposed alternatives. From I-370 to Montrose Road (NSAs 5-01 through 5-28), 16 NSAs contain noise impacts resulting from Alternative 13B, with four NSAs having levels equal to or exceeding 75 dBA. There were 16 NSAs with noise impacts resulting from under Alternatives 8, 9, and 13C, with four NSAs having levels equal to or exceeding 75 dBA. Under Alternative 10, 18 NSAs were identified with noise impacts, with four NSAs having levels equal to or exceeding 75 dBA. From Montrose Road to the spurs (NSA 5-29) one NSA contains impacts resulting from all of the Build Alternatives, with the levels equal to or exceeding 75 dBA for each alternative option as well. Along the spurs (NSA 5-30 through 5-37), eight NSAs contain noise impacts resulting from Alternative 5, with three NSAs having levels equal to or exceeding 75 dBA. Eight NSAs contain noise impacts resulting from Alternatives 8, 9, 10, 13B, and 13C, with four NSAs having levels equal to or exceeding 75 dBA. The following NSAs warrant further consideration of noise abatement due to the construction of the proposed highway improvements: 5-01, 5-02, 5-6, 5-7, 5-8, 5-9, 5-10, 5-12, 5-13, 5-14, 5-15, 5-16, 5-17, 5-18, 5-19, 5-20, 5-21, 5-22, 5-29, 5-30, 5-31, 5-32, 5-33, 5-34, 5-36, and 5-37. See maps 53 through 76.

At the interchanges with I-95 and MD 295, all of the build alternatives tie into the highways with the same ramp configuration, therefore only one Build Alternative was analyzed at each location. Two (2) NSAs were evaluated for impacts along I-95. Both NSAs contain noise impacts resulting from the Build Alternative, with one NSA having levels equal to or exceeding 75 dBA. Two (2) NSAs were evaluated for impacts along MD 295. Both NSAs contain noise impacts resulting from the build Alternatives, but neither

NSA has noise levels equal to or exceeding 75 dBA. The following NSAs warrant further consideration of noise abatement due to the construction of the proposed highway improvements: I95-N, I95-S, BW-N, and BW-S. See maps 77 and 78.

ES.4 Barrier Analysis Summary

Federal regulation (23 CFR 772) and the MDOT SHA *Highway Noise Abatement Planning and Engineering Guidelines* (2020) require that noise abatement be investigated at all NSAs where the Build traffic noise levels approach or exceed the FHWA Noise Abatement Criteria (NAC) for the defined land use category, or where there are substantial increases (10 dB(A) per the 2020 MDOT SHA Guidelines) from existing to build condition noise levels. Where noise abatement was warranted for consideration, additional criteria were examined to determine if the abatement is feasible and reasonable.

Several noise barrier scenarios have been analyzed for this study: existing noise barriers that would remain in place, existing noise barriers that will be displaced by construction and would be replaced by a reconstructed barrier on a new alignment, existing noise barriers that would be reconstructed and extended, and new barrier construction. The following is a summary of the noise barrier systems that are considered ***feasible and reasonable***.

It is assumed under the current design alternatives, that the following NSAs have existing noise barriers that would remain in place as it is currently constructed: 3-05, 3-15, 3-16, 3-17, 5-01, 5-02 and 5-12.

It is assumed under the current design alternatives, that the following NSAs are areas where the existing noise barrier would be displaced by construction and replaced by a reconstructed barrier: 2-02, 2-03, 2-04, 2-05, 2-08, 2-09, 2-10, 2-11, 2-12, 2-13, 2-14, 2-15, 2-17, 2-18, 2-19, 2-20, 2-21, 2-22, 2-23, 2-24, 2-26, 2-27, 2-28, 2-29, 2-30, 2-31, 2-32, 3-02, 3-06, 3-07, 3-08, 3-09, 3-11, 3-12, 3-13, 3-18, 4-04, 5-16, 5-17, 5-20, 5-21, and 5-29.

It is assumed under the current design alternatives, that the following NSAs are areas where the existing noise barrier would be reconstructed and extended: 1-03 and 2-01, 1-06 and 3-01, 1-09 and 2-06, 2-16 and 1-35, 2-25 and 1-25, 1-08 and 3-04, 1-12 and 2-07, 3-10 and 1-33, 1-29, 3-14 and 5-31.

It is assumed under the current design alternatives, that the following NSAs are areas where there is currently not an existing noise barrier, and a new barrier would be constructed: 1-01, 1-02, 1-04, 1-05, 1-10, 1-11, 1-13, 1-14, 1-16, 1-17, 1-20, 1-21, 1-23, 1-26, 1-28, 5-13, 5-15, 5-30, 5-33, 5-34, 5-36, 5-37, and BW-S.

The following potential noise barrier systems are considered ***not feasible and reasonable***. NSAs 1-22, 1-34, 1-36, 1-37, 5-06, 5-07, 5-08, 5-09, 5-10, 5-14 and 5-32 do not meet due to failure to meet the noise reduction design goal and cost effectiveness reasonableness criteria. NSAs 5-18, 5-19, 5-22, I95-N, I-95-S, BW-N, and portions of the NSA 5-37 barrier do not meet due to failure to meet the noise reduction design goal reasonableness criteria.

Abatement for NSAs VA-01, VA-02, VA-03 and VA-04 is being evaluated in coordination with the Virginia Department of Transportation (VDOT) and in compliance with the VDOT Highway Traffic Noise Impact Analysis Guidance Manual. The results of this evaluation will be included in the FEIS.

ES.5 Statement of Likelihood

Based on the studies performed thus far, MDOT SHA recommends installation of highway traffic noise abatement in the form of a barrier for the NSAs as reflected in **Table ES-1**. These preliminary indications of likely abatement measures are based upon preliminary design for barrier square footage equal to or less than the maximum amount allowed per benefited residence by the MDOT SHA Highway Noise Abatement Planning and Engineering Guidelines. Concrete is the typical material used for construction of noise barriers and is assumed as part of the barrier analysis; however, a final determination of material will be made in final design, based upon FHWA requirements to achieve a minimum 20 dB(A) Transmission Loss in accordance with ASTM Recommended Practice E413-87. The findings in this analysis are based upon preliminary design information. A preliminary determination of horizontal and vertical alignment for the noise barriers was made; however, final determination of barrier dimensions will be made in final design. Engineering changes reflected in final design could alter the conclusions reached in this analysis, leading to recommendations to add or omit noise barrier locations. A Final Design Noise Analysis will be performed for this Study based on detailed engineering information during the design phase. The views and opinions of all benefited property owners and residents will be solicited through public involvement and outreach activities during final design.

Table ES-1 Summary of Noise Sensitive Area (NSA) Impacts and Preliminary Sound Barrier Mitigation[2] by Alternative

NSA	Map Number	Impacted		Preliminary Sound Barrier Mitigation by Build Alternatives							Preliminary Barrier Dimensions (ft)	
		Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height
Area 1: I-495 west side, south of George Washington Parkway												
VA-01	79,80	Y		Abatement for the portion of the study area within Virginia is being evaluated in coordination with VDOT and in compliance with the VDOT Highway Traffic Noise Impact Analysis Guidance Manual. The results of this evaluation will be included in the FEIS.								
VA-02	79,80	Y										
Area 2: I-495 west side, between George Washington Parkway and Clara Barton Parkway												
VA-02	79,80	Y		Abatement for the portion of the study area within Virginia is being evaluated in coordination with VDOT and in compliance with the VDOT Highway Traffic Noise Impact Analysis Guidance Manual. The results of this evaluation will be included in the FEIS.								
VA-04	79,80		N									
Area 3: I-495 west side, between Clara Barton Parkway and MD 190												
1-01	1,2,27,28	Y		✓	✓	✓	✓	✓	✓	✓	1,734	28
1-02	1,2,27,28	Y		✓	✓	✓	✓	✓	✓	✓	9,182	27
1-04	1,2,3,27, 28,29	Y		✓	✓	✓	✓	✓	✓	✓		
1-05	2,3,28,29	Y		✓	✓	✓	✓	✓	✓	✓		
1-03	1,2,27,28	Y		✓	✓	✓	✓	✓	✓	✓	3,751	30
2-01	2,3,28,29	Y		✓	✓	✓	✓	✓	✓	✓		
Area 4: I-495 west side, between MD 190 and I-270 west spur												
1-06	4,30	Y		✓	✓	✓	✓	✓	✓	✓	3,548	35
3-01	4,30	Y		✓	✓	✓	✓	✓	✓	✓		
4-01[3]	4,30	Y		✗	✗	✗	✗	✗	✗	✗	N/A	N/A
2-02	4,30	Y		✓	✓	✓	✓	✓	✓	✓	4,182	22

[2] This table presents abatement that meets feasibility and reasonableness criteria based on preliminary studies. The feasibility and reasonableness of abatement is subject to change in final design. Concrete is the typical material used for construction of noise barriers and is assumed as part of the barrier analysis; however, a final determination of material will be made in final design, based upon FHWA requirements to achieve a minimum 20 dB(A) Transmission Loss in accordance with ASTM Recommended Practice E413-87.

[3] NSA 4-01 consists of the Burning Tree Country Club. This NSA is not considered to have sufficient frequency and duration of use to warrant consideration of noise abatement.

Table ES-1 Summary of Noise Sensitive Area (NSA) Impacts and Preliminary Sound Barrier Mitigation[2] by Alternative												
NSA	Map Number	Impacted		Preliminary Sound Barrier Mitigation by Build Alternatives							Preliminary Barrier Dimensions (ft)	
		Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height
Area 5: I-495 top side, between I-270 west spur and MD 187												
3-02	4,5,30,31	Y		✓	✓	✓	✓	✓	✓	✓	2,513	24
3-04	5,31	Y		✓	✓	✓	✓	✓	✓	✓	3,401	20
1-08	5,6,31,32	Y		✓	✓	✓	✓	✓	✓	✓		
2-03	5,6,31,32	Y		✓	✓	✓	✓	✓	✓	✓	1,621	24
2-04	6,32	Y		✓	✓	✓	✓	✓	✓	✓	4,042	20
2-05	6,32	Y		✓	✓	✓	✓	✓	✓	✓	4,614	20
Area 6: I-495 top side, between MD 187 and I-270 east spur												
2-06	6,7,32,33	Y		✓	✓	✓	✓	✓	✓	✓	2,650	17
1-09	7,33	Y		✓	✓	✓	✓	✓	✓	✓		
1-10	6,7,32,33	Y		✓	✓	✓	✓	✓	✓	✓	3,866	24
Area 7: I-495 top side, between I-270 east spur and MD 185												
1-11	7,8,33,34	Y		✓	✓	✓	✓	✓	✓	✓	5,972	19
1-13	8,9,34,35	Y		✓	✓	✓	✓	✓	✓	✓		
2-07	8,34	Y		✓	✓	✓	✓	✓	✓	✓	3,279	22
1-12	8,34	Y		✓	✓	✓	✓	✓	✓	✓		
2-08	8,9,34,35	Y		✓	✓	✓	✓	✓	✓	✓	2,007	18
3-05	9,35		N	Existing Barrier to Remain							N/A	N/A
Area 8: I-495 top side, between MD 185 and MD 97												
1-14	9,10,11, 35,36,37	Y		✓	✓	✓	✓	✓	✓	✓	6,731	21
1-36	9,35	Y		✓	✓	✓	✓	✓	✓	✓	6,568	20
2-09	9,10,35,36	Y		✓	✓	✓	✓	✓	✓	✓		
3-06	10,11,36, 37	Y		✓	✓	✓	✓	✓	✓	✓		
2-10	11,37	Y		✓	✓	✓	✓	✓	✓	✓	3,514	77
3-07	11,37	Y		✓	✓	✓	✓	✓	✓	✓	3,393	22
2-11	11,37	Y		✓	✓	✓	✓	✓	✓	✓		
Area 9: I-495 top side, between MD 97 and US 29												
3-08	11,12,37, 38	Y		✓	✓	✓	✓	✓	✓	✓	1,363	20
3-09	11,12,37, 38	Y		✓	✓	✓	✓	✓	✓	✓	2,025	18
4-02[4]	12,38	Y		✗	✗	✗	✗	✗	✗	✗	N/A	N/A
4-03[5]	12,38	Y		✗	✗	✗	✗	✗	✗	✗	N/A	N/A
2-12	12,13,38, 39	Y		✓	✓	✓	✓	✓	✓	✓	4,142	24
2-13	12,13,38, 39	Y		✓	✓	✓	✓	✓	✓	✓	2,396	22
Area 10: I-495 top side, between US 29 and MD 193												

[4] NSA 4-02 consists of the Holy Cross Hospital and a portion of the Sligo Creek Trail. There are no outdoor land uses at the Holy Cross Hospital in this area, there would be no interior noise impacts resulting from this project. The Sligo Creek Trail is not considered to have sufficient frequency and duration of use to warrant consideration of noise abatement.

[5] NSA 4-03 consists of Sligo Creek Golf Course and a portion of Sligo Creek Park. These areas are not considered to have sufficient frequency and duration of use to warrant consideration of noise abatement.

Table ES-1 Summary of Noise Sensitive Area (NSA) Impacts and Preliminary Sound Barrier Mitigation[2] by Alternative												
NSA	Map Number	Impacted		Preliminary Sound Barrier Mitigation by Build Alternatives							Preliminary Barrier Dimensions (ft)	
		Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height
2-14	13,14,39, 40	Y		✓	✓	✓	✓	✓	✓	✓	2,733	20
4-04	13,14,39, 40	Y		Existing Barrier to Remain/Partial Replacement							N/A	N/A
Area 11: I-495 top side, between MD 193 and MD 650												
2-15	13,14,39, 40	Y		✓	✓	✓	✓	✓	✓	✓	5,399	20
2-17	14,40	Y		✓	✓	✓	✓	✓	✓	✓		
2-16	13,14,39, 40	Y		✓	✓	✓	✓	✓	✓	✓	7,678	20
1-35	14,40	Y		✓	✓	✓	✓	✓	✓	✓		
2-18	14,15,40, 41	Y		✓	✓	✓	✓	✓	✓	✓	1,942	22
Area 12: I-495 top side, between MD 650 and I-95												
2-19	15,41	Y		✓	✓	✓	✓	✓	✓	✓	1,785	20
2-20	14,15,40, 41	Y		✓	✓	✓	✓	✓	✓	✓	3,014	26
1-15[6]	15,15A,41, 41A		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1-16	15,15A,41, 41A	Y		✓	✓	✓	✓	✓	✓	✓	3180	26
3-17	15,15A,41, 41A		N	Existing Barrier to Remain/Partial Replacement							N/A	N/A
I95-N[7]	77	Y		×	×	×	×	×	×	×	N/A	N/A
Area 13: I-495 east side, between I-95 and US 1												
I95-S[8]	77	Y		×	×	×	×	×	×	×	N/A	N/A
1-17	15A,41A	Y		✓	✓	✓	✓	✓	✓	✓	3,692	17
1-18	15A,16, 41A,42		N	Active use area is behind building and not impacted.							N/A	N/A
Area 14: I-495 east side, between US 1 and Greenbelt Metro												
2-21	15A,16, 41A,42	Y		✓	✓	✓	✓	✓	✓	✓	1,775	20
2-22	16,42	Y		✓	✓	✓	✓	✓	✓	✓	3,559	20
3-18	16,42	Y		✓	✓	✓	✓	✓	✓	✓		
2-23	16,42	Y		✓	✓	✓	✓	✓	✓	✓	3,216	18
Area 15: I-495 east side, between Greenbelt Metro and MD 201												
1-20	17,43	Y		✓	✓	✓	✓	✓	✓	✓	3,289	19
Area 16: I-495 east side, between MD 201 and Baltimore-Washington Parkway												
1-21	17A,43A	Y		✓	✓	✓	✓	✓	✓	✓	3,556	20
1-22	17A,43A	Y		×	×	×	×	×	×	×	N/A	N/A
BW-N	78	Y		✓	✓	✓	✓	✓	✓	✓	1,156	15

[6] NSA 1-15 consists of Eglise Baptiste Du Calvaire and The Hindu Temple of Metropolitan Washington, as well as single family residences in the Adelphi Community, and Knollwood Park. There is no apparent outdoor use at the places of worship; the park does not have apparent areas of recreational activity.

[7] NSA I95-N consist of single family residences, two schools, athletic fields and places of worship. The barrier evaluated for this area is not reasonable (<50% of impacts achieve 7 dBA noise reduction).

[8] NSA I95-S consist of single family residences, a community center and athletic fields. The barrier evaluated for this area is not feasible (<70% of impacts are benefited)

Table ES-1 Summary of Noise Sensitive Area (NSA) Impacts and Preliminary Sound Barrier Mitigation[2] by Alternative

NSA	Map Number	Impacted		Preliminary Sound Barrier Mitigation by Build Alternatives							Preliminary Barrier Dimensions (ft)	
		Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height
Area 17: I-495 east side, between Baltimore-Washington Parkway and MD 450												
BW-S	78	Y		✓	✓	✓	✓	✓	✓	✓	3,489	16
1-23	17A,18,19, 43A,44,45	Y		✓	✓	✓	✓	✓	✓	✓	4,720	21
1-24[9]	17A,18, 43A,44	Y		✗	✗	✗	✗	✗	✗	✗	N/A	N/A
2-24	18,19,44, 45	Y		✓	✓	✓	✓	✓	✓	✓	4,361	20
2-25	19,45	Y		✓	✓	✓	✓	✓	✓	✓	2,451	21
1-25	19,45	Y		✓	✓	✓	✓	✓	✓	✓		
2-26	19,45	Y		✓	✓	✓	✓	✓	✓	✓	6,182	21
2-27	19,45	Y		✓	✓	✓	✓	✓	✓	✓	3,274	18
Area 18: I-495 east side, between MD 450 and US 50												
3-10	19,20,45, 46	Y		✓	✓	✓	✓	✓	✓	✓	2,060	24
1-33	20,46	Y		✓	✓	✓	✓	✓	✓	✓		
2-28	20,46	Y		✓	✓	✓	✓	✓	✓	✓	1,553	20
Area 19: I-495 east side, between US 50 and MD 202												
2-29	20,46	Y		✓	✓	✓	✓	✓	✓	✓	1,558	20
3-11	20,46	Y		✓	✓	✓	✓	✓	✓	✓	1,714	18
2-30	20,21,46, 47	Y		✓	✓	✓	✓	✓	✓	✓	3,155	19
2-31	21,47	Y		✓	✓	✓	✓	✓	✓	✓	2,916	21
Area 20: I-495 east side, between MD 202 and Arena Drive												
N/A	N/A			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Area 21: I-495 east side, between Arena Drive and MD 214												
3-12	22,48	Y		✓	✓	✓	✓	✓	✓	✓	208	25
Area 22: I-495 east side, between MD 214 and Ritchie Marlboro Road												
1-26	23,23A,49, 49A	Y		✓	✓	✓	✓	✓	✓	✓	4,701	19
Area 23: I-495 east side, between Ritchie Marlboro Road and MD 4												
1-37	23A,49A	Y		✓	✓	✓	✓	✓	✓	✓	2,645	25
Area 24: I-495 east side, between MD 4 and Forestville Road / MD 337												
1-27	24A,50A		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Area 25: I-495 east side, between Forestville Road / MD 337 and Suitland Road / MD 337												
1-28	24,50	Y		✓	✓	✓	✓	✓	✓	✓	5,342	22
Area 26: I-495 east side, between Suitland Road / MD 337 and MD 5												
1-29	24,50	Y		✓	✓	✓	✓	✓	✓	✓	878	35
3-14	24,25,50, 51	Y		✓	✓	✓	✓	✓	✓	✓		
3-13	24,25,50, 51	Y		✓	✓	✓	✓	✓	✓	✓	1,836	20

[9] NSA 1-24 consists of a portion of Greenbelt Park. There are no apparent areas of recreational activity in this area, and therefore consideration of noise abatement is not warranted.

Table ES-1 Summary of Noise Sensitive Area (NSA) Impacts and Preliminary Sound Barrier Mitigation[2] by Alternative												
NSA	Map Number	Impacted		Preliminary Sound Barrier Mitigation by Build Alternatives							Preliminary Barrier Dimensions (ft)	
		Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height
1-34[10]	25,51	Y		✗	✗	✗	✗	✗	✗	✗	N/A	N/A
2-32	25,25A,51, 51A	Y		✓	✓	✓	✓	✓	✓	✓	930	22
Area 27: I-495 east side, west of MD 5												
3-15	25A,51A		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3-16	25A,26, 51A,52		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Area 28: I-270 west spur, between I-495 and Democracy Boulevard												
5-35	60,63,72, 75		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3-03/5-36	64,76	Y		✓	✓	✓	✓	✓	✓	✓	3,344	21
5-37/1-07	64,76	Y		✓	✓	✓	✓	✓	✓	✓	528	20
Area 29: I-270 west spur, between Democracy Boulevard and Westlake Terrace												
5-32[11]	63,75	Y		✗	✗	✗	✗	✗	✗	✗	N/A	N/A
Area 30: I-270 east spur, between I-495 and MD 187												
5-33	61,62,73, 74	Y		✓	✓	✓	✓	✓	✓	✓	6,164	21
5-34	61,62,73, 74	Y		✓	✓	✓	✓	✓	✓	✓	1,984	28
Area 31: I-270 west and east spurs, between Y-split and Westlake Terrace and MD 187												
5-31	60,61,72, 73		N	Existing Barrier to Remain/Partial Replacement							N/A	N/A
5-32	60,61,63, 72,73,75		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Area 32: I-270 mainline, between Y-split and Montrose Road												
5-28	58,70		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-29	58,59,70, 71	Y		Existing Barrier to Remain							N/A	N/A
5-30	60,72		N	Existing Barrier to Remain							N/A	N/A
Area 33: I-270 mainline, between Montrose Road and MD 189												
5-23	57,69		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-24	57,69		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-25	57,69		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-26	57,58,69, 70		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-27	58,70		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Area 34: I-270 mainline, between MD 189 and MD 28												
5-18[12]	56,68	Y		✗	✗	✗	✗	✗	✗	✗	N/A	N/A
5-19	56,68	Y		✗	✗	✗	✗	✗	✗	✗	N/A	N/A
5-16	55,56,67, 68	Y		✓	✓	✓	✓	✓	✓	✓	4,920	20
5-17	56,68	Y		✓	✓	✓	✓	✓	✓	✓		
5-20	56,68	Y		✓	✓	✓	✓	✓	✓	✓		

[10] NSA 1-34 consists of the Manchester Estates community. A barrier is not feasible due to the topography and flanking noise coming from MD-5 and the distance between the receptors and the roadway.

[11] NSA 5-32 consists of a pedestrian path. The barrier is not feasible (<70% of impacts are benefited) and is not reasonable (>1700 sf-p-r).

[12] NSAs 5-18 and 5-19 will be re-evaluated to account for the existing berm along I-270. The results of this evaluation will be included in the FEIS.

Table ES-1 Summary of Noise Sensitive Area (NSA) Impacts and Preliminary Sound Barrier Mitigation[2] by Alternative												
NSA	Map Number	Impacted		Preliminary Sound Barrier Mitigation by Build Alternatives							Preliminary Barrier Dimensions (ft)	
		Yes	No	Alt 5	Alt 8	Alt 9	Alt 10	Alt 13B	Alt 13C	Alt 9M	Length	Height
5-21	56,57,68, 69	Y		✓	✓	✓	✓	✓	✓	✓		
5-22	56,57,68, 69	Y		×	×	×	×	×	×	×	N/A	N/A
Area 35: I-270 mainline, between MD 28 and Shady Grove Road												
5-08[13]	54,66	Y		×	×	×	×	×	×	×	N/A	N/A
5-09[42]	54,66	Y		×	×	×	×	×	×	×	N/A	N/A
5-10[14]	54,66	Y		×	×	×	×	×	×	×	N/A	N/A
5-11	54,66		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-12	55,67		N	Existing Barrier to Remain							N/A	N/A
5-14[15]	55,67	Y		×	×	×	×	×	×	×	N/A	N/A
5-13	55,67	Y		✓	✓	✓	✓	✓	✓	✓	2,628	22
5-15	55,56,67, 68	Y		✓	✓	✓	✓	✓	✓	✓		
Area 36: I-270 mainline, between Shady Grove Road and I-370												
5-03	54,66		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-05	53,65		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5-06[16]	53,54,65, 66	Y		×	×	×	×	×	×	×	N/A	N/A
5-07	54,66	Y		×	×	×	×	×	×	×	N/A	N/A
Area 37: I-270 mainline, north of I-370												
5-01	53,65		N	Existing Barrier to Remain							N/A	N/A
5-02	53,65		N	Existing Barrier to Remain							N/A	N/A
5-04	53,65		N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Summary of Noise Barrier System Mitigation												
Existing Noise Barriers that would remain in place as currently constructed											7	
Existing Noise Barriers that would be displaced and replaced with a reconstructed barrier											42	
Existing Noise Barriers that would be reconstructed and extended											19	
New Noise Barriers constructed											23	
Noise Barrier System is not reasonable or feasible											17	

[13] NSAs 5-08 and 5-09 consist of an apartment complex and various commercial land uses. The barrier evaluated for this area is not feasible (<70% of impacts are benefited) and is not reasonable (>1700 sf-p-r).

[14] NSA 5-10 consists of various commercial land uses. The barrier for this area is not feasible (<70% of impacts are benefited) and is not reasonable (>2700 sf-p-r).

[15] NSA 5-14 consists of various commercial land uses. The barrier for this area is not feasible (<70% of impacts are benefited) and is not reasonable (>2700 sf-p-r).

[16] NSA 5-06 consists of the Rio Washingtonian Center. NSA 5-07 consists of various commercial land uses. The barrier for this area is not feasible (<70% of impacts are benefited) and is not reasonable (>2700 sf-p-r).

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

ES.1 Overview 1

ES.2 Land Uses and Methodology 2

ES.3 Impact Analysis Summary 3

ES.4 Barrier Analysis Summary 4

ES.5 Statement of Likelihood 5

1 INTRODUCTION 1

1.1 Overview 1

1.2 Study Corridors 1

1.3 Study Purpose and Need 3

1.4 Alternatives Evaluated 4

1.5 Highway Noise Fundamentals 9

1.6 Noise Abatement Criteria 11

1.7 Noise Technical Analysis Approach 13

1.7.1 I-495 (Capital Beltway) – Maryland and Virginia 15

1.7.2 I-270 (Dwight D. Eisenhower Memorial Highway) 15

1.7.3 I-95 and MD 295 Interchanges 15

2 MEASUREMENTS AND TNM MODEL VALIDATION 16

2.1 Introduction 16

2.2 I-495 (Capital Beltway) 16

2.2.1 Land Uses 16

2.2.2 Noise Measurement Data 30

2.2.3 TNM Model Validation 30

2.3 I-270 (Dwight D. Eisenhower Memorial Highway) 31

2.3.1 Land Uses 31

2.3.2 Noise Measurement Data 46

2.3.3 TNM Model Validation 46

2.4 I-95 (North of Capital Beltway) 49

2.4.1 Land Uses 49

2.4.2 TNM Model Validation 49

2.5 MD 295 (Baltimore-Washington Parkway) 50

2.5.1 Land Uses 50
2.5.2 TNM Model Validation 50
2.6 I-495 (Capital Beltway-Virginia) 51
2.6.1 Land Uses 51
2.6.2 Noise Measurement Data 52
2.6.3 Noise Model Validation 53
3 PREDICTED NOISE LEVELS AND IMPACT ANALYSIS 54
3.1 Introduction 54
3.2 Traffic Data 54
3.3 I-495 (Capital Beltway-Maryland) 55
3.4 I-270 (Dwight D. Eisenhower Memorial Highway) 55
3.5 I-95 (North of Capital Beltway) 56
3.6 MD 295 (Baltimore-Washington Parkway) 56
3.7 I-495 (Capital Beltway-Virginia) 56
4 BARRIER ANALYSIS 57
4.1 Introduction 57
4.2 Feasibility and Reasonableness Criteria 57
4.2.1 Feasibility 57
4.2.2 Reasonableness 58
4.2.3 Viewpoints of Benefited Property Owners and Residents 58
4.2.4 Benefited Residences and Design Goal 58
4.2.5 Cost Effectiveness 59
4.3 Noise Barrier Design Terms 60
4.4 Noise Barrier Design Process 61
4.5 I-495 (Capital Beltway in Maryland) 62
4.5.1 Noise Barrier Design Goals and the Four Phases 62
4.5.2 BARRIER SYSTEM 495 MD-1 64
4.5.3 BARRIER SYSTEMS 495 MD-2 AND 495 MD-4 66
4.5.4 BARRIER SYSTEM 495 MD-3 70
4.5.5 BARRIER SYSTEM 495 MD-5 73
4.5.6 BARRIER SYSTEM 495 MD-6 76
4.5.7 BARRIER SYSTEM 495 MD-7 78
4.5.8 BARRIER SYSTEM 495 MD-8 78

4.5.9 BARRIER SYSTEM 495 MD-9 80
4.5.10 BARRIER SYSTEM 495 MD-10 80
4.5.11 BARRIER SYSTEM 495 MD-11 81
4.5.12 BARRIER SYSTEM 495 MD-12 84
4.5.13 BARRIER SYSTEM 495 MD-13 86
4.5.14 BARRIER SYSTEM 495 MD-14 88
4.5.15 BARRIER SYSTEM 495 MD-15 88
4.5.16 BARRIER SYSTEM 495 MD-16 92
4.5.17 BARRIER SYSTEM 495 MD-17 95
4.5.18 BARRIER SYSTEM 495 MD-18 98
4.5.19 BARRIER SYSTEM 495 MD-19 99
4.5.20 BARRIER SYSTEM 495 MD-20 100
4.5.21 BARRIER SYSTEM 495 MD-21 102
4.5.22 BARRIER SYSTEM 495 MD-22 106
4.5.23 BARRIER SYSTEM 495 MD-23 107
4.5.24 BARRIER SYSTEM 495 MD-24 109
4.5.25 BARRIER SYSTEM 495 MD-25 110
4.5.26 BARRIER SYSTEM 495 MD-26 113
4.5.27 BARRIER SYSTEM 495 MD-27 114
4.5.28 BARRIER SYSTEM 495 MD-28 116
4.5.29 BARRIER SYSTEM 495 MD-29 116
4.5.30 BARRIER SYSTEM 495 MD-30 119
4.5.31 BARRIER SYSTEM 495 MD-31 122
4.5.32 BARRIER SYSTEM 495 MD-32 124
4.5.33 BARRIER SYSTEM 495 MD-33 124
4.5.34 BARRIER SYSTEM 495 MD-34 128
4.5.35 BARRIER SYSTEM 495 MD-35 129
4.5.36 BARRIER SYSTEM 495 MD-36 131
4.5.37 BARRIER SYSTEM 495 MD-36A 132
4.5.38 BARRIER SYSTEM 495 MD-37 133
4.5.39 BARRIER SYSTEM 495 MD-38 137
4.5.40 BARRIER SYSTEM 495 MD-39 138
4.5.41 BARRIER SYSTEM 495 MD-40 139

4.5.42 BARRIER SYSTEM 495 MD-40A 141
4.5.43 BARRIER SYSTEM 495 MD-40B 143
4.5.44 BARRIER SYSTEM 495 MD-41 144
4.5.45 BARRIER SYSTEM 495 MD-42 146
4.5.46 BARRIER SYSTEM 495 MD-43 146
4.5.47 BARRIER SYSTEM 495 MD-44 150
4.5.48 BARRIER SYSTEM 495 MD-45 152
4.5.49 BARRIER SYSTEM 495 MD-46 154
4.5.50 BARRIER SYSTEM 495 MD-47 156
4.5.51 BARRIER SYSTEM 495 MD-48 156
4.5.52 BARRIER SYSTEM 495 MD-49 159
4.5.53 BARRIER SYSTEM 495 MD-50 159
4.5.54 BARRIER SYSTEM 495 MD-51 162
4.5.55 BARRIER SYSTEM 495 MD-52 164
4.5.56 BARRIER SYSTEM 495 MD-53 164
4.5.57 BARRIER SYSTEM 495 MD-53A 167
4.5.58 BARRIER SYSTEM 495 MD-54 169
4.5.59 BARRIER SYSTEM 495 MD-55 170
4.5.60 BARRIER SYSTEM 495 MD-56 172
4.5.61 BARRIER SYSTEM 495 MD-57 174
4.5.62 BARRIER SYSTEM 495 MD-58 176
4.5.63 BARRIER SYSTEM 495 MD-59 177
4.6 I-270 (Dwight D. Eisenhower Memorial Highway) 179
4.6.1 EXISTING BARRIER SYSTEM at NSAs 5-01 and 5-02 179
4.6.2 BARRIER SYSTEM 270-1 180
4.6.3 BARRIER SYSTEM 270-2 182
4.6.4 BARRIER SYSTEM 270-3 184
4.6.5 EXISTING BARRIER SYSTEM at NSA 5-12 185
4.6.6 BARRIER SYSTEM 270-4 185
4.6.7 BARRIER SYSTEM 270-5 187
4.6.8 BARRIER SYSTEM 270-6 189
4.6.9 EXISTING BARRIER SYSTEM AT NSAs 5-16, 5-17, 5-20, and 5-21 193
4.6.10 EXISTING BARRIER SYSTEM AT NSA 5-29 198

4.6.11 BARRIER SYSTEM 270-7 205
4.6.12 BARRIER SYSTEM 270-8 207
4.6.13 BARRIER SYSTEM 270-9 217
4.6.14 BARRIER SYSTEM 270-10 221
4.6.15 BARRIER SYSTEM 270-11 222
4.6.16 BARRIER SYSTEM 270-12 224
4.7 I-95 (North of Capital Beltway) 227
4.7.1 BARRIER SYSTEM 95-1 227
4.7.2 BARRIER SYSTEM 95-2 229
4.8 I-295 (Baltimore-Washington Parkway) 230
4.8.1 BARRIER SYSTEM 295-1 230
4.8.2 BARRIER SYSTEM 295-2 232
4.9 I-495 (Capital Beltway in Virginia) 233
5 COORDINATION WITH LOCAL OFFICIALS 234
5.1 Coordination with Local Officials 234
5.2 Construction Noise 235
6 ALTERNATIVES MAPPING 236

LIST OF TABLES

Table ES-1: Summary of NSA Impacts and Preliminary Sound Barrier Mitigation by Alternative ES.5
Table 1-1: Common Outdoor and Indoor Noise Levels 10
Table 1-2: Noise Abatement Criteria (NAC) [Hourly A-Weighted Sound Level in Decibels dB(A)] 12
Table 1-3: Building Noise Reduction Factors for Estimating Interior Impacts for Category D 13
Table 4-1: Cost Reasonableness Evaluation Thresholds 59
Table 4-2: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-01 65
Table 4-3: Noise Barrier Design Summary 65
Table 4-4: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-02 66
Table 4-5: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-04 68
Table 4-6: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-05 69
Table 4-7: Noise Barrier Design Summary 70
Table 4-8: Noise Barrier Design Summary 70
Table 4-9: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-03 71
Table 4-10: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-01 72
Table 4-11: Noise Barrier Design Summary 72
Table 4-12: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-06 73
Table 4-13: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-01 74
Table 4-14: Noise Barrier Design Summary 76

Table 4-15: Noise Barrier Design Summary 76
Table 4-16: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-02 76
Table 4-17: Noise Barrier Design Summary 78
Table 4-18: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-02 79
Table 4-19: Noise Barrier Design Summary 79
Table 4-20: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-03 81
Table 4-21: Noise Barrier Design Summary 81
Table 4-22: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-08 82
Table 4-23: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-04 83
Table 4-24: Noise Barrier Design Summary 83
Table 4-25: Noise Barrier Design Summary 84
Table 4-26: Two Barrier Combined Noise Barrier Design Summary 84
Table 4-27: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-04 84
Table 4-28: Noise Barrier Design Summary 85
Table 4-29: Noise Barrier Design Summary 86
Table 4-30: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-05 86
Table 4-31 : Noise Barrier Design Summary 87
Table 4-32: Noise Barrier Design Summary 87
Table 4-33: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-09 89
Table 4-34: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-06 89
Table 4-35: Noise Barrier Design Summary 90
Table 4-36: Noise Barrier Design Summary 90
Table 4-37: Noise Barrier Design Summary 90
Table 4-38: Noise Barrier Design Summary 90
Table 4-39: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-10 91
Table 4-40: Noise Barrier Design Summary 92
Table 4-41: Noise Barrier Design Summary 92
Table 4-42: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-11 93
Table 4-43: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-13 94
Table 4-44: Noise Barrier Design Summary 94
Table 4-45: Noise Barrier Design Summary 94
Table 4-46: Noise Barrier Design Summary 94
Table 4-47: Noise Barrier Design Summary 95
Table 4-48: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-12 96
Table 4-49: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-07 97
Table 4-50: Noise Barrier Design Summary 97
Table 4-51: Noise Barrier Design Summary 97
Table 4-52: Two Barrier Combined Noise Barrier Design Summary 98
Table 4-53: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-08 98
Table 4-54: Noise Barrier Design Summary 99
Table 4-55: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-05 99
Table 4-56: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-14 101
Table 4-57: Noise Barrier Design Summary 102
Table 4-58: Noise Barrier Design Summary 102

Table 4-59: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-09 103
Table 4-60: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-06 104
Table 4-60a: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-36 105
Table 4-61: Noise Barrier Design Summary 105
Table 4-62: Noise Barrier Design Summary 106
Table 4-63: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-10 106
Table 4-64: Noise Barrier Design Summary 107
Table 4-65: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-11 108
Table 4-66: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-07 109
Table 4-67: Noise Barrier Design Summary 109
Table 4-68: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-08 111
Table 4-69: Noise Barrier Design Summary 111
Table 4-70: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-09 112
Table 4-71: Noise Barrier Design Summary 112
Table 4-72: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-12 113
Table 4-73: Noise Barrier Design Summary 114
Table 4-74: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-13 115
Table 4-75: Noise Barrier Design Summary 115
Table 4-76: Noise Barrier Design Summary 116
Table 4-77: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 4-04 117
Table 4-78: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-14 117
Table 4-79: Noise Barrier Design Summary 119
Table 4-80: Noise Barrier Design Summary 119
Table 4-81: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-15 119
Table 4-82: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-17 120
Table 4-83: Noise Barrier Design Summary 121
Table 4-84: Noise Barrier Design Summary 121
Table 4-85: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-16 122
Table 4-86: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-35 123
Table 4-87: Noise Barrier Design Summary, Alt 5 124
Table 4-88: Noise Barrier Design Summary, Alt 8, 9, 10, 13B, and 13C 124
Table 4-89: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-18 126
Table 4-90: Noise Barrier Design Summary 126
Table 4-91: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-19 127
Table 4-92: Noise Barrier Design Summary 127
Table 4-93: Noise Barrier Design Summary 127
Table 4-94: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-20 128
Table 4-95: Noise Barrier Design Summary 129
Table 4-96: Noise Barrier Design Summary 129
Table 4-97: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-17 130
Table 4-98: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-16 131
Table 4-99: Noise Barrier Design Summary 132
Table 4-99A: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-17 132
Table 4-99B: Noise Barrier Design Summary 133

Table 4-100: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-21 134
Table 4-101: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-22 135
Table 4-102: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-18 135
Table 4-103: Noise Barrier Design Summary 136
Table 4-104: Noise Barrier Design Summary 136
Table 4-105: Noise Barrier Design Summary 137
Table 4-106: Noise Barrier Design Summary 137
Table 4-107: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-23 137
Table 4-108: Noise Barrier Design Summary 138
Table 4-109: Noise Barrier Design Summary 138
Table 4-110: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-20 139
Table 4-111: Noise Barrier Design Summary 140
Table 4-112: Noise Barrier Design Summary 141
Table 4-112A: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-21 142
Table 4-112B: Noise Barrier Design Summary 142
Table 4-113: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-22 143
Table 4-114: Noise Barrier Design Summary 144
Table 4-115: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-23 144
Table 4-116: Noise Barrier Design Summary 145
Table 4-117: Noise Barrier Design Summary 145
Table 4-118: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-24 147
Table 4-119: Noise Barrier Design Summary 148
Table 4-120: Noise Barrier Design Summary 148
Table 4-121: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-25 148
Table 4-122: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-25 149
Table 4-123: Noise Barrier Design Summary 149
Table 4-124: Noise Barrier Design Summary 150
Table 4-125: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-27 150
Table 4-126: Noise Barrier Design Summary 151
Table 4-127: Noise Barrier Design Summary 151
Table 4-128: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-26 152
Table 4-129: Noise Barrier Design Summary 153
Table 4-130: Noise Barrier Design Summary 153
Table 4-131: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-10 154
Table 4-132: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-33 155
Table 4-133: Noise Barrier Design Summary 155
Table 4-134: Noise Barrier Design Summary 156
Table 4-135: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-28 157
Table 4-136: Noise Barrier Design Summary 157
Table 4-137: Noise Barrier Design Summary 157
Table 4-138: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-29 158
Table 4-139: Noise Barrier Design Summary 158
Table 4-140: Noise Barrier Design Summary 158
Table 4-141: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-11 160

Table 4-142: Noise Barrier Design Summary 160
Table 4-143: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-30 161
Table 4-144: Noise Barrier Design Summary 162
Table 4-145: Noise Barrier Design Summary 162
Table 4-146: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-31 162
Table 4-147: Noise Barrier Design Summary 163
Table 4-148: Noise Barrier Design Summary 164
Table 4-149: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-12 165
Table 4-150: Noise Barrier Design Summary 165
Table 4-151: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-26 165
Table 4-152: Noise Barrier Design Summary 167
Table 4-153: Noise Barrier Design Summary 167
Table 4-154: Noise Barrier Design Summary 167
Table 4-155: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-37 168
Table 4-156: Noise Barrier Design Summary 168
Table 4-157: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-28 169
Table 4-158: Noise Barrier Design Summary 170
Table 4-159: Noise Barrier Design Summary 170
Table 4-160: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-13 171
Table 4-161: Noise Barrier Design Summary 172
Table 4-162: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-29 172
Table 4-163: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-14 173
Table 4-164: Noise Barrier Design Summary 174
Table 4-165: Noise Barrier Design Summary 174
Table 4-166: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-32 175
Table 4-167: Noise Barrier Design Summary 175
Table 4-168: Noise Barrier Design Summary 176
Table 4-169: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-15 176
Table 4-170: Noise Barrier Design Summary 177
Table 4-171: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-16 177
Table 4-172: Noise Barrier Design Summary 179
Table 4-173: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-06 and 5-07 180
Table 4-174: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-08 and 5-09 183
Table 4-175: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-10 185
Table 4-176: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-14 186
Table 4-177: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-13 and 5-15 187
Table 4-178: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-18 and 5-19 190
Table 4-179: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-16, 5-17, 5-20, and 5-21 194
Table 4-180: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-29 199

Table 4-181: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-30 205
Table 4-182: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-31 206
Table 4-183: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits NSA 5-33 208
Table 4-184: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-33 210
Table 4-185: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-33 212
Table 4-186: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-33 215
Table 4-187: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-33 216
Table 4-188: 2040 Existing Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-34 218
Table 4-189: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-34 219
Table 4-190: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-34 220
Table 4-191: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-32 221
Table 4-192: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-36 222
Table 4-193: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-36 223
Table 4-194: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-37 225
Table 4-195: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-37 226
Table 4-196: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-37 228
Table 4-197: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA I95-N 229
Table 4-198: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA I95-S 230
Table 4-199: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA BW-N 231
Table 4-200: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA BW-S 232
Table 5-1: Land Use Activity Category G Areas, Typical NAC Distances 234

LIST OF FIGURES

Figure 1-1: Study Area Corridors 2
Figure 1-2: Typical Sections of Alternatives Considered 7
Figure 1-3: Sound Level Versus Time 11

LIST OF APPENDICES

Appendix A TNM Model Runs
Appendix B Design Traffic Volumes
Appendix C Model Validation Results
Appendix D Impact Analysis Results
Appendix E Traffic Noise Monitoring Sessions

1

1 INTRODUCTION

1.1 Overview

The Federal Highway Administration (FHWA), as the Lead Federal Agency, and the Maryland Department of Transportation State Highway Administration (MDOT SHA), as the Local Project Sponsor, are preparing an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) for the I-495 & I-270 Managed Lanes Study (Study). The Study is evaluating potential transportation improvements to portions of the I-495 and I-270 corridors in Montgomery and Prince George's County, Maryland, and Fairfax County, Virginia.

This EIS is being prepared in accordance with FHWA and Council on Environmental Quality (CEQ) regulations implementing NEPA and provisions of the Fixing America's Surface Transportation (FAST) Act. The content of the EIS also conforms to CEQ guidelines, which provide direction regarding implementation of the procedural provisions of NEPA, and the FHWA's Guidance for *Preparing and Processing Environmental and Section 4(f) Documents* (Technical Advisory T6640.8A, October 1987).

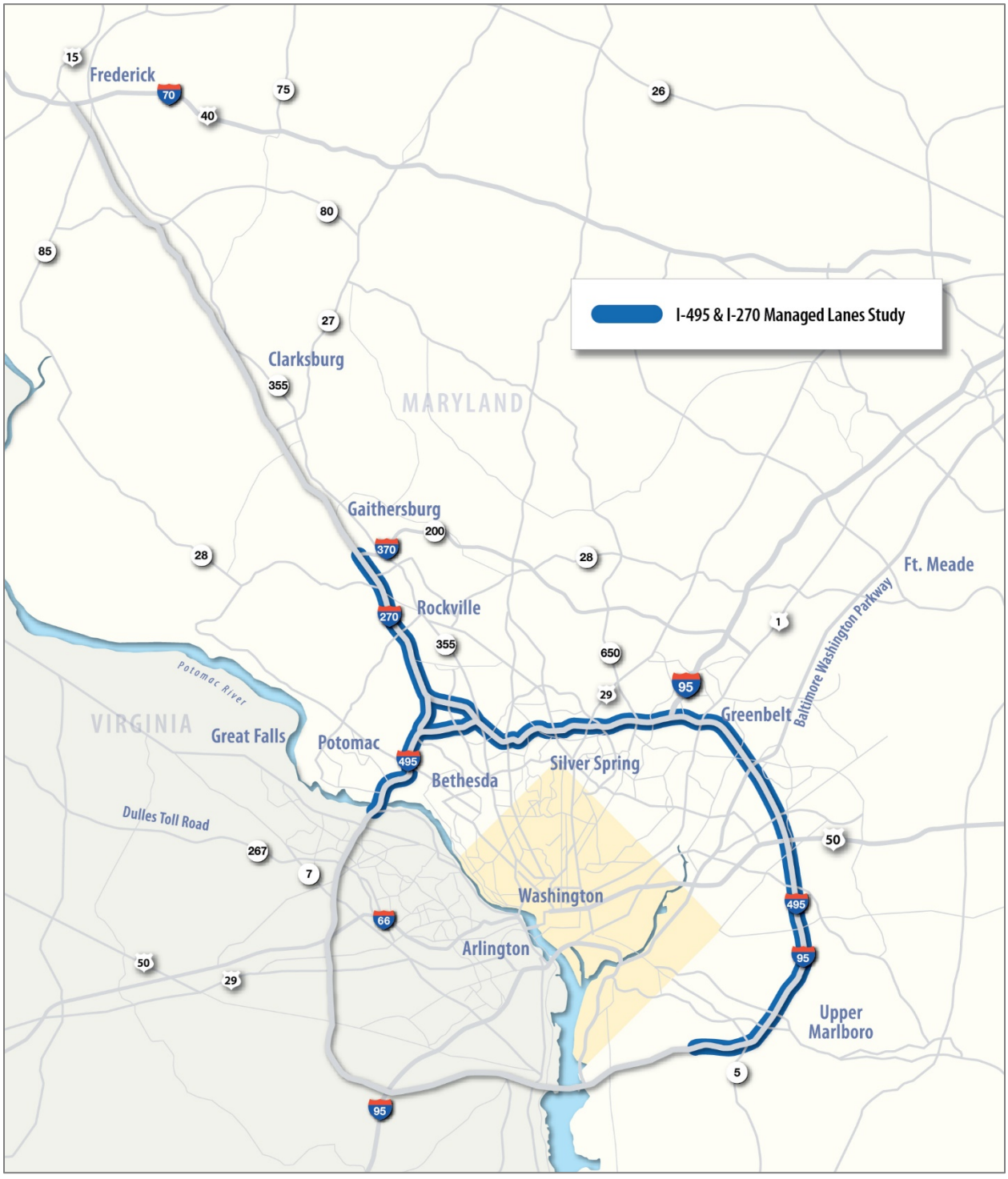
The purpose of the Noise Technical Report is to present an assessment of potential impacts of the Screened Alternatives to the noise environment and is being prepared to support and inform the EIS. The report begins with a description of the Study corridors, a summary of the Purpose and Need, and a description of the alternatives evaluated.

The findings in this document are based on preliminary design information. Project engineering changes reflected in final design could alter the conclusions reached in this analysis, leading to recommendations to add or omit noise barrier locations. A Final Design Noise Analysis will be performed for this Study based on detailed engineering information during the design phase.

1.2 Study Corridors

I-495 and I-270 in Maryland are the two most heavily traveled freeways in the National Capital Region, each with Average Annual Daily Traffic volume up to 260,000 vehicles per day in 2016 (MDOT SHA, 2017). I-495 is the only circumferential route in the region that provides interregional connections to many radial routes in the region, such as I-270, US 29 (Colesville Road), I-95, the Baltimore-Washington Parkway, US 50 (John Hanson Highway), and MD 5 (Branch Avenue). I-270 is the only freeway link between I-495 and the fast-growing northwest suburbs in northern Montgomery County and the suburban area in Frederick County. In addition to heavy commuter traffic demand, I-495 is merged with I-95 in Maryland for 25 miles around the east side of Washington DC providing connectivity along the East Coast. (**Figure 1-1**).

Figure 1-1: Study Area Corridors



1.3 Study Purpose and Need

The purpose of the Study is to develop a travel demand management solution(s) that addresses congestion and improves trip reliability on I-495 and I-270 within the Study limits and enhances existing and planned multimodal mobility and connectivity. The Study will address the following needs:

- **Accommodate Existing Traffic and Long-Term Traffic Growth** - High travel demand from commuter, business, and recreational trips results in severe congestion from 7 to 10 hours per day on the Study corridors, which is expected to deteriorate further by the planning horizon year of 2040. Additional capacity is needed to address existing and future travel demand and congestion, reduce travel times, and allow travelers to use the facilities efficiently.

- **Enhance Trip Reliability -** Congestion on I-495 and I-270 results in unpredictable travel times. Travelers and freight commodities place a high value on reaching their destinations in a timely and safe manner, and in recent years, the Study corridors have become so unreliable that uncertain travel times are experienced daily. More dependable travel times are needed to ensure trip reliability.

- **Provide Additional Roadway Travel Choices -** Travelers on I-495 and I-270 do not have enough options for efficient travel during extensive periods of congestion. Additional roadway management options are needed to improve travel choices, while retaining the general-purpose lanes.

- **Accommodate Homeland Security** - The National Capital Region is considered the main hub of government, military, and community installations related to homeland security. These agencies and installations rely on quick, unobstructed roadway access during a homeland security threat. Additional capacity would assist in accommodating a population evacuation and improving emergency response access should an event related to homeland security occur.

- **Improve Movement of Goods and Services** - I-495 and I-270 are major regional transportation networks that support the movement of passenger and freight travel within the National Capital Region. Existing congestion along both corridors increases the cost of doing business due to longer travel times and unreliable trips. The effects of this congestion on the movement of goods and services is a detriment to the health of the local, regional, and national economy. Efficient and reliable highway movement is necessary to accommodate passenger and freight travel, moving goods and services through the region.

Additional capacity and improvements to enhance reliability must be financially viable. MDOT's traditional funding sources would be unable to effectively finance, construct, operate, and maintain improvements of this magnitude. Revenue sources that provide adequate funding, such as pricing options, are needed to achieve congestion relief and address existing high travel demand.

Given the highly constrained area surrounding the interstates in the Study corridors, MDOT SHA recognizes the need to plan and design this project in an environmentally responsible manner. MDOT SHA will strive to avoid and minimize community, natural, cultural, and other environmental impacts, and mitigate for any unavoidable impacts at an equal or greater value. MDOT SHA will work with our Federal, State, and Local resource agency partners in a streamlined, collaborative, and cooperative way to meet

all regulatory requirements to ensure the protection of environmental resources to the maximum extent practicable. Any build alternatives will adequately offset unavoidable impacts while prioritizing and coordinating comprehensive mitigation measures near the Study area which are meaningful to the environment and the community.

1.4 Alternatives Evaluated

Seven alternatives are being evaluated and compared in the technical reports supporting the EIS. These Screened Alternatives include Alternatives 1, 5, 8, 9, 10, 13B, and 13C and are illustrated in the typical sections shown in **Figure 1-2**.

The following terms are used in the description of the alternatives.

- **General Purpose Lanes** are lanes on a freeway or expressway that are open to all motor vehicles.[17]
- **Managed Lanes** are highway facilities, or a set of lanes, where operational strategies are proactively implemented and managed in response to changing conditions.[18]
- **High-Occupancy Toll (HOT) Lanes** are High-Occupancy Vehicle (HOV) facilities that allow lower-occupancy vehicles, such as solo drivers, to use the facilities in return for toll payments, which could vary by time of day and level of congestion.[1]
- **Express Toll Lanes (ETL)** are dedicated managed lanes within highway rights-of-way that motorists may use by paying a variably priced toll.[19]
- **High-Occupancy Vehicle (HOV)** Lanes are any preferential lane designated for exclusive use by vehicles with two or more occupants for all or part of a day, including a designated lane on a freeway, other highway or a street, or independent roadway on a separate right-of-way (ROW).[20]
- **Reversible Lanes** are facilities in which the direction of traffic flow can be changed at different times of the day to match peak direction of travel, typically inbound in the morning and outbound in the afternoon.[1]

A. Alternative 1: No Build

The No Build Alternative, often called the base case, includes all projects in the 2040 financially Constrained Long-Range Plan (CLRP) for the National Capital Region adopted by the Metropolitan Washington Council of Governments - Transportation Planning Board. This includes other projects impacting the facilities that are subject to this Study. Specifically, the CLRP reflects the Purple Line which is currently under construction (Spring 2019), and the extension of the I-495 Express Lanes in Virginia from north of the Dulles Toll Road interchange to the American Legion Bridge (Virginia's 495 Express Lanes Northern Extension [NEXT] Project). Alternative 1 also includes the I-270 Innovative Congestion Management Contracts, which are providing a series of construction projects to improve mobility and safety at key points along I-270 targeted to reduce congestion at key bottlenecks along the corridor. All improvements are being implemented within the existing roadway ROW and are anticipated to be

[17] *National Cooperative Highway Research Program, Research Report 835, Guidelines for Implementing Managed Lanes*. Transportation Research Board. 2016

[18] https://ops.fhwa.dot.gov/publications/managelanes_primer/index.htm

[19] https://www.fhwa.dot.gov/ipd/tolling_and_pricing/defined/demand_mgmt_tool.aspx

[20] https://ops.fhwa.dot.gov/freewaymgmt/hovguidance/glossary.htm

completed in 2021. While these improvements will improve mobility and safety, they will not address the long-term roadway capacity needs for the I-270 corridor. Routine maintenance and safety improvements along I-495 and I-270 are included in the No Build Alternative, but it does not include new capacity improvements to I-495 and I-270. Consistent with NEPA requirements, Alternative 1 will be carried forward for further evaluation to serve as a base case for comparing the other alternatives.

B. Alternative 5: 1-Lane, High-Occupancy Toll Managed Lane Network

This alternative consists of adding one HOT managed lane in each direction on I-495 and converting the one existing HOV lane in each direction to a HOT managed lane on I-270. Buses would be permitted to use the managed lanes.

C. Alternative 8: 2-Lane, Express Toll Lane Managed Lanes Network on I-495 and 1-Lane Express Toll Lane and 1-Lane HOV Managed Lane Network on I-270

This alternative consists of adding two ETL managed lanes in each direction on I-495, retaining one existing HOV lane in each direction on I-270, and adding one ETL managed lane in each direction on I-270. Buses would be permitted to use the managed lanes.

D. Alternative 9: 2-Lane, High-Occupancy Toll Managed Lanes Network

This alternative consists of adding two HOT managed lanes in each direction on I-495, converting the one existing HOV lane in each direction on I-270 to a HOT managed lane, and adding one HOT managed lane in each direction on I-270, resulting in a two-lane, managed lane network on both highways. Buses would be permitted to use the managed lanes.

E. Alternative 10: 2-Lane, Express Toll Lane Managed Lanes Network and 1-Lane HOV Managed Lane Network on I-270 Only

This alternative consists of adding two ETL managed lanes in each direction on I-495, retaining one existing HOV lane per direction on I-270, and adding two ETL managed lanes in each direction on I-270. Buses would be permitted to use the managed lanes.

F. Alternative 13B: 2-Lane, High-Occupancy Toll Managed Lanes Network on I-495 and HOT Managed Reversible Lanes Network on I-270

This alternative consists of adding two HOT managed lanes in each direction on I-495 and converting the existing HOV lanes in both directions to two HOT managed, reversible lanes on I-270. Buses would be permitted to use the managed lanes.

G. Alternative 13C: 2-Lane, ETL Managed Lanes Network on I-495 and ETL Managed, Reversible Lanes Network and 1-Lane HOV Managed Lane Network on I-270

This alternative consists of adding two ETL managed lanes in each direction on I-495 and retaining the existing HOV lanes in both directions and adding two ETL managed, reversible lanes on I-270. Alternative 13C would maintain the existing roadway network on I-270 with HOV lanes to allow for free HOV travel while adding two managed, reversible lanes. Buses would be permitted to use the managed lanes.

H. Consideration of Alternative 9M

The analysis for the Screened Alternatives summarized above was completed in Spring of 2019 and reflects information available to MDOT SHA at that time. As the Study progressed through the NEPA process, the project team obtained comments as a result of cooperating agency coordination. As a result of this continued effort, MDOT SHA and FHWA have evaluated an additional alternative for the Study known as Alternative 9M. Alternative 9M is considered a blend of two Screened Alternatives, Alternative 5 (one-lane HOT) and Alternative 9 (two-lane HOT).

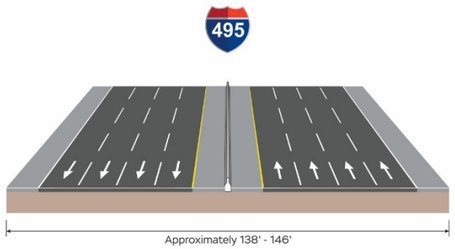
Alternative 9M has the same LOD as Alternative 9 along I-495 from south of the George Washington Memorial Parkway in Virginia to the I-270 West Spur and from the I-95 interchange to west of MD 5 as well as along I-270 from I-495 to I-370. Alternative 9M has the same LOD as Alternative 5 along I-495 from I-270 West Spur to the I-95 interchange. Alternative 9M includes the same build elements as the other Screened Alternatives including direct access locations and interchange improvements.

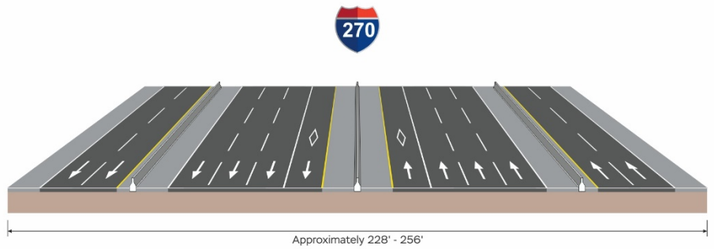
Because Alternative 9M is a blend of Alternatives 9 and 5, the environmental impacts associated with Alternative 9M are covered in this Technical Report. Specific impacts associated with Alternative 9M have been quantified and are shown in the DEIS for comparison with the other Build Alternatives. Any differences in the quantity or intensity of impacts between Alternative 9M and other alternatives are noted either in tables or text in the DEIS.

Figure 1-2: Typical Sections of Alternatives Considered

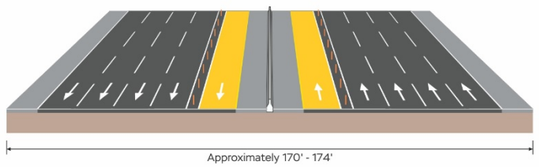
SCREENED ALTERNATIVES

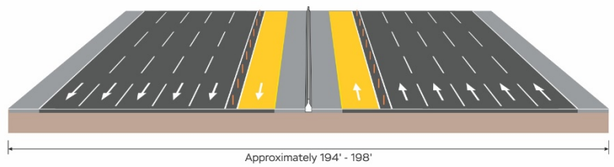
1 **No Build (Existing):**
All projects in Constrained Long-Range Plan (CLRP) (including I-270 Innovative Congestion Management (ICM) improvements)



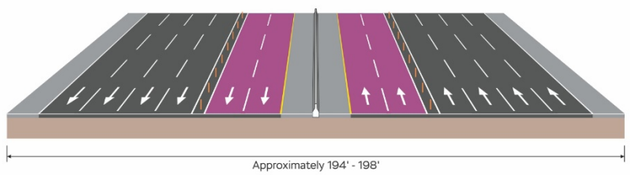


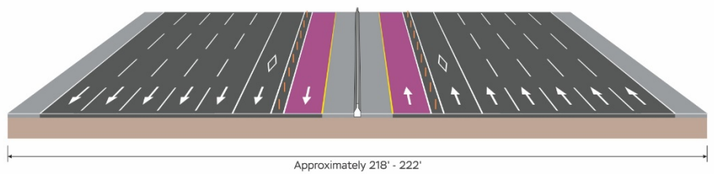
5 **1-Lane, HOT Managed Lane Network:**
Add one HOT managed lane in each direction **on I-495** and convert one existing HOV lane in each direction to a HOT managed lane **on I-270**



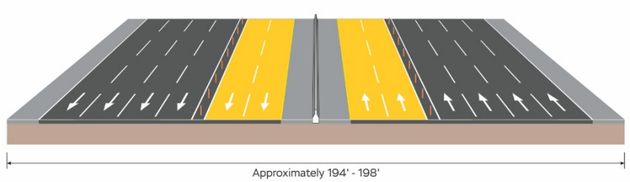


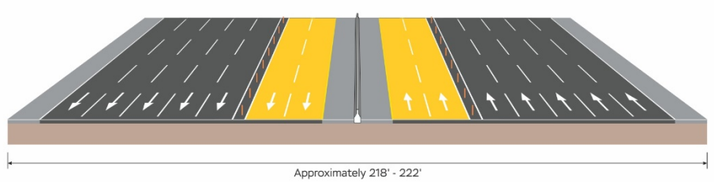
8 **2-Lane, ETL Managed Lanes Network on I-495, 1-Lane ETL and 1-Lane HOV Managed Lane network on I-270 only**
Add two ETL managed lanes in each direction **on I-495** and add one ETL managed lane and retain one HOV lane in each direction **on I-270**





9 **2-Lane, HOT Managed Lane Network:**
Add two HOT managed lanes in each direction **on I-495** and convert one existing HOV lane to a HOT managed lane and add one HOT managed lane in each direction **on I-270**





Legend
New HOT Managed Lanes
New ETL Managed Lanes
* **Note:** Managed Lanes Could Include Buses

NOT TO SCALE

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

SCREENED ALTERNATIVES

10

2-Lane, ETL Managed Lane Network and 1-Lane HOV Managed Lane Network on I-270 only

Add two ETL managed lanes in each direction **on I-495 and on I-270** and retain one existing HOV lane in each direction **on I-270 only**

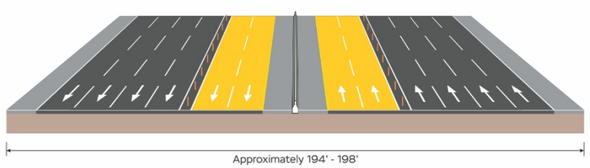


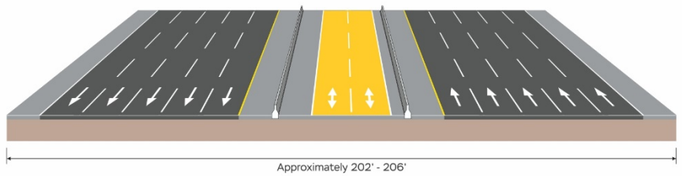


13B

2-Lane, HOT Managed Lane Network on I-495; HOT Managed, Reversible Lane Network on I-270:

Add two HOT managed lanes in each direction on I-495 and convert existing HOV lanes to two HOT managed reversible lanes **on I-270** while maintaining GP lanes

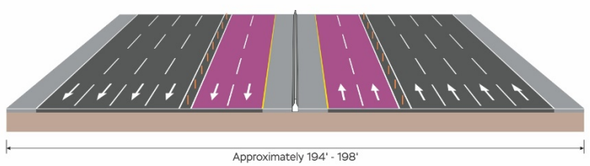


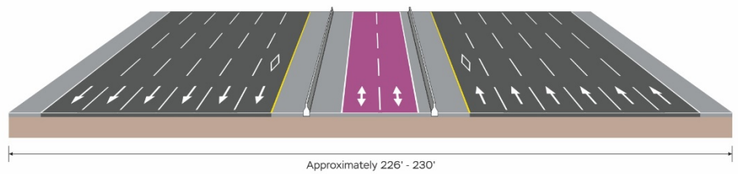


13C

2-Lane, ETL Managed Lane Network on I-495; ETL Managed, Reversible Lane Network and 1-Lane HOV Managed Lane Network on I-270

Add two ETL managed lanes in each direction on I-495, maintain existing HOV managed lanes on I-270 and add two reversible ETL managed lanes on I-270





Legend

- New HOT Managed Lanes
- New ETL Managed Lanes

* **Note:** Managed Lanes Could Include Buses

NOT TO SCALE

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

1.5 Highway Noise Fundamentals

The assessment of highway noise impacts distinguishes between the concepts of "sound" and "noise." When an object moves, sound is created. The movements cause vibrations of the molecules in air to move in waves like ripples on water. Sound is heard when the vibrations reach a person's ears. By contrast, noise is defined by the FHWA as unwanted sound. It represents the unpleasant, unwanted sounds generated on streets and highways.

The level of highway traffic noise depends primarily on the following three factors:

- traffic volume;
- traffic speed; and
- the number of trucks in the flow of traffic.

Generally, the loudness of traffic noise increases with heavier traffic volumes, higher speeds, and greater numbers of trucks. Vehicle noise is a combination of the noises produced by the engine, exhaust, and tires. The FHWA has established the following vehicle categories to use in traffic noise analyses:

- Automobiles - vehicles with two axles and four tires;
- Medium trucks - all cargo vehicles with two axles and six tires;
- Heavy trucks - all cargo vehicles with three or more axles;
- Buses - all vehicles designed to carry more than nine passengers; and
- Motorcycles - all vehicles with two or three tires and an open-air driver/passenger compartment

Noise levels are also affected by distance from the noise source, terrain between the noise source and receptor, and vegetation and other natural or manmade obstacles between the noise source and receptor.

The decibel (dB) is the basic unit of sound measurement. Decibels are units that represent relative acoustic energy intensities. Because the range of energy found throughout the spectrum of normal hearing is so wide, the numbers necessary to define these levels must represent huge variations of energy. To compensate for this wide range of numbers, a base 10 logarithmic scale is used to make the numbers more understandable.

According to the Federal Highway Administration's *Highway Traffic Noise Analysis and Abatement Guidance*, sound level changes between 2 and 3 decibels are barely perceptible if the sounds are of similar character, while a change of 5 decibels is readily noticeable by most people. Because decibels are measured on a logarithmic scale, a 10 decibel increase is generally perceived as a doubling of loudness (a sound level of 70 is twice as loud to the listener as a level of 60). Conversely, the loudness is perceived to be reduced by approximately one-half when a sound level is reduced by approximately 10 decibels.

Table 1-1 provides examples of common outdoor noise levels, their respective noise level decibels, and correlating indoor noise level examples.

Table 1-1: Common Outdoor and Indoor Noise Levels

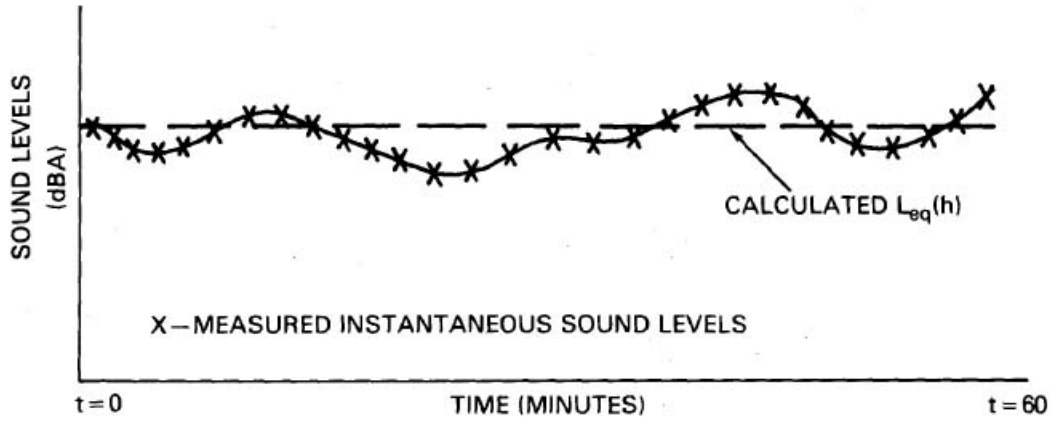
Common Outdoor Noise Example	Noise Level (decibels)	Common Indoor Noise Example
	110	Rock Band
Jet Flyover at 1,000 feet	100	Inside Subway Train
Gas Lawn Mower at 3 feet		
Diesel Truck at 50 feet	90	Food Blender at 3 feet
Noisy Urban Daytime	80	Garbage Disposal at 3 feet, Shouting at 3 feet
Gas Lawn Mower at 100 feet	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher, Next Room
Quiet Urban Nighttime	40	Small Theater, Large Conference Room (background)
Quiet Suburban Nighttime		Library
	30	
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast and Recording Studio
	10	Threshold of Hearing
	0	

Adapted from Guide on Evaluation and Attenuation of Traffic Noise. AASHTO. 1974

People respond differently to sound energy in varying acoustic frequency ranges. Sounds heard in the environment usually consist of a range of frequencies, each at a different level. The method of correlating human response to equivalent sound pressure levels at different frequencies is called weighting. The weighting system used to correlate human hearing to frequency response is the A-weighting scale and the resultant sound pressure level is called A-weighted sound pressure level. This is generally abbreviated by the expression dB(A). The A-weighted decibel scale dB(A) is generally used in assessing highway noise exposure because this scale closely approximates the frequency response of the human ear.

The A-weighted equivalent sound level ($L_{eq(h)}$ or Leq) is the descriptor used most frequently in highway noise analyses. The Leq is the equivalent steady-state sound level, which represents the mean energy of sound intensity level for a given time period. This is the descriptor that will be used in this highway noise analysis. The concept of the Leq is illustrated in **Figure 1-3** below.

Figure 1-3: Sound Level Versus Time



Source: http://www.fhwa.dot.gov/environment/noise/construction_noise/special_report/hcn02.cfm

1.6 Noise Abatement Criteria

FHWA guidelines require that States define impact criteria that are at least one dB(A) less than the Noise Abatement Criteria (NAC) in the Code of Federal Regulations, based upon the identified type of activity or land use. **Table 1-2** shows MDOT SHA's Noise Impact Levels, which are based off of the NAC; MDOT SHA's levels are set 1 dB(A) less than the NAC. The majority of Noise Sensitive Areas (NSAs) that MDOT SHA evaluates fall within Activity Categories B and C. This typically includes ground level outdoor living spaces where frequent human use typically occurs but may also include the evaluation of upper floors in certain instances. Activity Category B noise sensitive receptors are defined exclusively as residences. Category C noise sensitive receptors consist of non-residential land uses not specifically covered in Category A or B, as defined in **Table 1-2**.

Table 1-2: Noise Abatement Criteria (NAC) [Hourly A-Weighted Sound Level in Decibels dB(A)]

Activity Category	Activity Criteria[1] Leq(h)[2]	MDOT SHA Approach Criteria	Evaluation Location	Description of Activity Category
A	57	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	66	Exterior	Residential
C	67	66	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare 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	51	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[3]	72	71	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

1. *The Leq(h) Activity Criteria values are for impact determination only and are not design standards for noise abatement measures.*
2. *The equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period, with Leq(h) being the hourly value of Leq.*
3. *Includes undeveloped lands permitted for this activity category.*

According to MDOT SHA's *Highway Noise Abatement Planning and Engineering Guidelines* (2020), for a Type I project an impact is identified when design year noise levels are projected to approach or exceed the appropriate NAC for each land use, or when projected noise levels are anticipated to increase substantially (10 dBA) over existing year noise.

The MDOT SHA approach criteria for a Category D area is 51 dB(A). However, this equates to a different exterior impact criteria depending on the building type and window condition. **Table 1-3** lists the building noise reduction factors used to estimate interior highway traffic noise impacts for Land Use Activity Category D areas.

Table 1-3: Building Noise Reduction Factors for Estimating Interior Impacts for Category D

Exterior Evaluation	Leq(h) [dB(A)]	86	76		71	61
Interior Evaluation	Building Type	Masonry		Light Frame		All
	Window Condition	Double Glazed	Single Glazed	Storm Window	Ordinary Sash (closed)	Open
	Noise Reduction Due to Structure Exterior (dB)	35	25		20	10
	Leq(h) [dB(A)]	(51)	(51)		(51)	(51)

- *Adapted from Table 6 of report FHWA-HEP-10-025, Highway Traffic Noise: Analysis and Abatement Guidance. FHWA. 2011*
- *The windows shall be considered open unless there is firm knowledge that the windows are in fact kept closed almost every day of the year.*

Building noise reduction factors are discussed as appropriate in the NSA descriptions located in **Section 2**.

1.7 Noise Technical Analysis Approach

MDOT SHA evaluates highway noise in two separate categories, Type I and Type II. A Type I Study is performed when new highways are constructed or existing highways are expanded. A Type II analysis is performed along existing highways independent of improvements. The I-495 & I-270 Managed Lanes Study includes the physical alteration of an existing highway with both substantial horizontal and vertical modifications, as well as the addition of new through traffic lanes, therefore this Study is classified as a Type I Study as defined in 23 CFR 772.5 (2&3). This report presents the results of the Noise Technical Analysis. I-495, I-270, I-95, MD 295, and George Washington Parkway are the dominant highway noise sources for all NSAs within the study limits.

At the initiation of the Study, prior noise assessments conducted within the Study's limits were reviewed and considered in concert with MDOT SHA and FHWA. Along I-495, a draft noise analysis was conducted in 2005 for potential improvements to the entire length of I-495 in Maryland, from the Woodrow Wilson Bridge to the American Legion Bridge (ALB). The noise analysis was evaluated under the 1998 MDOT SHA Noise Policy and included: land use determination, NSA layout, ambient noise measurements, TNM validation, existing condition noise modeling, future no-build condition modeling, future build condition modeling, noise impact assessment, noise mitigation evaluation, feasibility and reasonableness of noise mitigation determination, and report documentation. The 2005 project was ultimately put on hold prior to completion of the NEPA process, and the noise analysis report was never finalized beyond a draft stage. The existing land uses and topography remain very similar to the conditions presented within the 2005 study throughout the corridor, therefore a majority of the models and validation results remain valid for the analysis conducted within this Study.

Along I-270, noise validation modeling from I-495 to the proposed Watkins Mill interchange was completed in 2016, in support of the I-270 Innovative Congestion Management Program. For this effort, noise-sensitive land uses were determined along the study corridor in accordance with the 2011 MDOT

SHA Noise Policy, ambient noise measurements were taken, model validation was completed, and a summary report was developed detailing the ambient measurement and validation modeling results.

The FHWA Traffic Noise Model (FHWA TNM®) Version 2.5 has been in use since 2004 and is still the FHWA model of record today. The previous analyses along I-495 and I-270, and associated supporting models/data, were completed using TNM Version 2.5, and there have been no major changes to the configuration of either highway in the intervening years. Therefore, it was decided that these validation models would be the starting point for the completion of the noise analysis for this Study. The study corridor was carefully evaluated to determine whether there have been changes in land use or significant topography modifications that would require a reevaluation of the existing validated models. New model validation was conducted where study limits extended beyond the limits of the older models.

The Virginia Department of Transportation is studying proposed I-95 improvements from Dulles Toll Road to the American Legion Bridge. Additional information on this study can be found at http://www.495northernextension.org. In support of this Study's proposed modifications to I-495 in Virginia, VDOT provided the noise team with their Study's 2018 validated noise models.

The 2005 I-495 noise analysis design-year build alternatives used Level of Service (LOS) C/D border at a speed of 55 MPH as the basis for the modeling of the worst noise hour. This approach is consistent with 23 CFR 772, both before and after the 2011 revision. The 2011 *FHWA Highway Traffic Noise: Analysis and Abatement Guidance* states that the "worst hourly traffic noise impact" occurs at a time when truck volumes and vehicle speeds are the greatest, typically when traffic is free flowing and at or near LOS C conditions. The Managed Lanes Study adopted a similar approach, opting to use LOS C/D traffic volumes at 65 MPH. This approach, using heavy traffic volumes at free-flow speeds, assures that the worst-case noise levels are projected.

At the initiation of the Study, detailed modeling for two potential alternatives was undertaken: one additional lane in each direction, or two additional lanes in each direction. However, as the development of potential alternatives progressed, variations were added to the two initial alternatives. A total of six build alternatives were ultimately retained for Detailed Study. Along I-495, the alternatives remained essentially the same (either one or two additional lanes in each direction). Along I-270, the alternatives differed in both the number and usage of additional lanes. Acoustically, the alternatives only differ based on number of lanes. In order to streamline the analysis process, MDOT SHA proposed to continue detailed modeling on the original two build alternatives and create simplified models to determine the acoustical differences between additional alternatives (generally found to be less than one decibel). This value was then added/subtracted, as appropriate, to all critical sensitive noise receptor results from the detailed models, to determine the community noise impacts for each non-detailed alternative. During a January 8, 2019 meeting, FHWA agreed that if alternatives being considered are very similar in their design that it would not be necessary to do detailed modeling analysis of each one to determine the relative change in noise levels or noise impacts from those alternatives. Several alternatives within this study have identical cross sections where the only difference is the classification of the lanes and the traffic distribution across the lanes, therefore these alternatives would generate nearly identical noise results. For this preliminary analysis in locations where similar alternatives are proposed, only one alternative has been analyzed in detail as a representative for each of these similar alternatives. The preliminary access locations were

included in this noise analysis. Modifications to the managed lane access points following input from the Counties will be considered in the updated noise analysis in support of the FEIS/ROD.

To maintain consistency with previous studies, the Study was broken down into distinctive corridor zones: I-495 (Capital Beltway) in Maryland and Virginia; I-270 including the spurs; I-95; and MD 295.

1.7.1 I-495 (Capital Beltway) – Maryland and Virginia

The 2005 Analysis of I-495 in Maryland was divided into four distinct phases. The Managed Lanes Study opted to retain the NSA numbering used in the 2005 study in order to maintain consistency between the past and current analyses. There are 88 total NSAs along I-495 in Maryland.

The corridor Study area extends across the American Legion Bridge to the George Washington Memorial Parkway in Virginia to tie the proposed widening into VDOT's I-495 Express Lanes Northern Extension Study. Within Virginia, the Study area was divided into four NSAs, for a total of 92 NSAs for the entire I-495 corridor.

Of the 92 total NSAs along I-495, 80 of them are primarily Activity Category B, and 12 are primarily Activity Category C. The NSAs also include areas that fall into Activity Categories D and E.

1.7.2 I-270 (Dwight D. Eisenhower Memorial Highway)

The 2016 validation study of I-270 divided into three regions:

- Region A: I-495 to south of Tuckerman Lane
- Region B: south of Tuckerman Lane to MD 28
- Region C: MD 28 to north of I-370

The NSAs along I-270 are primarily Activity Category B, as defined in **Table 1-2**; however non-residential areas are also included. The NSA shapes have been defined to capture all of the land uses between major roadway intersections, and as such many of the NSAs include uses that fall into several activity categories.

Of the 37 total NSAs along I-270, 26 of them are primarily Activity Category B, seven are primarily Activity Category C, one is primarily Activity Category D, and three of them are primarily Activity Category E.

1.7.3 I-95 and MD 295 Interchanges

The Study requires modifications to the ramps at the I-95 and MD 295 interchanges, therefore noise testing and modeling was extended along I-95 and MD 295. Two NSAs at each interchange have been identified for a total of four NSAs. The NSA shapes have been defined to capture all of the land uses between major roadway intersections, and as such each NSA includes uses that fall into both Activity Category B and C, as defined in **Table 1-2**.

2

2 MEASUREMENTS AND TNM MODEL VALIDATION

2.1 Introduction

This section separates the different land uses within the study limits into noise sensitive and non-noise sensitive areas, discusses the noise measurements that were collected for the Study, and documents the validation results of the noise prediction modeling. Generally, land use areas that fall within 500' of the edge of the proposed roadway have been identified within each NSA and the TNM model has been validated to this distance. Appendix A includes information on the input used for the TNM model validation, impact analysis and barrier analysis.

2.2 I-495 (Capital Beltway)

2.2.1 Land Uses

The areas of different land use along I-495 have been combined into a single NSA since they are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features. Additionally, grouping them together assists in evaluating mitigation, as one barrier would be analyzed for the NSA, and not just each land use. A description of each NSA is listed below. Any distance references given are relative to the edge of the existing near roadway shoulder, unless otherwise noted.

A. Noise-Sensitive Areas

Residential NSAs include single-family residences, single-family attached residences (townhouses), and multi-family residences (condominiums and apartments), located in neighborhoods adjacent to the Capital Beltway. Non-residential NSAs include recreation areas, playgrounds, active sports areas, parks, schools, places of worship, motels, hotels, libraries, and hospitals located adjacent to the Capital Beltway.

The noise study area for the Maryland portion of the Capital Beltway is divided into eighty-eight (88) separate NSAs. The following describes each NSA.

NSA 1-01

Consists of single-family residences of the Glengarry neighborhood along MacArthur Boulevard and Tammy Court and a portion of the Congressional Country Club and Golf Course. Only one hole at the golf course runs adjacent to I-495. The receptors are 130 feet to 930 feet from the edge of the southbound I-495 shoulder. The area is along the outer loop of I-495 from Clara Barton Parkway to Persimmon Tree Road.

NSA 1-02

Consists of single-family residences along Carlynn Drive and Carlynn Court of the Congressional Country Club Estates neighborhood. The receptors are 90 feet to 680 feet from the edge of the northbound I-495 shoulder. The area is along the inner loop of I-495 from MacArthur Boulevard to Persimmon Tree Road.

NSA 1-03

Consists of single-family residences along Stone Trail Drive and Hamilton Spring Road of the Carderock Springs neighborhood, and the Carderock Springs Elementary School. Outdoor activities at the elementary school include a ball field, several playgrounds, and basketball courts. The outdoor land uses are all located on the highway side of the school and are therefore not shielded from highway noise by the building. The receptors are 80 feet to 750 feet from the edge of the southbound I-495 shoulder. The area is along the outer loop of I-495 from Persimmon Tree Road to approximately 2,200 feet east of Persimmon Tree Road.

NSA 1-04

Consists of single-family residences along the Tomlinson Avenue, Osage Lane, and Cypress Grove Lane in the Evergreen neighborhood and Seven Locks Park (recreational). Outdoor activities at the park include tennis courts, a soccer field, playground, basketball courts, and two swimming pools. The park is located behind two rows of residences. The receptors are 110 feet to 1100 feet from the edge of the northbound I-495 shoulder. The area is along the inner loop of I-495 from Persimmon Tree Road to Seven Locks Road.

NSA 1-05

Consists of single-family residences along Royal Dominion Drive, Pepperell Drive, and Pepperell Court of the Al Marah neighborhood and part of Booze Creek Park (passive recreational). The receptors are 210 feet to 1,010 feet from the edge of the northbound I-495 shoulder. The area is along the inner loop of I-495 from Cabin John Parkway to River Road.

NSA 1-06

Consists of single-family residences along Seven Locks Road, and townhouses along River Quarry Place and Quarry Manor Terrace of the Seven Locks Hills neighborhood. The receptors are 210 feet to 1,110 feet from the edge of the southbound I-495 shoulder. The area is along the outer loop of I-495 from River Road to approximately 1,300 feet north of River Road.

NSA 1-07 (NSA 5-37)

Consists of townhouses and athletic (tennis) facilities within Bethesda Country Club. The receptors are 100 feet to 440 feet from the edge of the southbound I-495 shoulder. The area is along the outer loop of I-495 from Bradley Boulevard to the I-270 split, approximately 1,400 feet north of Bradley Boulevard. This NSA has been evaluated as part of I-270, and re-designated as NSA 5-37.

NSA 1-08

Consists of single-family residences along Fernwood Road in the Tuscullum neighborhood and a private swim club (Old Georgetown Club Inc). Outdoor activities at the club include a swimming pool and tennis courts. The receptors are 130 feet to 990 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from 850 feet west of Fernwood Road to Fernwood Road.

NSA 1-09

Consists of single-family residences along Kingswood Road, Raleigh Tavern Court, and Dickens Avenue of the North Bethesda Grove neighborhood, the Renewable Natural Resources Foundation (no outdoor noise sensitive areas), and Fleming Park (recreational). Outdoor activities at the park include a ballfield, playground, and tennis courts. The receptors are 120 feet to 630 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from approximately 1,300 feet east of Old Georgetown Road to I-270.

NSA 1-10

Consists of assisted-living facility (Maplewood Park Place), townhouses along Maplewood Park Drive, Maplewood Park Place, Maplewood Park Court, Barrister Court, and Whitley Park Terrace, apartments, condominium (The Promenade) and hotel (Bethesda Marriot) in the Maplewood Park and Pook's Hill neighborhoods. The receptors are 80 feet to 810 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from Old Georgetown Road to I-270.

NSA 1-11

Consists of townhouses along King Charles Way, and single-family residences along Parkwood Terrace, Franklin Street, and Parkwood Drive in the Grosvenor and Parkwood neighborhoods, and part of Rock Creek Park (recreational). The receptors are 100 to 1,190 from the edge of the westbound I-495 shoulder. The area is located along the outer loop of I-495 from (east spur) I-270 to Cedar Lane.

NSA 1-12

Consists of single-family homes along Broad Brook Drive, Elmhirst Parkway, and West Parkhill Drive in the Locust Hill Estates neighborhood, and part of Rock Creek Park (recreational). The receptors are 190 feet to 640 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from approximately 800 feet northwest of Cedar Lane to Cedar Lane.

NSA 1-13

Consists of single-family residences along Culver Street, Bramber Street, and Carriage Drive in the Rock Creek Highlands and Byeford Knolls neighborhoods, Cedar Lane Unitarian Church and part of Rock Creek Park, which includes a paved walking path. The receptors are 380 feet to 1250 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from Cedar Lane to Connecticut Avenue.

NSA 1-14

Contains single-family residences along Raymoor Road, Hill Street, La Duke Drive, and Campbell Drive in the Rock Creek Hills neighborhood and part of Rock Creek Park. The receptors are 110 feet to 1,270 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop from Connecticut Avenue to Seminary Road.

NSA 1-15

Consists of two places of worship: Eglise Baptiste Du Calvaire and The Hindu Temple of Metropolitan Washington. Neither facility appears to have outdoor use. The NSA also includes single-family homes along Vireo Street, Killdeer Avenue, Phoebe Lane, Geranium Avenue, and Floral Drive in the Adelphi Forest community, and Knollwood Park (recreational). The receptors are 200 feet to 800 feet from the edge of

the westbound I-495 shoulder. The area is along the outer loop in the northwest quadrant of the I-495/I-95 interchange, beginning approximately 500 feet west of Riggs Road.

NSA 1-16

Consists of single-family residences along Tuckahoe Lane, Muskogee Street, Custer Terrace, Lackawanna Place, Lackawanna Street, and Muskogee Place in the White Oak Manor neighborhood. The receptors are 70 feet to 1020 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop in the southwest quadrant of the I-495/I-95 interchange, beginning at Riggs Road.

NSA 1-17

Consists of the Cherry Hill Park campgrounds along Appalachian Trail, Arctic Court, Yosemite Lane, Yukon Terrace, Carter Lake Vista, and Carlsbed Cove in the northeast quadrant of the I-495/I-95 interchange. The receptors are 270 feet to 990 feet from the edge of the westbound I-95/495 shoulder. The area is along the outer loop in the northeast quadrant of the I-495/I-95 interchange, ending at Cherry Hill Road.

NSA 1-18

Consists of single-family residences along Park Drive and 47th Avenue and apartment buildings along Cherry Hill Road in the Cherry Hill and Seven Springs neighborhoods, Cherry Hill Road Community Park, and the Knight's of Columbus property which includes an outdoor pool. The outdoor usage area at the Knight's of Columbus property are all located behind the building, and are also located down a slope which provides additional protection, and therefore are not impacted. Also, the east side of the area is a commercial-retail center. The receptors are 170 feet to 1,010 feet from the edge of the eastbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from approximately 900 feet west of Cherry Hill Road to Baltimore Boulevard.

NSA 1-19

This NSA has been re-designated as NSA 3-18.

NSA 1-20

Consists of rental apartments and townhouses along Edmonston Road, Springhill Drive, and Spamhill Court in the Spring Hill Lake neighborhood. The receptors are 70 feet to 990 feet from the edge of the southbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from Cherrywood Lane to Kenilworth Avenue.

NSA 1-21

Consists of townhouses along Belle Point Drive, Damsel Court, Vanity Fair Drive, and Lady Anne Court in the Charlestown North and Belle Point neighborhoods, and professional offices (not noise sensitive). The receptors are 150 feet to 740 feet from the edge of the northbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 from Kenilworth Avenue to Greenbelt Road.

NSA 1-22

This NSA is located within Greenbelt Park. Outdoor activities within the park include picnic areas, trails and an athletic field. The receptors are 240 feet to 1230 feet from the edge of the southbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from Greenbelt Road to the Baltimore Washington

Parkway. The closest noise sensitive land use to the beltway is the Holly Picnic Area which is located approximately 450 feet from the edge of the roadway.

NSA 1-23

Consists of townhouses, condominiums and apartments along Hanover Parkway, Village Park Drive, and Lake Parke Drive in the Hunting Ridge and Greenbelt Lake Village neighborhoods, a commercial area that includes a Holiday Inn Hotel with an outdoor pool, and a private childcare center that includes outdoor athletic fields. The receptors are 100 feet to 1320 feet from the edge of the northbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 from approximately 1,000 feet southeast of the Baltimore Washington Parkway to Good Luck Road.

NSA 1-24

Consists of the Greenbelt Park along the inner loop of I-495/I-95 from the Baltimore Washington Parkway to approximately 2,000 feet southeast of the Baltimore Washington Parkway. There are no apparent outdoor activities present within this NSA. The receptors are 720 feet and 280 from the edge of the southbound I-495/I-95 shoulder respectively. There is no apparent public use in this area.

NSA 1-25

Consists of single-family residences along Priscilla Court in the Princess Gardens neighborhood. The receptors are 170 feet to 2000 feet from the edge of the northbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 from approximately 1,700 feet southeast of Good Luck Road to 3200 feet southeast of Good Luck Road.

NSA 1-26

Consists of single-family townhomes along Campus Way South, and single-family residences along Patrician Lane, Pritchard Lane, Castlewood Drive, Carriage House Lane, New Orchard Drive, Merikem Lane, and Vermell Place in the Rambling Hills neighborhood and part of Southwest Branch Park. The receptors are 100 feet to 1,020 feet from the edge of the northbound I-95 shoulder. The area is along the outer loop of I-495 from Central Avenue to approximately 2000 feet south of Ritchie Marlboro Road.

NSA 1-27

Consists of single-family residences along South Forest Edge Road, North Forest Edge Road, and Cranston Boulevard and small businesses in the Forestville community (not noise sensitive). The receptors are 50 feet to 850 feet from the edge of the southbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from approximately 1,300 feet northeast of Pennsylvania Avenue to Pennsylvania Avenue.

NSA 1-28

Consists of single-family residences along Pickett Drive, Lou Lane, and Pickett Court, and apartment buildings along Forestville Road and Rena Road in the Morningside community, and Douglas Patterson Park. Outdoor activities at the park include a basketball court, tennis courts, a playground and picnic area, and athletic fields. The receptors are 110 feet to 960 feet from the edge of the westbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from Forestville Road to Suitland Road.

NSA 1-29

Consists of single-family residences along Mckeldin Drive, Walton Avenue, and Bridgeport Drive in the Morningside community. The receptors are 140 feet to 780 feet from the edge of the westbound I-495/I-95 shoulder. The neighborhood is along the inner loop of I-495/I-95 from Suitland Road to approximately 1,300 feet east of Auth Road.

NSA 1-32

Consists of apartments in Oxon Hill Village. The receptors are 130 feet to 800 feet from the edge of the westbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from St. Barnabas Road to approximately 1,000 feet west of St. Barnabas Road.

NSA 1-33

Consists of single-family residences along Whitfield Chapel Road and Jenna Court in the Whitfield West neighborhood, and Whitfield Community Park. Outdoor activities at the park include a playground, picnic areas, and ballfields. The receptors are 110 feet to 1270 feet from the edge of the northbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 directly north of US 50.

NSA 1-34

Consists of the Manchester Estates neighborhood. Existing single-family residences along Manchester Drive and Ridgecroft Drive are 330 feet to 1130 feet from the edge of the eastbound I-495/I-95 shoulder. Between the highway and the existing residences is undeveloped land comprised of dense, mature woods. The area is along the outer loop of I-495/I-95 from approximately 1,500 feet west of Auth Road to Branch Avenue. A barrier at this location is not feasible due to the topography and flanking noise coming from MD-5. and distance between the receptors and the roadway.

NSA 1-35

Consists of single-family residences along Hedin Drive and Arbor Hill Drive in the Oakview neighborhood, Brookview Park, and Roscoe Nix Elementary School. Outdoor activities at the school include a ballfield, basketball courts, and several playgrounds. The receptors are 150 feet to 980 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from approximately 4200 feet east to 2,000 feet east of New Hampshire Avenue.

NSA 1-36

Consists of single-family homes along Inverness Drive in the North Chevy Chase community. The receptors are 290 feet to 1320 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from Connecticut Avenue to approximately 1,000 feet east of Connecticut Avenue.

NSA 1-37

Consists of single-family townhomes along Westhurst Lane and mobile homes along Baumann Drive, Elmwood Park Street, Dogwood Park Street, and Elmwood Park Drive in Fernwood Mobile Home Park. The receptors are 310 feet to 910 feet from the edge of the northbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 from Ritchie Marlboro Road to approximately 2900 feet south of Ritchie Marlboro Road.

NSA 2-01

Consists of single-family residences along Hamilton Spring Road and Thornley Court of the Carderock Springs neighborhood, and Gibson Grove A.M.E. Zion Church (no outdoor activities). The receptors are 200 feet to 1,000 feet from the edge of the southbound I-495 shoulder. The area is along the outer loop of I-495 from 1,600 feet west of Seven Locks Road to Seven Locks Road.

NSA 2-02

Consists of single-family residences along Arrowood Court, Arrowood Road, Arrowood Terrace, and Kittery Lane in the Arrowood neighborhood and a portion of the Burning Tree Country Club. The receptors are 110 feet to 1,140 feet from the edge of the northbound I-495 shoulder. The area is along the inner loop of I-495 from Burning Tree Country Club to Bradley Boulevard.

NSA 2-03

Consists of single-family residences along Renita Lane, Corkran Lane, Rutley Lane, and Tusculum Road in the Stratton Woods neighborhood and a portion of the WMAL Transmitter property. The receptors are 140 feet to 1,110 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from 1,500' east of Greentree Road to Fernwood Road.

NSA 2-04

Consists of single-family residences along Rockhurst Road, Brixton Lane, Holmhurst Road, Montauk Avenue, De Paul Drive, Ashburton Lane, and Belhaven Road in the Fernwood neighborhood. The receptors are 110 feet to 980 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from Fernwood Road to Old Georgetown Road.

NSA 2-05

Consists of single-family residences along Earlham Drive, Singleton Drive, Singleton Court, Singleton Place, Hollins Drive, Wadsworth Drive, Bulls Run Parkway, and Kingsford Road in the Ashburton neighborhood. The receptors are 90 feet to 960 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from Fernwood Road to Old Georgetown Road.

NSA 2-06

Consists of single-family residences along Ipswich Road and Broad Street in the Alta Vista Gardens neighborhood. The receptors are 180 feet to 830 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from Old Georgetown Road to approximately 250 feet east of Old Georgetown Road.

NSA 2-07

Consists of single-family residences along Bellevue Drive and Elsmere Avenue in the Locust Hill Estates neighborhood, and part of Rock Creek Park. The receptors are 90 feet to 1,050 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from Rockville Pike to approximately 800 feet west of Cedar Lane.

NSA 2-08

Consists of single-family residences along East Parkhill Drive, Parkhill Terrace, Avamere Street, Gretna Street, and Traymore Street in the Parkview Estates neighborhood, and part of Rock Creek Park. The

receptors are 100 feet to 1,190 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from Cedar Lane to the National Naval Medical Center.

NSA 2-09

Consists of single-family residences along Faircastle Drive, Glenmoor Drive, Clifford Avenue, and Spring Hill Lane in the North Chevy Chase community and Park View Estates neighborhood, and part of Rock Creek Park. The receptors are 130 feet to 1100 feet from the edge of the eastbound I-495 shoulder. The neighborhood is along the inner loop of I-495 from Kensington Parkway to approximately 2,000 feet east of Kensington Parkway.

NSA 2-10

Consists of single-family residences along Gwyndale Drive, Westview Drive, Westview Terrace, Riley Road, Hale Place, and Landsdowne Way in the Montgomery Hills neighborhood. The receptors are 90 feet to 860 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from the MARC railroad tracks to Georgia Avenue.

NSA 2-11

Consists of single-family residences along Forest Glen Road, Coleridge Drive, Ellis Street, Belvedere Place, and Elkton Avenue in the Forest Glen community, and Forest Glen Park. The receptors are 40 feet to 1110 feet from the edge of the westbound I-495 shoulder. The area is located along the outer loop of I-495 from approximately 700 feet east of Seminary Road to Georgia Avenue.

NSA 2-12

Consists of single-family homes along Forest Glen Road, Tenbrook Drive, Sidney Road, Portland Road, Renfrew Road, Dallas Avenue, Sutherland Road, and Lorain Avenue in the Sunset Terrace neighborhood, Argyle Park, and the Siena School. The receptors are 80 feet to 870 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from Sligo Creek Parkway to Colesville Road.

NSA 2-13

Consists of single-family residences along Dallas Avenue, Bristol Avenue, Guilford Street, Grayson Avenue, Lorain Avenue, Granville Drive, and Sutherland Road located within the North Hills of Sligo Park neighborhood. The receptors are 70 feet to 640 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from Dallas Avenue to Colesville Road.

NSA 2-14

Contains single-family residences along Shorey Road, Granville Drive, Fairway Avenue, Lawson Place, Lawndale Drive, Marshall Avenue, and Evergreen Street in the Indian Springs neighborhood, Indian Springs Terrace Park, and YMCA. Outdoor activities present at the park include a basketball court, playground, pavilion, and tennis courts. Outdoor activities present at the YMCA include athletic fields, a swimming pool, and tennis courts. The receptors are 130 feet to 900 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from Colesville Road to University Boulevard.

NSA 2-15

Consists of single-family residences along Nassau Lane, Cherry Tree Lane, and Waterford Road in the Indian Springs Village neighborhood, and part of the Northwest Branch Park. The receptors are 120 feet

to 1000 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop from University Boulevard to Northwest Branch Park.

NSA 2-16

Consists of single-family residences along Merwood Lane, East Indian Spring Drive, and McAlpine Road in the Franklin Knolls neighborhood. The receptors are 120 feet to 970 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop from University Boulevard to Northwest Branch Park.

NSA 2-17

Consists of single-family residences along Cresthaven Drive and Devere Drive in the Hillandale Heights neighborhood, and part of the Northwest Branch Park. The receptors are 110 feet to 820 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from Northwest Branch Park to approximately 1,800 feet west of New Hampshire Avenue.

NSA 2-18

Consists of single-family residences along East Light Drive, Dilston Road, Cottrell Terrace, Moffet Road, and Braddock Road in the Oakview neighborhood, and part of Brookview Park. The receptors are 150 feet to 750 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from approximately 2300 feet west of New Hampshire Avenue to New Hampshire Avenue.

NSA 2-19

Consists of single-family residences along Elton Road, Wooded Way, and Wooded Court in the Hillandale Forest neighborhood, and part of the Hillandale Shopping Center. The receptors are 110 feet to 750 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from approximately 700 feet east of New Hampshire Avenue to approximately 600 feet west of Riggs Road.

NSA 2-20

Consists of single-family residences along Avenel Road, Laconia Drive, Muskogee Street, 22nd Avenue, 23rd Avenue, 24th Avenue, and Mistletoe Place and apartments along Mount Pisgah Road and Hampshire Green Lane in the Holly Hill Manor and Château neighborhoods. The receptors are 90 feet to 940 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from New Hampshire Avenue to Riggs Road.

NSA 2-21

Consists of single-family residences along Niagara Road and Nantucket Road in the College Park community. The receptors are 70 feet to 800 feet from the edge of the eastbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from Baltimore Avenue to Rhode Island Avenue.

NSA 2-22

Consists of single-family residences along Ontario Road, Niagara Road, Nantucket Road and 51st Street in the Hollywood neighborhood. The receptors are 100 feet to 480 feet from the edge of the eastbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from Rhode Island Avenue to 1,300 feet east of Rhode Island Avenue.

NSA 2-23

Consists of single-family residences along Odessa Road, 51st Street, and 52nd Street in the Sunnyside neighborhood. The receptors are 60 feet to 810 feet from the edge of the westbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 from Rhode Island Avenue to approximately 1,000 feet east of Rhode Island Avenue.

NSA 2-24

Consists of single-family residences along Kepner Court, Nashville Court, Nashville Road, Lamont Drive, Wilhelm Drive, Graylynn Drive, and Cathedral Avenue in the Good Luck Estates neighborhood, Good Luck Estates Neighborhood Park which includes tennis courts and an athletic field, and New Carrollton Bible Church (includes a playground and grounds for outdoor events). The receptors are 80 feet to 900 feet from the edge of the southbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from Greenbelt Park to Good Luck Road.

NSA 2-25

Consists of single-family residences along Midra Drive, Edgerton Drive, Desen Drive, Tiffany Lane, Seta Drive, Tiffany Court, and Brays Street in the Dresden Green neighborhood. The receptors are 70 feet to 650 feet from the edge of the northbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 from Good Luck Road to 1800 feet southeast of Good Luck Road.

NSA 2-26

Consists of single-family residences along Caswell Place, 86th Avenue, 86th Court, Carrollton Parkway, 87th Avenue, Fremont Street, Preston Street, Powhatan Street, Oliver Street, Oglethorpe Street, Nicholson Street, Madison Street, and Legation Road in the New Carrollton community, and Robert Frost Elementary School, and Carrollton Manor Apartments. Outdoor activities at the school includes playgrounds and athletic fields. The receptors are 50 feet to 740 feet from the edge of the southbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from Good Luck Road to Annapolis Road.

NSA 2-27

Consists of single-family residences along Spring Avenue, 88th Place, 89th Place, and 89th Avenue in the New Carrollton community and Princess Gardens neighborhood, and New Carrollton Community Center (no outdoor uses), Kingdom Hall of Jehovah's Witnesses (no outdoor uses), and Grace Presbyterian Church (no outdoor uses). The receptors are 70 feet to 1,010 feet from the edge of the northbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 from approximately 3,500 feet north of Lanham Severn Road to Lanham Severn Road.

NSA 2-28

Consists of single-family residences along 91st Place, 91st Court, Kinmount Road, Walkerton Drive, and Concept Court in the Whitfield Woods neighborhood. The receptors are 1,470 feet to 3,000 feet from the edge of the westbound US 50 shoulder. The area is along John Hanson Highway (US 50) from Whitfield Chapel Road to approximately 1,500 feet east of Whitfield Chapel Road.

NSA 2-29

Consists of single-family residences along Wallace Road, 91st Place, Varnum Street, Volta Street in the Carsondale neighborhood. The receptors are 870 to 2,300 feet from the edge of the eastbound US 50

shoulder. The area is along John Hanson Highway (US 50) from Whitfield Chapel Road to approximately 1,200 feet east of Whitfield Chapel Road.

NSA 2-30

Consists of single-family residences along Jefferson Street, Ardmore Road, Bold Street, 7th Street, 8th Street, and Glenarden Parkway in the Glenarden community, Springdale Gardens and Tyrol Estates neighborhoods. The receptors are 110 feet to 760 feet from the edge of the northbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 from Martin Luther King Jr. Highway to approximately 1,200 feet south of Glenarden Parkway.

NSA 2-31

Consists of single-family residences along Sterling Street, Amador Drive, 5th Street, 4th Street, 3rd Street, 2nd Street, and Reicher Street and apartments in the Glenarden community and HP Johnson Park. Outdoor activities at the park includes a playground, pavilion, basketball court, athletic fields, and tennis courts. The receptors are 110 feet to 840 feet from the edge of the southbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from Ardwick Ardmore Road to Landover Mall.

NSA 2-32

Consists of single-family residences along Oakland Way, Silver Valley Way, Hill Way, and Vernon Way in the Silver Valley neighborhood, Holiday Inn Express Hotel with an outdoor pool (surrounded by concrete wall), and St. Phillips Church and School (athletic fields and playgrounds). The receptors are 90 feet to 1,110 feet from the edge of the westbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from 1,500 feet west of Auth Road to Branch Avenue.

NSA 3-01

Consists of single-family residences along Seven Locks Road, Cindy Lane, Earl Court, Groton Road, Dwight Drive, Quintana Drive, Carteret Road, Shadywood Road, and Glennon Drive in the Seven Locks Hills, Burning Tree Estates and Rose Hill Estates neighborhoods. The receptors are 40 feet to 1,070 feet from the edge of the southbound I-495 shoulder. The area is along the outer loop of I-495 from 1,300 feet north of River Road to Bradley Boulevard.

NSA 3-02

Consists of single-family residences along Armat Drive, Longwood Drive, and Rainswood Court in the Bradley Manor and Longwood neighborhoods. The receptors are 190 feet to 1,220 feet from the edge of the northbound I-495 shoulder. The area is along the inner loop of I-495 from Bradley Boulevard to Greentree Road.

NSA 3-03 (NSA 5-36)

Consists of single-family residences in the Bradley Manor neighborhood. The receptors are 80 feet to 950 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from I-270 (west spur) to Greentree Road. This NSA has been evaluated as part of I-270, and re-designated as NSA 5-36.

NSA 3-04

Consists of single-family residences along Newbold Place, Newbold Drive, and Newbold Court in the Bradley Manor and Tuscullum neighborhoods. The receptors are 150 feet to 1370 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from Greentree Road to approximately 800 feet west of Fernwood Road.

NSA 3-05

Consists of single-family residences along Woodlawn Road in the North Chevy Chase community, David Fairchild Estate, and North Chevy Chase Park. Outdoor activities at the park include ballfields, swimming pools, and tennis courts. The receptors are 180 feet to 1,300 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from North Chevy Chase Park to Connecticut Avenue.

NSA 3-06

Consists of single-family residences along Park View Road, Forsythe Avenue, Newcastle Avenue, and Stanton Avenue in the Park View Estates and Montgomery Hills neighborhoods, National Park Seminary Historic District at Forest Glen, and part of Rock Creek Park. The receptors are 110 feet to 920 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from approximately 2,000 feet east of Kensington Parkway to the MARC railroad.

NSA 3-07

Consists of single-family residences along Forest Glen Road, Glen Avenue, and Hollow Glen Place in the Forest Glen community. The receptors are 110 feet to 740 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from Seminary Road to approximately 600 feet east of Seminary Road.

NSA 3-08

Consists of single-family residences along Forest Grove Drive, Admiralty Drive, Saxony Road, and Dameron Drive in the Forest Estates neighborhood. The receptors are 130 feet to 910 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from Georgia Avenue to Holy Cross Hospital.

NSA 3-09

Consists of single-family residences along Landsdowne Way, Flora Lane, Flora Court, and Flora Terrace, and part of Sligo Creek Park. The receptors are 80 feet to 850 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from Georgia Avenue to approximately 2,300 feet east of Georgia Avenue.

NSA 3-10

Consists of single-family residences along Ruxton Drive, Saunders Lane, Misty Drive, Cortland Lane, and Timber Lane in the Lanham community. The receptors are 100 feet to 830 feet from the edge of the northbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 from the Amtrak railroad tracks to Whitfield Chapel Park.

NSA 3-11

Consists of single-family residences along Ebenezer Lane, Jefferson Street, and Fairview Avenue in the Carsondale neighborhood. The receptors are 260 feet to 850 feet from the edge of the northbound I-495/I-95 shoulder. The area is located along the outer loop of I-495/I-95 from John Hanson Highway (US 50) to Martin Luther King Jr. Highway.

NSA 3-12

Consists of apartments along Continental Place and Congress Place in the Centennial Village neighborhood. The receptors are 90 feet to 470 feet from the edge of the southbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from approximately 2300 feet south of Arena Drive to approximately 2,000 feet north of Central Avenue.

NSA 3-13

Consists of single-family residences along Carswell Terrace, Medford Avenue, and Gunston Lane, and apartments along Morris Avenue and Maxwell Drive located in the Andrews Manor, Princeton and Manchester Estates neighborhoods, and Beltway Church of Christ (no outdoor uses). The receptors are 110 feet to 1,110 feet from the edge of the eastbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 from approximately 2,000 feet west of Suitland Road to approximately 1,500 feet west of Auth Road.

NSA 3-14

Contains single-family residences along Armand Avenue, Barto Avenue, Bramer Avenue, Delta Lane, and Dublin Drive, and townhouses along Clacton Avenue in the Auth Village and Silver Valley neighborhoods. The receptors are 100 feet to 680 feet from the edge of the westbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from approximately 1,200 feet east to approximately 1,500 feet west of Auth Road.

NSA 3-15

Consists of single-family residences along Keppler Road, Old Branch Avenue, Braddock Road, and Long View Road in the Woodlane neighborhood, and part of Henson Creek Stream Valley Park. The receptors are 60 feet to 1,150 feet from the edge of the westbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from (the ramp from) Branch Avenue to approximately 2,100 feet west of Branch Avenue.

NSA 3-16

Consists of single-family residences along Old Branch Avenue, Yorkfield Drive, Tolson Road, Bentley Road, Acton Road, Keppler Place, Canterbury Way, Straton Road, Corkan Lane, Spring Terrace, Donna Lane, Dogwood Drive, Barry Drive, Fielding Lane, and Church Way in the Yorkshire Village and Temple Terrace neighborhoods, and part of Henson Creek Stream Valley Park. The receptors are 100 feet to 1,150 feet from the edge of the eastbound I-495/I-95 shoulder. The area is along the outer loop of I-495/I-95 from (the ramp to) Branch Avenue to Temple Hill Road.

NSA 3-17

Consists of single-family homes along Duncan Drive and Edgemont Drive in the Knollwood community. The receptors are 200 feet to 1,200 feet from the edge of the westbound I-495 shoulder. The area is along

the outer loop in the northwest quadrant of the I-495/I-95 interchange, beginning approximately 1,800 feet east of Riggs Road.

NSA 3-18

Consists of single-family residences along Niagara Place, 51st Terrace, 52nd Place, 53rd Avenue, and Edgewood Road of the Hollywood neighborhood, and part of Hollywood Park. Outdoor activities at the park include a basketball court, ballfields, and playgrounds. The receptors are 160 feet to 1,040 feet from the edge of the eastbound I-495/I-95 shoulder. The area is along the inner loop of I-495/I-95 from approximately 2,700 feet northwest of the Greenbelt Metro rail line to the Greenbelt Metro rail line.

NSA 4-01

Consists of the Burning Tree Country Club. Five of the holes at the golf course run adjacent to I-495. The receptors are 210 feet to 1,000 feet from the edge of the northbound I-495 shoulder. The area is along the inner loop of I-495 from River Road to approximately 2600 feet north of River Road.

NSA 4-02

Consists of Holy Cross Hospital, and part of Sligo Creek Park. The Holy Cross Hospital has recently added an addition directly adjacent to I-495. This addition was constructed with a specially designed curtain wall to insulate the interior of the building from highway noise. The receptors are 90 feet to 120 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from approximately 1,500 feet east of Georgia Avenue to approximately 300 feet west of Sligo Creek Parkway. A portion of the Sligo Creek Trail is included in this NSA. This area is considered a transient part of the trail and is therefore not an outdoor use of sufficient frequency or duration.

NSA 4-03

Consists of Sligo Creek Golf Course and part of Sligo Creek Park. Three of the holes at the golf course run adjacent to I-495. The receptors are 100 feet to 780 feet from the edge of the eastbound I-495 shoulder. The area is along the inner loop of I-495 from approximately 2,300 feet east of Georgia Avenue to approximately 2,400 feet west of Colesville Road.

NSA 4-04

Consists of the Montgomery Blair High School, which contains outdoor use area, and Silver Spring Fire Company No. 16 (not noise sensitive). The outdoor activities present at the school include a track, basketball courts, tennis courts, ballfields, and athletic fields. The receptors are 110 feet to 600 feet from the edge of the westbound I-495 shoulder. The area is along the outer loop of I-495 from Colesville Road to University Boulevard. There is an existing noise barrier in NSA 4-04.

B. Non-Noise Sensitive Areas

Non-NSAs are also defined by their corresponding FHWA land use activity category. Category F areas are excluded from the Study due to their non-noise-sensitive activity. The Category G land uses consist of non-permitted undeveloped land. Category F and G areas that fall between the delineated noise sensitive areas have not been identified since they require no additional analysis. These areas include: The WMAL Radio Transmitter Site located between NSA 3-03 and NSA 2-03, Greenbelt Metro Station located between NSA 3-18 and NSA 1-20, New Carrollton Metro Station adjacent to NSA 3-10, and the Andrews Air Force

Base adjacent to NSA 1-28. The portion of Andrews Air Force Base adjacent to I-495 is classified as Category F; there are no noise-sensitive land uses present in this area of the base.

2.2.2 Noise Measurement Data

In acoustical studies, measurement of ambient noise levels is used to validate the computer model against field-observed conditions. This ensures the accuracy and reliability of the computer predictions of future noise conditions for the proposed project.

Noise monitoring along I-495 in Maryland was conducted from September 2004 through February 2005. Along I-495, a total of 504 short-term noise measurements of 20-minute duration were taken for the purposes of TNM model validation.

The validation process utilized off-peak noise monitoring to ensure that free-flow travel conditions would be present on I-270 and other study area roadways. Stop-and-go traffic conditions and wide ranges of average speed conditions are very difficult to model, therefore free-flow conditions were targeted so that observed noise levels would be more capable of validating within the noise model. Traffic counts on noise-contributing roadways were taken concurrent to the monitoring periods to assist in the determination of their traffic noise influence on the individual sites. Video cameras were used to record traffic flow during the monitoring periods, and traffic from those periods was tabulated remotely at a later time.

Other relevant information on non-traffic noise "events" was noted during the monitoring sessions (i.e. aircraft fly-overs, construction equipment noise). Data collected during those periods that were influenced by non-traffic noise was identified and evaluated to determine the appropriateness of its inclusion in the traffic noise level calculation. Prior to calculating the equivalent noise levels, the short-term monitoring data was scrutinized for outlier values typical of non-traffic noise sources. Where these outlier values were verified through corresponding field notes and/or additional evidence from the collected data (such as an atypical instantaneous "peak" level), those periods experiencing non-traffic noise influences were removed from the aggregate data used to calculate the field-observed equivalent noise level.

All highway noise measurements were performed in accordance with recommendations within the FHWA's *Measurement of Highway-Related Noise* (FHWA-PD-96-046 May 1996).

2.2.3 TNM Model Validation

All prediction modeling was performed using FHWA's TNM v2.5. The TNM seeks to simulate the noise environment by considering variable inputs for traffic (including autos, medium trucks, heavy trucks, buses, and motorcycles), variable inputs of traffic speed for each vehicle type, variable inputs for roadway design, (including roadway width, horizontal and vertical alignment), variable inputs for terrain lines and propagation features (such as building rows, ground zones, and tree zones), and inclusion of traffic control measures including stop lights and stop signs.

The TNM Model validation determines the effectiveness of the Noise Barrier Design by evaluating the model's ability to reproduce the Measured Noise Levels. Measured Noise Levels correspond to ambient measurements taken in conjunction with highway traffic counts. The model's ability to reproduce Measured Noise Levels ensures its ability to accurately predict future build-condition noise levels.

Noise has been measured and/or modeled at selected points throughout the study area referred to as 'Receptors'. In this Study, receptors have been labeled according to the following convention: 'M' receptors were both measured in the field and modeled, 'R' receptors were only modeled. The single digit number following 'M' or 'R' indicates Phase, the two-digit middle number is the NSA (within the Phase), and the two-digit end number is a serial number (within the NSA).

After the Noise Measurements and Traffic Counts were obtained, a TNM Model was developed for the Study area, inputting all pertinent roadways, terrain, and structural elements thought to be needed for adequately characterizing the Study area's noise environment. Each Noise Measurement Receptor was accurately represented in the model by a TNM Modeled Receptor. The model was then validated by testing it under each of the traffic conditions encountered during the traffic monitoring sessions. MDOT SHA considers a TNM Model to be properly validated when the Modeled Noise Levels are within ±3 dB(A) of the Measured Noise Levels for most of the receptors. In order to bring the model into validation, modifications are applied by inputting additional terrain and structural elements in an orderly sequence of TNM runs, with each new model revision, or "Case," being re-tested until the validation criteria were determined met by MDOT SHA.

Tables summarizing the results of model validation completed as part of the I-495 analysis in Maryland are included in Appendix C.

At the 6 non-validating receptors, the noise level at the receptors was influenced by side street traffic which was not counted during the validation runs.

2.3 I-270 (Dwight D. Eisenhower Memorial Highway)

2.3.1 Land Uses

A. Noise-Sensitive Areas

As with I-495, the areas of different land use along I-270 have been combined into a single NSA since they are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features. Additionally, grouping them together assist in evaluating mitigation, as one barrier would be analyzed for the NSA, and not just each land use. A description of each NSA is listed below. Any distance references given are relative to the edge of the near roadway shoulder, unless otherwise noted.

NSA 5-01

This area consists of multiple residential and recreational land uses. Morris Park, which is maintained by the City of Gaithersburg, contains a playground, tennis and basketball courts, baseball and soccer fields, and a 90-person capacity picnic pavilion. The park is located approximately 360 feet from the edge of pavement where the on-ramp from I-370 merges with the northbound I-270 C-D lanes. An existing Type I noise barrier (#15126N0) constructed in 1991 is currently providing noise abatement to the park.

The Brighton East townhouse community is located along the east side of I-270. The nearest residences are located approximately 100 feet from the shoulder of the northbound I-270 C-D lanes. An existing Type I noise barrier (#15126N0) constructed in 1991 is currently providing noise abatement to the community. A retaining wall (#15166R0), which begins at the northern end of this location, is situated in front of the barrier along the northbound I-270 C-D lanes. The community pool area, which runs adjacent to I-270 for

200 feet, is evaluated based on capacity, not linear frontage. [MDOT SHA approximates this capacity to be 23 residences based on ten percent of the 228 units that could use the facility.]

The Fireside Condominium community, along the east side of I-270, consists of 108 units in phase I and 150 units in phase 2. The nearest of these condos are located approximately 30 feet from the shoulder of the northbound I-270 C-D lanes. An existing Type I noise barrier (#15126N0) constructed in 1991 is currently providing noise abatement to the community. A retaining wall (#15166R0), which runs approximately 1400 feet along this area, is situated in front of the barrier along the northbound I-270 C-D lanes. The community pool area, which runs adjacent to I-270 for 100 feet, is evaluated based on capacity, not linear frontage. [MDOT SHA approximates this capacity to be 26 residences based on ten percent of the 258 units that could use the facility.] The community tennis courts, which run adjacent to I-270 for 135 feet, are evaluated based on capacity, not linear frontage. [MDOT SHA approximates this capacity to be 4 residences based on a maximum of two doubles teams playing on the single court.]

The Brighton East Condominium I & II community is located along Duvall Lane behind the Fireside Condominiums east of I-270. The nearest of these condos are located approximately 300 feet from the shoulder of the northbound I-270 C-D lanes. An existing Type I noise barrier (#15126N0) constructed in 1991 is currently providing noise abatement to the community. A retaining wall (#15166R0), which begins at the northern end of this location, is situated in front of the barrier along the northbound I-270 C-D lanes.

NSA 5-02

This area consists of residential and recreational land uses. The Brighton West Condominiums community is located along the west side of I-270. The nearest of these homes is located approximately 25 feet from the southbound shoulder of I-270. An existing Type I noise barrier (#15125N0) constructed in 1991 is currently providing noise abatement to the community. A retaining wall (#15167R0), which begins at the northern end of this area, is situated in front of the barrier along the southbound I-270 C-D lanes and transitions into another retaining wall (#15290R0) that supports the highway at the southern end of this area.

Malcom King Park is located along the west side of I-270. The park's playground is located approximately 500 feet from the outer shoulder of I-270 southbound, but the nearest section of the hiker-biker trail is less than 100 feet away. A retaining wall (#15290R0) that supports the highway ends at the northern end of this location.

NSA 5-03

This area consists of industrial and commercial (restaurants and offices) land uses. Two restaurants, Red Lobster and the Bugaboo Creek Steak House, are within this NSA. The nearest restaurant is located approximately 275 feet from the outside shoulder of the northbound I-270 C-D lanes. There are no outdoor use areas associated with this location. Consequently, it requires no further consideration.

The Shady Grove Development Park consists of five large buildings of mixed office and industrial use. The buildings are located approximately 150 feet from the outside shoulder of the northbound I-270 C-D lanes. There are no outdoor use areas of sufficient frequency, duration, or permanence associated with this area. Consequently, it requires no further consideration.

NSA 5-04

This area represents the Camden Washingtonian Apartments and Lifetime Athletic Club, Spa, and Cafe. The complex includes a parking garage which is located along the side of the lot closest to I-270, and the apartments are located approximately 1400 feet from the outside shoulder of the I-270 C-D lanes. The Athletic club includes an outdoor swimming pool, but the pool is located on the back side of the building in relation to I-270, approximately 1750 feet from the outside shoulder of I-270. Due to the distance separation and shielding by structures from I-270, it requires no further consideration.

NSA 5-05

This area represents a variety of restaurants and shops at the northern end of the Rio Washingtonian Center located along the west side of I-270. These facilities are generally located approximately 1,300-1,800 feet from the southbound shoulder of I-270. The area contains a Kohl's, Target, along with various other strip mall shops and is completely commercial with no evident outdoor use areas; as such it requires no further consideration.

NSA 5-06

This area consists of outdoor retail and recreational land uses, as well as an office building and a hotel. The Rio Washingtonian Center, which includes a variety of restaurants and shops, is located along the west side of I-270. These facilities are located approximately 650 feet from the southbound shoulder of I-270 across the lake. The facility is geared toward outdoor use, which includes outdoor eating areas and a boardwalk. The Rio Washingtonian Center also includes a park, located along the west side of I-270. The nearest portion of the path is located approximately 170 feet from the shoulder of the southbound I-270 C-D lanes (approximately 120 feet from the outer ramp shoulder) and consists of a paved walking trail, outdoor carousel, playground, and other features.

A Sodexo office building is located along the west side of I-270. This facility is located approximately 620 feet from the southbound shoulder of I-270 and contains no evident outdoor use areas. Consequently, it requires no further consideration.

The Gaithersburg Marriott Washingtonian Center hotel is located along the west side of I-270. An outdoor patio is located approximately 350 feet from the shoulder of the southbound I-270 C-D lanes and is partially shielded by the hotel building.

NSA 5-07

This area consists of several hotels as well as an office building. The Two Washington hotel managed by Marriott is located along the west side of I-270. A large multi-story parking garage lies at the end of this area. There are no outdoor use areas associated with this location. Consequently, it requires no further consideration.

The Residence Inn hotel managed by Marriott is located along the west side of I-270. An outdoor pool is located approximately 145 feet from the shoulder of the southbound I-270 C-D lanes.

The Spring Hill Suites hotel managed by Marriott is located along the west side of I-270. There are no outdoor use areas associated with this hotel. Consequently, it requires no further consideration.

The office building at 9711 Washingtonian Boulevard is located along the west side of I-270. The building is located approximately 350 feet from the southbound shoulder of I-270. There are no outdoor use areas associated with this office building. Consequently, it requires no further consideration.

NSA 5-08

This area consists of the newly reconstructed apartment building of Gables Upper Rock, which was destroyed by fire and demolished in April 2014. It is located approximately 140 feet from the adjacent Shady Grove Road interchange ramps and approximately 550 feet from the outside shoulder of the northbound I-270 C-D lanes. There is an outdoor pool area facing the highway, above the first floor parking garage.

NSA 5-09

This area includes a commercial educational facility, a medical center and a hotel. The Kaplan University Learning Center is located along the east side of I-270. The facility is located approximately 100 feet from the shoulder of the northbound I-270 C-D lanes. There are no outdoor use areas associated with this property. Consequently, it requires no further consideration.

The Shady Grove Medical Center is located along the east side of I-270, which has no frequent exterior use. The building appears to be of masonry construction with (at least) single glazed windows that are closed for air-conditioning. As a result, the structure is expected to have a minimum building noise reduction factor of 25 dB(A) when assessing *interior* impacts. The facility building, which consists of doctor's offices run by Kaiser Permanente, is located approximately 95 feet from the shoulder of the northbound I-270 C-D lanes.

The Sheraton Rockville Hotel is located along the east side of I-270. The hotel building is located approximately 360 feet from the shoulder of the northbound I-270 C-D lanes and 75 feet from the Redland Boulevard ramp. The hotel has an extensive paved path system with numerous benches. This outdoor area is approximately 430 feet from the outside shoulder of the northbound I-270 C-D lanes and 85 feet from the Redland Boulevard ramp. This ramp, which spurs from the off-ramp to Shady Grove Road, is likely the primary noise source to this area along with the other ramps in this quadrant of the interchange.

NSA 5-10

This area consists of a medical facility, hotels and offices. The medical facility is located along the west side of I-270, and has no frequent exterior use. This facility is located approximately 325 feet from the southbound shoulder of I-270. The building appears to be of masonry construction with (at least) single glazed windows that are closed for air-conditioning. As a result, the structure is expected to have a minimum building noise reduction factor of 25 dB(A) when assessing *interior* impacts.

Two hotels are located along the west side of I-270: the Radisson Hotel Washington DC – Rockville and a Sleep Inn. Both hotels share a common outdoor pool that is located approximately 220 feet from the outer shoulder of southbound I-270.

Four office buildings are located along the west side of I-270. The nearest of these office buildings is located approximately 160 feet from the southbound shoulder of I-270. There are no outdoor use areas

of sufficient frequency, duration, or permanence associated with this area. Consequently, it requires no further consideration.

Three office buildings are located along the west side of I-270. These buildings are located approximately 225 feet from the southbound shoulder of I-270. The only outdoor noise-sensitive use is located adjacent to the northernmost building (2277 Research Boulevard), which has a large courtyard with numerous benches and tables.

NSA 5-11

This area consists of offices, a medical facility and a hotel. An office building for Piccard Homes is located along the east side of I-270. The office building is located approximately 125 feet from the shoulder of the northbound I-270 C-D lanes. There are no outdoor use areas associated with this area. Consequently, it requires no further consideration.

A medical facility, containing the Piccard Surgery Center, is located along the east side of I-270. It has no frequent exterior use. The building appears to be of masonry construction with (at least) single glazed windows that are closed for air-conditioning. As a result, the structure is expected to have a minimum building noise reduction factor of 25 dB(A) when assessing *interior* impacts. The facility is located approximately 100 feet from the shoulder of the northbound I-270 C-D lanes.

Two office buildings are located along the east side of I-270. The first building is located approximately 175 feet from the shoulder of the northbound I-270 C-D lanes. There is a landscaped courtyard at the entrance of the building, which contains a few benches. Since the use is not of sufficient duration, it requires no further consideration. The second is an office building for ZeniMax. The ZeniMax office building is located approximately 115 feet from the shoulder of the northbound I-270 C-D lanes. There are no outdoor use areas associated with this area. Consequently, it requires no further consideration.

The Quality Suites Rockville hotel is located along the east side of I-270, approximately 100 feet from the shoulder of the northbound I-270 C-D lanes. The hotel has an outdoor pool that is completely surrounded by the building, which shields the use area from I-270. Consequently, it requires no further consideration.

NSA 5-12

This area includes retail, residences and a senior center with recreational areas. The Woodley Gardens Shopping Center includes an outdoor eating area. There are six tables with chairs that are used by customers of the eateries. It is located about 190 feet away from the highway and 14 feet below it in elevation. A retaining wall (#15276R0), supporting the highway, runs along the parking lot of the shopping center; the last 84 feet of the parking lot is also adjacent to the existing Type I noise barrier (#15124N0) that lies behind the retaining wall.

The Regents Square Condominium townhouses are located along the east side of I-270. The nearest residences are located approximately 50 feet from the shoulder of the northbound I-270 C-D lanes. An existing Type I noise barrier (#15124N0) constructed in 1991 is currently providing noise abatement to the community. A retaining wall (#15276R0), supporting the highway, is situated behind the first 144 feet of the barrier at the southern end.

The Woodley Woods community is also located along the east side of I-270. The nearest residences are located approximately 75 feet from the shoulder of the northbound I-270 C-D lanes. An existing Type I noise barrier (#15124N0) constructed in 1991 is currently providing noise abatement to the community.

The Rockville Senior Center is located along the east side of I-270. The center's building is located approximately 375 feet from the shoulder of the northbound I-270 C-D lanes. There are numerous outdoor noise-sensitive uses conducted on the property including a playground, garden, basketball court, and a walking trail, which is 35 feet from the highway. An existing Type I noise barrier (#15124N0) constructed in 1991 is currently providing noise abatement to the community.

NSA 5-13

This area includes the Woodley Gardens Park, which contains two baseball fields, tennis courts, basketball courts, a playground, picnic tables, and grills. Nearest to the highway is one of the baseball fields, which is approximately 180 feet away from the highway and 20 feet below it.

NSA 5-14

This area consists of office buildings and a hotel. Eight office buildings are located along the west side of I-270. The nearest of these facilities is located approximately 100 feet from the southbound shoulder of I-270. There are no outdoor use areas of sufficient frequency, duration, or permanence associated with this area. Consequently, it requires no further consideration.

The Best Western PLUS Rockville Hotel & Suites is located along the west side of I-270. This building and outdoor pool is located approximately 265 feet from the outer shoulder of the southbound I-270 C-D lanes.

NSA 5-15

This area consists of residences as well as a church. Two residences within the West End Park community are located along the west side of Nelson Street. The properties are between 30 and 70 feet away from the northbound I-270 C-D on-ramp and varies between 5 and 10 feet higher than the ramp. Additional residences within the West End Park community are located along the east side of Nelson Street. The northernmost property is approximately 200 feet from the northbound I-270 C-D shoulder and two feet below the highway. The property south of Beall Avenue is approximately 340 feet from the I-270 C-D on-ramp and 15 feet higher than the ramp. A portion of the land opposite the community between Nelson Street and the ramp is wooded.

The First Church of Christ, Scientist, which has no frequent exterior use, is located between Nelson Street and I-270. The building is of masonry construction with single glazed windows that are closed for air-conditioning. As a result, the structure is expected to have a building noise reduction factor of 25 dB(A) when assessing *interior* impacts.

NSA 5-16

This area represents Woottons Mill Park. Activities present include a community garden, tennis courts, and walking trails. This area also includes the former location of the Karma Academy School, which is now an open park and a basketball court.

NSA 5-17

This area represents the Rockshire community, which includes townhomes located east of Watts Branch Parkway and west of I-270, just south of MD 28. The community also includes single-family detached homes located west of Watts Branch Parkway, along Lochness Court and Gerard Street. The houses are shielded from I-270 by an existing Type I noise barrier (#15123N0). A retaining wall (#15320R0) concentrated at the northern end of this area is situated in front of the barrier along the southbound I-270 C-D lanes.

NSA 5-18

This area includes a nursing home, a residential community and two religious facilities (one of which houses a preschool). The Rockville Nursing Home is located at 303 Adclare Road, 60 feet from the local lanes along I-270. There are sparse trees between the building and I-270 which provide little shielding. There are benches at the entrance to the nursing home and a picnic table on the slope between I-270 and the building. MDOT SHA does not consider the picnic table to be noise sensitive, since it does not appear to be a permanent fixture and is not in a landscaped area.

The Rockville Christian Church is located at 301 Adclare Road. The church has a large outdoor playground which is utilized weekly during their Playground Potluck and Bible Study on Wednesday evenings. A retaining wall (#15276R0), which is likely providing some shielding to the area, is situated along the northbound I-270 C-D lanes.

The Foxboro community, which is located approximately 450 feet from the highway, includes single-family detached houses along Adclare Road east of I-270 and south of MD 28.

The First Baptist Church is located at 55 Adclare Road. The church operates the Weekday Early Education Center (W.E.E. Center) preschool, which has outdoor play areas. There is also an outdoor gathering area with benches and a basketball hoop on the church property. The ramp that continues from I-270 northbound to MD-28 eastbound has traffic affecting noise levels within this area. There is a 50-foot wide wooded area in between the church and the ramp in this area.

NSA 5-19

This NSA consists of recreational use areas as well as a residential community. A wooded open space, owned by the City of Rockville, contains two paved walking paths for use by the Rose Hill Falls community. The path that extends from the common use area of the community is roughly 280 feet from the highway at its nearest point. The other path, which connects two points along Winding Rose Way, is roughly 130 feet from the highway.

The common use area of the Rose Hill Falls community includes a basketball court, tennis court, playground, and a portion of a paved walking path. The shortest distance between the area and I-270 is at the edge of the basketball court, which is located approximately 430 feet from the highway. All of these areas are evaluated based on capacity, not linear frontage. [MDOT SHA has defined the capacity of the basketball court to be 10 residences based on five players per team. MDOT SHA approximates the capacity of the tennis court to be 4 residences based on a maximum of two doubles teams playing on the single court. MDOT SHA estimates the capacity of the playground to be 2 residences based on the limited amount of equipment. MDOT SHA assumes the capacity of the walking trail to be 2 residences.]

A portion of the Rose Hill Falls community along Winding Rose Drive and Blue Hosta Way, containing single-family three-story townhomes, is included in this NSA. Most of the residences have an elevated deck off the rear exit. The community is situated behind a 5-15 feet high berm, which is supported by a retaining wall on the community side, located within the wooded area adjacent to the highway.

NSA 5-20

This NSA consists of a park and a residential community. Rockmead Park. is covered entirely by trees and has no trails or recreational areas. There are no outdoor uses associated with this area. Consequently, it requires no further consideration.

The Fallswood community includes single-family detached homes located east and west of Watts Branch Parkway, along Fallswood Drive and Fallswood Court. The houses are shielded from I-270 by an existing Type I noise barrier (#15123N0).

NSA 5-21

This area represents the Saddlebrook community, which includes single-family detached homes located along Woodsend Place, Woodsend Court, and Lawngate Court along Watts Branch Parkway west of I-270. The houses are shielded from I-270 by an existing Type I noise barrier (#15123N0). A retaining wall (#15253R0) concentrated at the southern end of this area is situated in front of the last 270 feet of barrier along the southbound I-270 C-D lanes before following along the off-ramp to MD 189. The community also includes single-family detached homes located along Grovepoint Court, west of I-270. These homes are situated further from I-270 than the Fallswood Community and are separated by a 400-feet wide section of woods. The area also borders MD 189 on the south side.

NSA 5-22

This area represents the Julius West Middle School located at 651 Great Falls Road (MD 189). The area includes the school, ball field, tennis courts, and basketball courts. There is a 15-foot high berm and a strip of woods located in between the ball field area and I-270.

NSA 5-23

This area includes an office building, nursing center and residential community. The 20+ story Bank of America office building is located east of I-270 and north of Wooten Parkway. There are no outdoor use areas associated with this office building. Consequently, it requires no further consideration.

The Potomac Valley Nursing Center is located at 1235 Potomac Valley Rd. The area is shielded from I-270 by a 350-foot section of trees and a retaining wall (#15250R0) that varies in height from 10-18 feet. There are tables and chairs located outside in front of the building.

The Markwood Subdivision includes single-family detached houses located along Marcus Ct. east of I-270 and south of MD 189. The houses are shielded from I-270 by an existing Type I noise barrier (#15122N0). There are also woods between the residences and the ramp from northbound I-270 to MD 189.

NSA 5-24

This area represents the Orchard Ridge community, which includes single-family detached homes located west of Seven Locks Road and west of I-270 along Cliff Hill Court, Big Tree Court, Cliffe Hill Way, and Willowleaf Way. There are woods in-between I-270 and this area.

NSA 5-25

This area represents the Montgomery County Detention Center west of I-270. As part of a Category D Land Use, the interior sound levels caused by traffic within the Center must be 51 dB(A) or less. It is estimated the windows cause a 25 dB(A) reduction, thus the sound levels just outside of the building would need to be 76 dB(A). The outdoor activity area is shielded from roadway noise by several large buildings. Due to the high noise criteria and the distance separation of approximately 200 feet to I-270, it requires no further consideration.

NSA 5-26

This area contains commercial, retail, medical and office space. There are no outdoor noise sensitive uses in this NSA. An office building west of I-270 has a picnic table that was intended to be included in the validation model. However, the property owner would not grant permission to conduct noise monitoring at this location. Given the type of table observed in the field, it is clear that it could be relocated easily to other areas of the property if an impact occurred from any proposed build condition. As a result, MDOT SHA considers this area to have no outdoor use areas of sufficient frequency, duration, or permanence. Consequently, it requires no further consideration.

The retail area houses a Harris Teeter store and also restaurants, including Elevation Burger, which has outdoor seating. The outdoor seating is shielded from roadway noise by the building. There is also a separate building utilized by Washington Radiology. There are no unshielded outdoor uses associated with this area.

NSA 5-27

This area includes offices and industrial uses. A single office building and parking lot are located east of I-270, bounded between Tower Oaks Boulevard and the ramp from Montrose Road onto northbound I-270. There is an 80-foot wide section of woods and a group of picnic tables in-between the ramp and the office building. Given the type of tables, it is clear that they could be relocated easily to other areas of the property if an impact occurred from any proposed build condition. As a result, MDOT SHA considers this area to have no outdoor use areas of sufficient frequency, duration, or permanence. Consequently, it requires no further consideration. Another office building, located at 2600 Tower Oaks Boulevard, contains EMC^2, a software company. The area also includes a restaurant, parking garage, and parking lot. The buildings' elevations are approximately 15-25 feet below Tower Oaks Boulevard, as the side slope from the road is very steep. There are no outdoor uses located within this area. Consequently, it requires no further consideration.

The GEICO Materials Management Center, which consists of a warehouse building and parking lot, is located east of I-270 on the northeast side of Tower Oaks Boulevard. There is a wooded area in-between the building and Tower Oaks Boulevard, and also woods in-between I-270 and Tower Oaks Boulevard. There are picnic tables located at the building entrance closest to Tower Oaks Boulevard. The primary building use appears to be warehousing but there may be a small area of offices near the entrance. Given

the type of tables observed in the field, it is clear that they could be relocated easily to other areas of the property if an impact occurred from any proposed build condition. As a result, MDOT SHA considers this area to have no outdoor use areas of sufficient frequency, duration, or permanence. Consequently, it requires no further consideration.

NSA 5-28

This area includes residential and recreational land uses. The Watkins Glen community consists of the townhomes along Greenleaf Avenue, which back up against the on-ramp from eastbound Montrose Road to the southbound I-270 C-D lanes. Many of the residences have an elevated deck off the rear exit. There are woods that vary in width from 80-400 feet in-between I-270 and the residences.

Cabin John Regional Park, west of I-270, consists of a trail and the Robert C. McDonell Campground, which has seven campsites. The area is covered by trees, and the campground is accessed by an entrance along Tuckerman Lane approximately 0.5 miles west of I-270. Four receptors were modeled within the campsite area and two receptors were modeled along the trail.

NSA 5-29

This area incudes residential communities and park land. The Old Farm and Montrose Woods communities include single-family detached homes located east of I-270 in-between Tuckerman Lane and Old Stage Road, south of Montrose Road. The buildings are located along several local roads and often are situated around cul-de-sacs. The buildings are shielded from I-270 by an existing Type I noise barrier (#15121N0). There is also a wooden fence and an approximately 90-foot wide wooded area in-between I-270 and the houses.

A portion of the Cabin John Stream Valley Park is located east of I-270 and south of Montrose Road. The area is covered entirely by trees and has no trails or recreational areas. There are no outdoor use areas associated with this area. Consequently, it requires no further consideration.

NSA 5-30

This area represents the portion of the Windermere community (platted as Heritage Walk) along Daybreak Court. The area includes a row of six single-family detached homes east of I-270 and south of Tuckerman lane. There are woods and a wooden fence in-between the houses and I-270. The row of houses lines up perpendicular to Tuckerman Lane, with the nearest building less than 100 feet from the road. An existing Type I noise barrier (#15373N0) constructed in 2002 currently provides abatement for this area.

NSA 5-31

This area includes residential and recreational uses. The Oaks at North Bethesda community consists of single-family residences. An existing developer-built brick noise barrier, which ties into the existing Type I noise barrier (#15373N0), provides shielding from I-270 traffic noise. A paved path, located behind the barrier, begins on the east side of this area and extends along the south side of the community into 134-B.

The Windermere community (platted as Heritage Walk) contains single-family residences along Windermere Circle, Charnwood Lane and Earlsgate Lane. The nearest rear yards are approximately 70-75

feet from the northbound I-270 shoulder. An existing Type I noise barrier (#15373N0) constructed in 2002 currently provides abatement for this area.

The recreational uses associated with the Windermere Community Pool and Sam Suls Recreational Center include a playground, volleyball court, and tennis court. An existing Type I noise barrier (#15373N0) constructed in 2002 currently provides abatement for this area.

NSA 5-32

This area includes a hotel, offices and an apartment complex. The Bethesda Marriott Suites hotel has a jogging/fitness trail along the I-270 Spur on-ramp from Democracy Boulevard and an outdoor pool that is partially shielded by the hotel building and parking garage.

Democracy Center consists of three commercial office buildings owned by Democracy Associates. These buildings contain many different businesses. There are a few paved walking paths in the northern region of the property. The nearest path is approximately 140 feet from the highway.

Two Lockheed Martin office buildings are located at 6777 and 6801 Rockledge Drive. The area sits between both the I-270 Spur and I-270. There is a paved walking path in the northwest region of the property. At the nearest points, the path is approximately 135 feet from the I-270 Spur and 180 feet from I-270.

Two office buildings are located within the Rockledge Centre. There are two outdoor courtyards on the highway side with picnic tables. The extent of use is unknown at this time; however, both courtyards are depressed relative to the surrounding parking lot/garages. Therefore, they are shielded from the I-270 highway noise. Consequently, the area requires no further consideration.

The Berkshires at Rock Springs apartment complex is located along Rock Forrest Drive. Parking garages for the tenants have been constructed between the apartment buildings and I-270, and provide shielding from traffic noise. There is a pool area in the middle of the apartment complex, which currently receives abatement from a barrier put in place by the developer. Each apartment building contains a courtyard area with benches, which receives abatement in all directions from highway noise by the buildings. Consequently, this area requires no further consideration.

NSA 5-33

This area includes mostly residential uses, as well as recreational uses and a church. The Grosvenor House Condominiums occupy a 20-story high-rise building located at 10101 Grosvenor Place. This area contains an outdoor pool at the northern front of the building, which is constructed below a retaining wall that provides some shielding from I-270 traffic noise. The pool is approximately 400 feet from the highway behind a region of woods 200-feet wide. The pool is evaluated based on capacity, not linear frontage. [MDOT SHA approximates this capacity to be 40 residences based on 10 percent of the 404 dwellings that could use the facility.] Each of the units also contain a balcony or terrace. The tennis courts are shielded from I-270 traffic noise by the building. Another Grosvenor Park Condominium high-rise building with balconies is located at 10201 Grosvenor Place. This area also contains an outdoor pool at the southern rear of the building, which is located approximately 780-feet from I-270 behind a region of woods 200-feet wide. The pool is also partially shielded from I-270 noise by the pool house. Other common outdoor uses are located on the eastern side of the building away from the highway.

The Avalon Grosvenor Tower high-rise apartments (with balconies) is located at 10301 Grosvenor Place. This area contains an outdoor pool at the southern front of the building, which is located approximately 415-feet from I-270 behind a region of woods 200-feet wide.

The Grosvenor Park Townhouse Condominium community is located along Englishman Drive. A strip of woods is situated between the residences and the I-270 northbound shoulder; most of this land is comprised of 85 feet of MDOT SHA (ROW) and a 50-foot Washington Suburban Sanitary Commission (WSSC) utility ROW. A portion of the community is elevated 10 to 12 feet above the highway and the nearest residences are approximately 190 feet from the northbound shoulder. Most of the backyards have wooden privacy fences and elevated decks.

A portion of the North Bethesda Trail[21] is included in this NSA. This area is considered a transient part of the trail and is therefore not an outdoor use of sufficient frequency or duration. Consequently, it requires no further consideration.

The Brighton Gardens of Tuckerman Lane retirement facility includes two outdoor use areas: the front entrance seating area and the outdoor patio. However, both of these areas are shielded from I-270 by the multi-story masonry building. The rear entrance area is not considered a use of sufficient frequency or duration. The latched windows are (at least) single glazed and appear to be primarily closed for air-conditioning, but they could be opened by residents in their units or staff in common areas. As a result, the structure is expected to have a minimum building noise reduction factor of 10 dB(A) when assessing *interior* impacts. The facility is located approximately 185 feet from the I-270 northbound shoulder and sits behind a wooded berm of varying height.

The Timberlawn Crescent Apartments are located along Luxemburg Street. The three-story apartment buildings have balconies and patios. The nearest buildings are approximately 200 feet from the northbound I-270 shoulder. The southernmost buildings sit 10 feet below the highway and the northernmost buildings sit roughly 10 feet above the highway. A strip of woods is situated between the residences and the I-270 northbound shoulder; most of this land is comprised of 100 feet of MDOT SHA ROW and a 50-foot WSSC utility ROW.

The Timberlawn South at North Bethesda community consists of townhouses located along Pine Haven Terrace and Mist Haven Terrace. The properties closest to I-270 all contain decks. The nearest of these homes are located approximately 210 feet from the northbound I-270 shoulder with the rear of the properties being roughly 180 feet away. The southernmost buildings sit 20 feet above the highway and the northernmost buildings sit roughly 10 feet above the highway. A strip of woods is situated between the residences and the I-270 northbound shoulder; most of this land is comprised of 90 feet of MDOT SHA ROW and a 50-foot WSSC utility ROW. A depression exists within the MDOT SHA ROW that is six to ten feet below the highway elevation.

The Cloisters community (platted as Timberlawn) consists of townhouses and single-family homes located along Valerian Lane and Lady Slipper Terrace. The nearest buildings are approximately 170 feet from the northbound I-270 shoulder. The two-car brick garages are situated directly behind the townhouses and act as a barrier for the rear yards, providing shielding from I-270 traffic noise. Two single-family residences

[21] The part that crosses I-270 via an overpass lies outside of the NSA limits.

immediately north of Lady Slipper Terrace are behind an 8-foot berm. A strip of woods is situated between the residences and the I-270 northbound shoulder; most of this land is comprised of 85 feet of MDOT SHA ROW and a 50-foot WSSC utility ROW. Two tennis courts are located at the southern end of the community approximately 120 feet from the highway at their nearest point.

The Saint Mark Presbyterian Church is located at 10701 Old Georgetown Road. The church contains a playground at the southern side of the main building, which is primarily used on Sundays (as verified by the church coordinator). On the north side of the building, there is a memorial garden that contains two benches. This area receives some shielding from noise along I-270 by the church buildings.

NSA 5-34

Wildwood Manor and Wildwood Knolls include single-family residences. The existing Type II noise barrier (#15356N0), constructed in 2003, currently provides abatement for this area, but only extends in front of the last two southernmost residences along Aubinoe Farm Drive and likely provides little abatement in that area.

The Grosvenor Woods community contains single-family residences along Snow Point Drive, Thornbush Lane, and Thornbush Court. A strip of undeveloped, wooded land sits between the residences and I-270, which is part of the subdivision's open space maintained by the homeowner's association. The nearest of these homes is located approximately 200 feet from the shoulder of the southbound I-270 lanes.

NSA 5-35

This area includes residential and office uses. The office building located at 10411 Motor City Drive houses the ISN Corporation along with other businesses. There are no outdoor use areas associated with this office building. Consequently, it requires no further consideration.

The Wildwood Hills community consists of single-family houses. The existing Type II noise barrier (#15363N0) constructed in 2003 is providing noise abatement to the community.

NSA 5-36 (NSA 3-03)

This area consists of residential land uses. The **Wolfe's Subdivision** community contains single-family residences along Barnett Road. An existing Type II noise barrier (#15353N0) constructed in 2002 currently provides abatement for this area.

The **Academy Woods** community contains single-family residences located along Grubby Thicket Way. The nearest of these homes is located approximately 100 feet from the shoulder of the northbound I-270 Spur lanes.

The **Stratton Commons** community is located along Greentree Road, Derbyshire Lane and Surreywood Lane. The residences in include both single-family and townhouses. The nearest of these homes is located approximately 100 feet from the shoulder of the northbound I-270 Spur lanes.

NSA 5-37 (NSA 1-07)

This area includes residential and recreational uses. The **Bethesda Country Club**, which contains an 18-hole golf course and several tennis courts, is located adjacent to the highway.

The **Bethesda Overlook** community contains townhouses located along Bradley Boulevard. The overpass (#1511100) carrying Bradley Boulevard over the Capital Beltway may provide some localized shielding to this area. Additionally, the bridge itself may generate some noise.

B. Non-Noise-Sensitive Areas

The non-NSAs were also defined by their corresponding FHWA land use activity category; however, the land use letter is added to the beginning of the designation and each group is numbered independently (e.g. F-301 and G-301). The Category F land use indicates an area excluded from the Study due to its non-noise-sensitive activity. The six Category G land uses consist of non-permitted undeveloped land.

A description of each non-NSA is listed below:

F-301 This area is privately owned and is zoned as industrial.

F-302 This area consists of the retail facilities and parking lot of the Woodley Gardens Shopping Center.

G-301 This wooded undeveloped land is located in an area within the exit ramp connecting I-270 to Redland Boulevard. This property is privately owned and is zoned for commercial use.

F-201 This area represents an area east of I-270 and north of Tuckerman Lane that contains a water line owned by WSSC.

F-202 This area is west of I-270 and contains a Montgomery County Police Station.

F-203 This area is west of I-270 and contains the Montgomery County Division of Facilities Management office building, which is located just south of the detention facility.

F-204 This area is west of I-270 and contains the Montgomery County Fleet Management Facility, Transportation Systems Technical Center, Materials Testing Laboratory, and Sign and Marking Unit.

F-205 This area represents the retail businesses within the Harris Teeter building.

F-206 This area is west of I-270 and is owned by Montgomery County Public Schools and contains a Transportation Maintenance Facility and bus storage lot.

G-201 This area represents undeveloped land east of I-270 and south of Preserve Parkway. The parcel is covered by trees and is owned by the City of Rockville.

G-202 This area represents undeveloped land east of I-270 and in-between Tower Oaks Boulevard and Wootton Parkway. The parcel is covered by trees and is owned by the Tower-Dawson LLC. The parcel has commercial zoning and is 10.2 acres.

G-203 This area represents undeveloped land east of I-270. The land has commercial zoning and is covered by trees. The parcel is owned by Tower-Dawson LLC and is 34.7 acres.

G-204 This area represents undeveloped land that is covered by trees and is owned by the City of Rockville. The northernmost portion contains a drainage feature.

G-205 This area represents undeveloped land that is covered by trees and is owned by the City of Rockville. It lies behind the existing Type I noise barrier (#15123N0).

G-206 This area represents undeveloped land that is covered by trees and is owned by the City of Rockville. It lies behind the existing Type I noise barrier (#15123N0).

G-207 This NSA represents an area that is currently undeveloped west of I-270 and north of Montrose Road. Fortune Parc Development is the owner and the parcel has industrial zoning with 1.9 acres.

F-101 This area represents the Bells Mill Electrical Substation. It is owned by Potomac Electric Power Company (PEPCO).

F-102 This area represents the US Post Office facility (ZIP code 20817) located at 10421 Motor City Drive in Bethesda.

F-103 This area represents the Ourisman Collision Center located at 10401 Motor City Drive, which also houses an Enterprise Rent-A-Car business.

F-104 This area represents the Westfield Montgomery Mall.

F-105 This area represents the large parking lot and parking garage for the Marriott International corporate headquarters. The office building is over 680 feet from the highway and partially shielded by the parking garage.

G-101 This area represents undeveloped, wooded land owned by the Bethesda Place Commission Council, Inc. It is platted as "Parcel A" of the Stratton Commons community (NSA 108-B and 109-B). A storm water feature is located in the southern portion of this area.

G-102 This NSA represents the commercially zoned area platted as "Parcel 15" of Rock Spring Park owned by RSC COMMON FACILITIES LLC ET AL. The parcel is partially a storm water management facility that also contains electrical utilities.

G-103 This area represents undeveloped, wooded land that is platted as Grosvenor Heights Parcel "BB", which is planned to be conveyed to the M-NCPPC in the future. Based on the site plan referenced in NSA 118-B, a paved pathway/nature trail may be added in the area to connect the new townhouses to Fleming Local Park.

G-104 This area represents undeveloped, wooded land owned by Grosvenor Heights LLC. It is platted as part of Grosvenor Park.

G-105 This area represents undeveloped, wooded land owned by the TPM Development Corporation and Montgomery County. A stream with a 100-year floodplain easement runs through the platted parcel "AA" of Timberlawn.

G-106 The area represents undeveloped, wooded land owned by the Heritage Walk Homes Corporation. The area is platted as "Parcel B" on Plat 13 of Heritage Walk and contains a stream with a 100-year floodplain easement.

2.3.2 Noise Measurement Data

In acoustical studies, measurements are used to validate the computer model against field-observed conditions. This ensures the accuracy and reliability of the computer predictions of future noise conditions for the proposed project.

Noise monitoring for I-270 was conducted between August 2015 and November 2015. Short-term noise measurements of 20-minute duration were used to identify ambient acoustical conditions. A total of 164 sites were measured for the Study.

The validation process utilized off-peak noise monitoring to ensure that free-flow travel conditions would be present on I-270 and other study area roadways. Traffic counts on noise-contributing roadways were taken concurrent to the monitoring periods to assist in the determination of their traffic noise influence on the individual sites. Video cameras were used to record traffic flow during the monitoring periods, and traffic from those periods was tabulated remotely at a later time.

Other relevant information on non-traffic noise "events" was noted during the monitoring sessions (i.e. aircraft fly-overs, construction equipment noise). Data collected during those periods that were influenced by non-traffic noise was identified and evaluated to determine the appropriateness of its inclusion in the traffic noise level calculation. Prior to calculating the equivalent noise levels, the short-term monitoring data was scrutinized for outlier values typical of non-traffic noise sources. Where these outlier values were verified through corresponding field notes and/or additional evidence from the collected data (such as an atypical instantaneous "peak" level), those periods experiencing non-traffic noise influences were removed from the aggregate data used to calculate the field-observed equivalent noise level.

All highway noise measurements were performed in accordance with recommendations within the FHWA's *Measurement of Highway-Related Noise* (FHWA-PD-96-046 May 1996).

2.3.3 TNM Model Validation

All prediction modeling was performed using FHWA's Traffic Noise Model v2.5 (FHWA TNM®), hereafter referred to as simply "TNM". The TNM seeks to simulate the noise environment by considering variable inputs for traffic (including autos, medium trucks, heavy trucks, buses, and motorcycles), variable inputs of traffic speed for each vehicle type, variable inputs for roadway design, (including roadway width, horizontal and vertical alignment), variable inputs for terrain lines and propagation features (such as building rows, ground zones, and tree zones), and inclusion of traffic control measures including stop lights and stop signs.

TNM validation models were developed to encompass the entire study area with the exception of two areas behind existing Type II barriers (NSAs 5-37 and 5-34), the Bethesda Country Club (NSA 5-37), and two Category E areas with no outdoor uses of sufficient frequency or duration (NSAs 5-32 and 5-34). Observed traffic collected during noise monitoring sessions was incorporated into the related TNM models and the predicted noise levels were compared to the monitored noise levels. A difference of three decibels or less between the monitored and modeled levels is considered acceptable, since this is the limit of change detectable by typical human hearing. FHWA guidance specifies the arithmetic difference between monitored and predicted existing noise levels is a measure of the model's accuracy.

Average Pavement was used in the majority of the TNM models. Dense-graded asphaltic concrete (DGAC) pavement type was used in the models with Receptors M-227 to M-232, M-239 to M-250, and M-263 to M-268. For these receptors, the pavement type was changed from Average to the actual pavement type observed in the field. DGAC pavement should only be used for model validation. At three receptors, the measurements were not validated due to either the property owner not granting permission to conduct noise monitoring (M-269), or an equipment malfunction (M-232 and M-336).

Tables summarizing the results of model validation completed as part of the I-270 analysis are included in Appendix C. Of the 11 non-validating receptors, 6 of them have been deemed to be critical receptors.

M-104 is deemed critical since the measured level is above the NAC, but the modeled level is substantially lower. It is unclear if the underprediction is the result of the modeling, measurement, or a combination of both, since the existing noise barriers and retaining walls were modeled accurately. The field notes provide no clues that would explain a higher measurement, such as sustained wind or cicadas. However, this is a heavily wooded area, including a significant number of full-grown trees between both the noise wall and roadway as well as between the noise wall and residences. MDOT SHA's previous experience with this condition and the underprediction of noise levels is a function of reflections off of the tree canopy above the noise barrier. The dense canopy in this area reflects noise that is typically diffracted over the barrier, and results in a greater amount of sound energy being measured by the noise meter. As there is no way to model for the canopy, in accordance with FHWA-HEP-10-025, no adjustments have been made to account for the difference in measured and modeled levels. The impact results are not critical at this location because this receptor is behind an existing barrier that is being extended.

Receptor M-117 is deemed acceptable, since it is second row with a low measured level likely not to approach the NAC under any proposed build condition. Additionally, most of the neighboring receptors are validating well. Receptor M-134 is also acceptable for similar reasons. Although, there may be an issue with the topography next to the existing Type II barrier near this location, which could have affected the validation results. Any subsequent analyses to evaluate the Type II barrier's performance could lead to model refinements that may resolve this validation issue.

Careful attention must also be given to receptor M-145. The measured noise level is just above the exterior level needed to exceed the *interior* NAC for the building's worst-case open window condition. Since, the validation model under-predicts, any build condition model may generate similar results. MDOT SHA considers the measured noise level to trump the modeled noise level in this case. However, any interior impact initially identified would require a more rigorous noise analysis to verify the result.

Cicada noise was noted in the field during some of the measurements. When it appeared that the entire measurement was affected due to this noise, the reported measured noise level was adjusted using an approximate cicada background noise level, which was determined from careful examination of the meter data. A 57 dB(A) background noise level was used for receptors M-210, M-211, M-251, M-252, M-253, and M-256; a 61 dB(A) level was used for receptor M-209; and a 63 dB(A) level was used for receptors M-207, M-208, M-254, and M-255. The noise contribution from cicada is not permanent, and is not from highway sources, which means it cannot be predicted by TNM. The actual field measured level for these receptors is shown in parentheses above.

The measurement at receptor M-240 also indicated cicada noise, but the occurrence appeared to be isolated to only a few minutes and these intervals were de-spiked. Given the uncertainty of the duration of the cicada noise at this site, this measurement was not adjusted for background noise. If it had been, it would have validated. MDOT SHA deems that the under-prediction at this site is acceptable, since the two nearer and more critical measurements (M-239 and M-241) validated well.

Two of the receptors (M-244 and M-245) over-predicted noise levels by 5 dB(A) or more. The receptors were located east of I-270 and south of MD-28 within NSA 5-18. Both of these receptors are relatively close to the existing roadway, approximately 90-100 feet from the edge of the existing pavement, which leaves little intervening terrain-between the roadway and receptor to affect noise levels and modeling. However, there is a small cut slope that was modeled, which TNM may not be considering fully due to its ground-smoothing algorithm. Another more likely possibility is the sustained 10 to 12 mph wind documented during the monitoring sessions blowing from the SSE direction toward the highway, resulting in an upwind condition which lowered the measured level.

M-244 is deemed critical since the measured levels are hovering just below the NAC, but the modeled levels are substantially higher. However, since M-245 already shows a measured impact, the modeled over-prediction at that site would not change the overall impact assessment for the NSA. Additionally, if the measured noise levels were indeed lower than normal due to the wind, it would be reasonable to expect the levels to be higher, especially so close to the highway.

Receptor M-277 under-predicted noise levels by 5 dB(A). This receptor was located within the Cabin John Regional Park where the density of the woods varied. It is likely that the woods between the receptor and I-270 were not as densely vegetated as is represented by a TNM tree zone, or that background noise contributed to the measured level. At a distance of approximately 600 feet from the edge of existing pavement, the receptor is far from I-270 and both the measured and modeled noise levels are well below the impact threshold. For these reasons, receptor M-277 is not considered a critical receptor.

M-302, M-303, M-311, and M-313 are all deemed critical since the measured levels are hovering just below or exceed the NAC, but the modeled levels are substantially lower. Each of these critical non-validating receptors lie behind an existing noise barrier on the eastern side of I-270. It is unclear if the underprediction is the result of the modeling, measurement, or a combination of both, since the existing noise barriers and retaining walls were modeled accurately. The field notes provide no clues that would explain a higher measurement, such as sustained wind or cicadas. However, these are heavily wooded areas, including a significant number of full-grown trees between both between the noise wall and roadway as well as between the noise wall and residences. MDOT SHA's previous experience with this condition and the underprediction of noise levels is a function of reflections off of the tree canopy above the noise barrier. The dense canopy in this area reflects noise that is typically diffracted over the barrier, and results in a greater amount of sound energy being measured by the noise meter. The impact results are not critical at this location because the receptors are located behind an existing barrier that will be further evaluated during final design.

2.4 I-95 (North of Capital Beltway)

2.4.1 Land Uses

The areas of different land use along I-95 have been combined into a single NSA since they are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features. Additionally, grouping them together assist in evaluating mitigation, as one barrier would be analyzed for the NSA, and not just each land use. A description of each NSA is listed below. Any distance references given are relative to the edge of the near roadway shoulder, unless otherwise noted. The Study area was divided into two (2) distinct areas.

A. Noise-Sensitive Areas

Residential NSAs include single-family residences and multi-family residences (condominiums and apartments) located in neighborhoods adjacent to I-95 north of the Capital Beltway. Non-residential NSAs include recreation areas, playgrounds, active sports areas, parks, places of worship, and schools located adjacent to I-95 north of the Capital Beltway.

NSA I-95-N

Consists of Paint Branch Unitarian Universalist Church, Frances Fuchs ECC, athletic fields at High Point High School, James E. Duckworth Regional School, Healing Temple Church Nazarene, single-family residences, and multi-family residences. The roads within NSA I-95-N include Boxer Road, Bornedale Drive, Ashfield Drive, Sellman Road, Cherry Hill Road, Weeping Willow Lane, Collier Road, Green Ash Lane, Green Ash Court, and Evans Trail. The receptors are 150 feet to 1,150 feet from the edge of the southbound I-95 shoulder. This area is located along southbound I-95 north of the Capital Beltway from southwest of Cherry Hill Road to northeast of James E. Duckworth Regional School. Part of the NSA is located behind an existing noise barrier along southbound I-95 from Cherry Hill Road to R-I95-N-1 on Sellman Road.

NSA I-95-S

Consists of Beltsville Community Center, an agricultural/commercial facility, Little Paint Branch Park, and single-family residences along Sellman Road, West Drive, Weymouth Avenue, Sellman Road Relocated, Woodbine Road, Taunton Drive, Taunton Court, and Ulster Road. The receptors are 400 feet to 1,350 feet from the edge of the northbound I-95 shoulder. The area is along northbound I-95 north of the Capital Beltway from Sellman Road to Beltsville Community Center.

2.4.2 TNM Model Validation

TNM validation models were developed to encompass the portion of I-95 within this project's study area. Observed traffic data collected during noise monitoring sessions was incorporated into the related TNM models and the predicted noise levels were compared to the monitored noise levels. A difference of three decibels or less between the monitored and modeled levels is considered acceptable, since this is the limit of change detectable by typical human hearing. FHWA guidance specifies that the arithmetic difference between monitored and predicted existing noise levels is a measure of the model's accuracy.

Tables summarizing the results of model validation completed as part of the I-95 analysis are included in Appendix C. All receptors within this segment validate within 3 dB(A).

2.5 MD 295 (Baltimore-Washington Parkway)

2.5.1 Land Uses

The areas of different land use along MD 295 have been combined into a single NSA since they are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features. Additionally, grouping them together assist in evaluating mitigation, as one barrier would be analyzed for the NSA, and not just each land use. A description of each NSA is listed below. Any distance references given are relative to the edge of the near roadway shoulder, unless otherwise noted. The Study area was divided into two (2) distinct areas, both were identified as noise sensitive areas (NSAs).

A. Noise Sensitive Areas

Residential NSAs include single-family residences and multi-family residences (condominiums and apartments) located in neighborhoods adjacent to I-95 north of the Capital Beltway. Non-residential NSAs include recreation areas, playgrounds, active sports areas, parks, places of worship, and schools located adjacent to MD 295.

NSA BW-N

Consists of McDonald Field, Green Ridge House retirement apartments, single-family residences, and multi-family townhomes and apartments. The roads within NSA BW-N include Southway, Ridge Road, and Spellman Overpass. The receptors are 250 feet to 750 feet from the edge of the southbound MD 295 shoulder. This area is located along southbound MD 295 from Greenbelt Road to northeast of Spellman Overpass.

NSA BW-S

Consists of Eleanor Roosevelt High School, Greenbelt Children's Center, and multi-family apartments along Hanover Parkway, Spellman Overpass, and Mandan Road. The receptors are 250 feet to 750 feet from the edge of the northbound MD 295 shoulder. This area is located along southbound MD 295 from Greenbelt Road to Explorer Road.

2.5.2 TNM Model Validation

TNM validation models were developed to encompass the portion of MD 295 within this project's study area. Observed traffic collected during noise monitoring sessions was incorporated into the related TNM models and the predicted noise levels were compared to the monitored noise levels. A difference of three decibels or less between the monitored and modeled levels is considered acceptable, since this is the limit of change detectable by typical human hearing. FHWA guidance specifies that the arithmetic difference between monitored and predicted existing noise levels is a measure of the model's accuracy.

Tables summarizing the results of model validation completed as part of the MD 295 analysis are included in Appendix C.

Receptor M1-23-12 under-predicted noise levels by 12 dB(A). This receptor is located within an athletic field at Eleanor Roosevelt High School immediately adjacent to Hanover Parkway. This receptor is heavily influenced by background noise levels within the community and traffic along Hanover Parkway. Traffic counts for Hanover Parkway were not available at this location. This location is second row and most of the neighboring receptors are validating well. At a distance of approximately 600 feet from the edge of existing pavement, the receptor is far from I-295 and both the measured and modeled noise levels are

well below the impact threshold. For these reasons, receptor M1-23-12 is not considered a critical receptor.

2.6 I-495 (Capital Beltway-Virginia)

2.6.1 Land Uses

The portion of the study project within Virginia is being evaluated in coordination with VDOT and in compliance with the VDOT Highway Traffic Noise Impact Analysis Guidance Manual. The Study area was divided into four (4) distinct areas of similar land use in accordance with VDOT and FHWA policies and guidance. Of these, all four were identified as NSAs.

A. Noise-Sensitive Areas

Residential NSAs include single-family residences, single-family attached residences (townhouses), and multi-family residences (condominiums and apartments), motels and hotels located in neighborhoods adjacent to the Capital Beltway. Non-residential NSAs include recreation areas, playgrounds, active sports areas, parks, schools, churches, libraries, and hospitals located adjacent to the Capital Beltway.

NSA VA-1

This NSA is located west of the southbound lanes of I-495, between the George Washington Memorial Parkway and the grade separation at Live Oak Drive over I-495. This area consists of residences and recreational uses, including Scott's Run Nature Preserve and the Langley Swim and Tennis Club. Trails at Scott's Run Nature Preserve within this NSA include sections of the Potomac Heritage Trail, the Laurel Ridge Trail, the Oak Trail, and some unnamed connector trails within the park boundary (Fairfax County, 2015). The trails at Scott's Run are maintained by Fairfax County Park Authority (Fairfax County, 2019). Receptors do not have direct line of sight with I-495 and are generally at least 10 feet higher in elevation than the interstate mainline. The dominant noise source is traffic from I-495.

NSA VA-2

This NSA is located west of the southbound lanes of I-495, between the American Legion Memorial Bridge and the George Washington Memorial Parkway Interchange. This area consists of residences along Live Oak Drive, Rivercrest Drive, Green Oak Drive, and recreational use associated with the Potomac Heritage Trail. Receptors generally do not have direct line of sight with I-495 and are generally at least 20 to 70 feet in elevation relative to the interstate mainline. The dominant noise source is traffic from I-495 and George Washington Memorial Parkway.

NSA VA-3

This NSA is located east of northbound lanes of I-495, from Georgetown Pike (VA 193) and extends along the I-495 North on-ramp to eastbound George Washington Memorial Parkway. This area includes residences located along Lupine Lane, Wemberly Way, Lawton Street, Butternut Court, River Oaks Drive, Arbor Lane, Balls Hill Road, and recreational uses associated with the Dead Run Trail at Turkey Run Park (managed by the National Park Service). Receptors do not have direct line of sight with I-495 (due to existing noise barriers) and are generally at least +/- 20 feet in elevation relative to the interstate mainline. The dominant noise source is traffic from I-495 and George Washington Memorial Parkway.

NSA VA-4

This NSA is located east of the northbound lanes of I-495 adjacent to the American Legion Memorial Bridge, and north of George Washington Memorial Parkway. This area consists of recreational uses associated with the Potomac Heritage Trail, and Dead Run Trail at Turkey Run Park (managed by the National Park Service). Receptors generally do not have direct line of sight with I-495 and are generally at least 70 feet lower in elevation than the adjacent highway. The dominant noise source is traffic from I-495 and George Washington Memorial Parkway.

2.6.2 Noise Measurement Data

In acoustical studies, measurement of ambient noise levels is used to validate the computer model against field-observed conditions. This ensures the accuracy and reliability of the computer predictions of future noise conditions for the proposed project.

Noise monitoring along I-495 in Virginia was conducted between October 1 and 3, in 2018. Along I-495, a total of 6 short-term noise measurements of 20-minute duration were taken for the purposes of TNM model validation. The short-term noise measurements were collected using three Rion NL-42 Type 2 (precision) sound level meters. At the beginning and end of each day, the noise meters were calibrated to 94 dB(A) using a Rion NC-74 precision acoustic calibrator.

Readings were taken on the A-weighted scale and reported in dB(A). The data collection procedure involved the L_{eq} measurements in consecutive 10-second intervals. This method allowed for individual time intervals that include noise events unrelated to traffic noise (such as aircraft over flights) to be excluded from consideration for model validation purposes. Data collected by the noise meter included time, L_{eq}, minimum noise level (L_{min}), maximum noise level (L_{max}), percentile sound levels (e.g. L_5, L_{10}, L_{50}, L_{90}, L_{95}), and the Sound Exposure Level for each interval. Hourly L_{eq} were derived at each location from the 20-minute L_{eq} values. Existing noise measurements were collected under meteorologically acceptable conditions when the pavement was dry and winds were calm or light. Additional data collected at each monitoring location included atmospheric conditions and the observation of non-traffic noise events. A Kestrel model 4000 Pocket Weather Tracker was used to collect weather conditions (e.g. temperature, humidity, wind speed and direction, etc.) in the field at the time of each monitoring session.

During short-term monitoring the highway(s) providing the dominant noise source was recorded by video camera and was recorded manually on all other roadways which were visible from each monitoring site. Traffic was grouped into one of the three categories: automobiles (Class 2 and 3), medium trucks (Class 5) and heavy trucks (Class 6 through 13), per FHWA vehicle classifications. Buses (Class 4) were combined with the medium trucks and motorcycles (Class 1) were included with the automobiles (FHWA, 2014).

A summary of the short-term noise monitoring results are presented in Appendix C**.** For each site, the table lists the assigned monitoring site number; the location of the monitoring site; a description of the land use for each site; the dominant sources of noise at each site; and the monitored sound level.

The monitored L_{eq} in the Study corridor ranged from 55.9 dB(A) to 74.5 dB(A). Traffic noise from I-495, Georgetown Washington Memorial Parkway, were the dominant sources of noise within the Study area.

2.6.3 Noise Model Validation

The computer modeling process begins with model validation, per FHWA/VDOT requirements. This is accomplished by comparing the monitored noise levels and the noise levels predicted by TNM, using traffic volumes and speeds that were observed during the monitoring process (the 20-minute traffic data was converted to one-hour traffic data for validation of the model). This validation ensures that reported changes between the existing and future design-year conditions are due to changes in traffic, and not discrepancies between monitoring and modeling techniques. A difference of plus or minus 3 dB(A) or less between the monitored and modeled levels is acceptable, since this is the limit of change detectable by a typical human ear.

Tables summarizing the results of model validation completed as part of the I-495 in Virginia analysis are included in Appendix C.

As shown, the difference between the modeled and monitored noise levels range from -2.6 to +2.8 dB(A). The predicted levels that were modeled in TNM generally can differ from the recorded levels due to several factors. Such factors include atmospheric conditions[22] (upwind, neutral, or downwind) (NCHRP, 2018), existing shielding by structures that may be difficult to model, the limited preliminary survey data (i.e. as-built plans), complex roadway and/or receptor geometry[23] (FWHA, 2004), and the representativeness of louder vehicles which pass-by the sound level meter during the measurement period. Other types of environmental factors (i.e. non-traffic related noise) were witnessed during the monitoring events that cannot be replicated in TNM, which can include airplane overflights, jake brakes (engine brakes), transit events, emergency sirens, HVAC systems, lawnmowers (i.e. motorized lawn care activities), and backup alarms. The noise from these external environmental factors was removed from the noise monitoring data when it had a noticeable effect on the monitored noise levels. There are also factors in the noise model that may cause differences with the measured noise levels including 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.

Each of the 6 noise monitoring sites validated. Since all the monitored sites were validated within plus or minus 3 dB(A), the noise models were considered to be an accurate representation of actual existing conditions throughout the study area. Accordingly, the validated noise model was the base noise model used for the remainder of the noise analysis.

[22] Sound levels on the down-wind side of a sound source are often considerably higher than sound levels on the upwind side. On the downwind side, sound rays are curved downward which could allow multiple sound rays to arrive at a receiver. On the upwind side, sound rays are curved upward, which causes a sound shadow (zone) to occur. Sound rays enter the shadow region primarily due to a scattering of sound waves by atmospheric turbulence. Similar to the influence of wind, sound rays are curved by temperature variations in the atmosphere. Consequently, since specific atmospheric conditions are not modeled in TNM, predicted noise levels will most likely deviate from observed noise monitoring results.

[23] Limits have been placed on the number of barriers and the number of ground points that are calculated in TNM. TNM has been designed to handle up to two barrier objects (i.e. objects input using TNM's barrier input tool) located within the source-receiver path. If three or more barrier type objects are encountered, TNM will choose the most effective pair of barriers based on their input heights and then discards all other barrier objects for the remainder of the analysis. TNM next determines how many points in the geometry cause the shortest path from the source to receiver to diffract downward. These "highest path points" (HPPs) could be barriers or ground points, which could be associated with berms, terrain lines or roadways. If three or more HPPs are encountered, TNM will not compute diffraction from all of them, and only the most effective pair is retained for calculation.

3

3 PREDICTED NOISE LEVELS AND IMPACT ANALYSIS

3.1 Introduction

The section documents the future predicted noise levels resulting from the proposed design for each NSA and assesses whether or not the NSA is impacted and warrants a barrier analysis. Impacts were assessed based upon the following criteria:

- Projected 2040 design year noise levels approach or exceed the FHWA NAC for the intended land use (see **Table 1-2**).

For the NSAs that do not approach or exceed the NAC (and therefore are not considered impacted under that criterion), the lowest existing noise level was compared to the worst-case future build condition noise level in order to determine whether a substantial increase impact would occur (defined as 10 dB(A) per the 2020 MDOT SHA Guidelines). No NSAs will experience a substantial increase as a result of any Build Alternative evaluated for this project.

All prediction modeling was performed using FHWA's TNM v2.5 by applying the 2040 loudest-hour traffic data to the TNM noise barrier analysis models. The preliminary access locations were included in this noise analysis. Modifications to the managed lane access points following input from the Counties will be considered in the updated noise analysis in support of the FEIS/ROD. During field noise monitoring, a 55 dBA background noise level was observed due to the urban setting of the study area.

3.2 Traffic Data

Level of Service (LOS) 'C/D' traffic flow theoretically produces the worst-case noise scenario. The 2011 FHWA Highway Traffic Noise: Analysis and Abatement Guidance states that the "worst hourly traffic noise impact" occurs at a time when truck volumes and vehicle speeds are the greatest, typically when traffic is free flowing and at or near LOS C conditions. According to the Highway Capacity Manual, as the volume approaches the LOS C/D border, vehicle speeds begin to be affected by the surrounding traffic and average speeds begin to drop below free flow speeds. Therefore, LOS 'C/D' volumes typically represent the noisiest scenario, and these volumes are used in the noise model when the overall peak traffic hour volumes for a given segment are higher (LOS 'D', 'E', or 'F' conditions). If LOS 'C/D' volumes are not reached for a specific roadway segment, the highest hourly volume is used as the noisiest.

LOS 'C/D' volumes were calculated using the 2016 Highway Capacity Manual (HCM6) formulas. Several factors were considered in the analysis including free flow speed, number of lanes, peak hour factor,

interchange density, and percent trucks. Truck percentages (medium trucks, heavy trucks and busses) for each roadway segment are derived from recent class counts conducted by MDOT SHA.

See Appendix B for the LOS C/D volumes, speeds, and truck percentages for the Study area.

3.3 I-495 (Capital Beltway-Maryland)

A. Relocation of Existing Noise Barriers

Any existing noise barrier or portion of wall falling within the limits-of-disturbance for the 2040 Build Alternatives is assumed to be demolished and relocated during construction to accommodate roadway widening and/or stormwater management facilities, and drainage, grading and construction activities. The 2040 Build Alternative models were built under the baseline assumption that all existing noise barriers within the LOD that will require relocation are not in place. This ensures that the replacement barriers will be designed to optimize their effectiveness, because the model is predicting noise levels that are the direct result of the traffic noise without the existing barrier in place.

B. Predicted Noise Level Results

Eighty-eight (88) NSAs were evaluated for impacts along I-495 in Maryland. 86 NSAs contained impacts resulting from Alternative 5; 89 NSAs contained impacts resulting from Alternatives 8, 9, 10, 13B and 13C. Detailed predicted noise level results for each modeled receptor are found in Table D-1, in Appendix D.

C. Summary of Noise Abatement Warrants

The following NSAs warrant further consideration of new noise abatement measures due to the construction of the proposed highway improvements: 1-01, 1-02, 1-04, 1-05, 1-10, 1-11, 1-13, 1-14, 1-16, 1-17, 1-20, 1-22, 1-23, 1-26, 1-28 and 1-37. Geographically, the number of NSAs warranting further consideration of abatement are distributed as 8 in Montgomery County and 9 in Prince George's County. Extensions of existing noise barriers have been considered adjacent to the following NSAs: 1-03, 1-06, 1-08, 1-09, 1-12, 1-25, 1-29, 1-33, 1-34, 1-35 and 1-36. Locations where noise barriers already exist are not included in this list since they will be replaced as needed. The noise analysis has demonstrated that barriers continue to be warranted in communities with existing barriers.

3.4 I-270 (Dwight D. Eisenhower Memorial Highway)

A. Predicted Noise Level Results

Thirty-seven (37) NSAs were evaluated for impacts along I-270. The build alternatives vary throughout this portion of the project and were divided into three segments where the alternative options are similar. From NSA 5-01 through 5-28 there were three distinct alternative options (Alt 5 and 13B; Alt 8,9,10, and 13C; and Alt 10), adjacent to NSA 5-29 there were four distinct alternative options (Alt 5, 8, and 9; Alt 10; Alt 13B; and Alt 13C), and from NSA 5-30 through 5-37 there are two distinct alternative options (Alt 5; and Alt 8, 9, 10, 13B, and 13C).

From NSA 5-01 through 5-28, 16 NSAs contained impacts resulting from Alternative 5 and 13B; 16 NSAs contained impacts resulting from Alternatives 8, 9, and 13C; 18 NSAs contained impacts resulting from Alternative 10. Detailed data for each modeled receptor is found in Table D-2a, in Appendix D.

NSA 5-29 contains impacts resulting from all of the Build Alternatives. Detailed data for each modeled receptor is found in Table D-2b, in Appendix D.

From NSA 5-30 through 5-37, eight NSAs contained impacts resulting from Alternative 5; eight NSAs contained impacts resulting from Alternatives 8, 9, 10, 13B, and 13C. Detailed data for each modeled receptor is found in Table D-2c, in Appendix D.

B. Summary of Noise Abatement Warrants

The following NSAs warrant further consideration of noise abatement due to the construction of the proposed highway improvements: 5-01, 5-02, 5-06, 5-07, 5-08, 5-09, 5-10, 5-12, 5-13, 5-14, 5-15, 5-16, 5-17, 5-18, 5-19, 5-20, 5-21, 5-22, 5-29, 5-30, 5-31, 5-32, 5-33, 5-34, 5-36, and 5-37. All NSAs are located within Montgomery County. Locations where noise barriers already exist (NSAs 5-16, 5-17, 5-20, 5-21, and 5-29) are not included since they will be replaced as needed. The noise analysis has demonstrated that barriers continue to be warranted in communities with existing barriers.

3.5 I-95 (North of Capital Beltway)

A. Predicted Noise Level Results

Two NSAs were evaluated for impacts along I-95. Two NSAs contained impacts resulting from the build Alternatives. Detailed data for each modeled receptor is found in Table D-3, in Appendix D.

B. Summary of Noise Abatement Warrants

The following NSAs warrant further consideration of noise abatement due to the construction of the proposed highway improvements: I95-N and I95-S. All NSAs are located within Prince George's County. There is an existing noise barrier within NSA I95-N which will not be affected by construction.

3.6 MD 295 (Baltimore-Washington Parkway)

A. Predicted Noise Level Results

Two NSAs were evaluated for impacts along MD 295. Two NSAs contained impacts resulting from the build Alternatives. Detailed data for each modeled receptor is found in Table D-4, in Appendix D.

B. Summary of Noise Abatement Warrants

The following NSAs warrant further consideration of noise abatement due to the construction of the proposed highway improvements: BW-N and BW-S. All NSAs are located within Prince George's County.

3.7 I-495 (Capital Beltway-Virginia)

A. Predicted Noise Level Results

Four NSAs were evaluated for impacts along I-495 in Virginia. Three NSAs contained impacts resulting from Alternative 5; three NSAs contained impacts resulting from Alternatives 8, 9, 10, 13B and 13C. Detailed data for each modeled receptor is found in Table D-5, in Appendix D.

B. Summary of Noise Abatement Warrants

NSAs VA-1, VA-2 and VA-3 are being evaluated for noise abatement in coordination with VDOT and in compliance with the VDOT Highway Traffic Noise Impact Analysis Guidance Manual. The results of this evaluation will be included in the FEIS.

4

4 BARRIER ANALYSIS

4.1 Introduction

Federal regulation (23 CFR 772) and the MDOT SHA *Highway Noise Abatement Planning and Engineering Guidelines* (2020) require that noise abatement be investigated at all NSAs where the Build traffic noise levels approach or exceed the FHWA NAC for the defined land use category, or where there are substantial increases over peak ambient noise levels. Where noise abatement was warranted for consideration, additional criteria were examined to determine if the abatement is feasible and reasonable.

This section discusses the MDOT SHA barrier feasibility and reasonableness criteria, defines key noise barrier design terms, and outlines the noise barrier design process. It also documents the results for each of the barrier systems[24] that were studied. When applicable, it details the existing barrier assessment procedure and documents the evaluation of each existing barrier, studying barrier extensions or modifications and including any recommendations as necessary.

4.2 Feasibility and Reasonableness Criteria

Elements of the feasibility and reasonableness criteria as defined in the MDOT SHA *Highway Noise Abatement Planning and Engineering Guidelines* (2020) are listed below.

4.2.1 Feasibility

The assessment of noise abatement feasibility, in general, focuses on whether it is physically possible to build an abatement measure (i.e. noise barrier) that achieves a minimally acceptable level of noise reduction. Barrier feasibility considers three primary factors: acoustics, safety & access, and site constraints.

A. Acoustic Considerations

- A modeled reduction of projected noise levels must be at least 5 dB(A) at 70 percent of impacted sites to be considered feasible.
- Implementation of a noise barrier may not be feasible where external noise sources exist[25], if those sources significantly limit the effectiveness of the proposed abatement measure.

[24] A barrier system refers to a single barrier or group of barriers analyzed together to protect one or more NSAs.
[25] Some examples include areas under aircraft flight paths or adjacent to active railroads, etc.

B. Safety and Access Considerations

- Noise abatement may not be feasible in areas where driveway access needs to be maintained, where local street access exists, or if pedestrian access would be restricted.
- Noise abatement measures that would create adverse safety conditions, such as limiting sight distance or reduction of a vehicle recovery area, will not be considered feasible.

C. Site Constraints

Site constraints are circumstances or conditions associated with a potential noise barrier site that would require additional engineering solutions or expenditures in order to support the construction of the barrier. This assessment determines whether it is physically possible to construct an abatement measure in the necessary location. Possible site constraints include:

1. Topography;
2. Drainage (would the barrier reduce or eliminate the effectiveness of a drainage system);
3. Utilities (would the barrier displace any major utilities); and
4. Maintenance (would the barrier allow for necessary maintenance and inspection operations).

4.2.2 Reasonableness

The assessment of noise abatement reasonableness, in general, focuses on whether it is practical to build an abatement measure. Barrier reasonableness considers three primary factors: viewpoints, design goal, and cost effectiveness.

4.2.3 Viewpoints of Benefited Property Owners and Residents

This factor is often unknown during early analysis stages, where it is generally assumed that there is no significant opposition. If MDOT SHA receives opposing viewpoints from any impacted and benefited residents within a Noise Sensitive Area (NSA), a voting process will be administered. However, a voting process will not be administered based solely on the request of a non-impacted and benefited resident. The voting process requires that more than 50 percent of benefited residents be opposed to the noise abatement measure for it to be deemed not reasonable.

4.2.4 Benefited Residences and Design Goal

The total number of benefited residences will be the sum of the impacted and non-impacted residences that receive a 5-dB(A) or greater noise reduction. This sum also includes any impacted and non-impacted benefited equivalent residences (ER), which have been calculated for outdoor noise-sensitive use areas of sufficient duration, frequency, or permanence based on the subject Land Use Activity Category and intensity of use.

> *Common use areas identified within a Category B area that would be typically available for use by residents of the entire multifamily property/facility/complex would be weighted based upon the total potential users and with consideration given, as appropriate, also to the overall capacity and extent of use of the subject common area. The equivalent residences for category C, D, and E land*

uses are based on either the total linear frontage of property along the subject highway where 125 feet of linear frontage is equivalent to one (1) residence, or the capacity of the use, as detailed in Appendix D of the MDOT SHA Highway Noise Abatement Planning and Engineering Guidelines (2020).

At least three (3) or 50 percent (whichever is greater) of impacted residences must receive at least a 7 dB(A) reduction from the proposed abatement in order for the abatement to be considered reasonable.[26] This is the MDOT SHA Noise Reduction Design Goal. While this goal is deemed the minimum acceptable, the MDOT SHA will also consider a desirable goal of 10 dB(A) that will be pursued where practical, in the spirit of the explicit FHWA guidance to provide substantial noise reduction in the consideration of noise abatement and to maintain consistency with past MDOT SHA design practice.

4.2.5 Cost Effectiveness

Noise barriers that are determined to be feasible are also evaluated for reasonable cost. The MDOT SHA uses the QUANTITY of noise barrier material (in terms of square-footage) as a measure of reasonableness, rather than an actual dollar-based criterion. Specifically, reasonableness is assessed in terms of the total number of benefited residences. The total square-footage of the barrier system would then be divided by the total number of benefited residences, including any equivalent residences, to yield a square-footage per residence (SF-p-r). The result of which would need to be at or below the governing threshold to be considered reasonable:

MDOT SHA sets the appropriate barrier quantity cap (*evaluation threshold*) based on the degree and extent that the subject Type I highway project changes the existing noise environment. The threshold can increase from a baseline allowance of 700 SF-p-r up to a maximum possible allowance of 2700 SF-p-r as shown in **Table 4-1**.

Table 4-1: Cost Reasonableness Evaluation Thresholds

Baseline – applies to **ALL** Type I Projects	**NONE** of the conditions is present	700 SF-p-r
Condition • The project increases through capacity. • The project increases noise levels by a minimum of 3 dB(A) from existing to future build conditions. • The project results in noise levels at or above 75 dB(A).	Only **ONE** of the conditions is present	1700 SF-p-r
	TWO OR MORE of the conditions are present	2700 SF-p-r

The evaluation threshold is independently determined for each proposed barrier system based upon the project characteristics affecting the noise environment. If a studied barrier system protects areas that fall

[26] NSAs must have a minimum of three (3) impacted receptors in order to be considered for noise abatement.

under different conditions, the analysis will use the higher evaluation threshold in the assessment of barrier reasonableness.

- Extra-Cost Assessment – *If necessary*, the basic approach in an ECA is focused on a detailed determination of the extra cost required and a comparison with the estimated all-inclusive barrier cost (based on the needed square footage for the subject barrier design). From this, an extra-cost square-footage is determined, which is then applied to the baseline square-footage. As long as the adjusted square-footage per residence does not exceed the appropriate evaluation threshold, the barrier would be judged as feasible and reasonable. Detailed procedures are found in Appendix E of the *MDOT SHA Highway Noise Abatement Planning and Engineering Guidelines (2020).*

4.3 Noise Barrier Design Terms

The terms defined below are necessary to the understanding of the noise barrier design process.

A. Background Noise

A noise barrier is only designed to reduce highway traffic noise levels. However, each study area is also subjected to background noise. Background noise is comprised of ALL sources of noise in the environment such as rustling leaves, children playing, local traffic, dogs barking, aircraft flyovers, lawn-mowing, etc. For this Study, a **55-dB(A)** background noise level was selected based on observations made during the noise measurement phase.

Background noise can impose a limit on the perceived effectiveness of a noise barrier, especially for receptors more distant from the highway where overall noise levels from the project are lower. Thus, TNM Output undergoes a background noise level adjustment so that a barrier's effectiveness is not unrealistically overstated.

B. Critical Sensitive Receptors

Generally, only critical sensitive (CS) receptors are used to govern barrier design. Critical sensitive receptors are typically defined as first-row, ground-level sites (5 feet above ground, as per standard industry practice), where worst-case noise impacts are found. Noise reduction at second-row receptors or other locations not directly adjacent to the barrier is considered a secondary benefit. Elevated receptors used to represent multi-story balconies are also used to govern the barrier design, if they are impacted or as appropriate.

C. Limit Receptors

Limit receptors may be used in conjunction with CS receptors to more fully develop a barrier design. These receptors may have noise levels just below the NAC or may lie just outside a particular property or NSA. Their use helps ensure adequate protection is provided to the full extent of a targeted area when CS receptors alone could leave gaps in the coverage.

D. Performance Objectives

The performance objectives established by the MDOT SHA Noise Team are used to guide the noise barrier design process. These objectives, which maintain consistency with past MDOT SHA design practice, are

primarily focused on impacted properties with the aim to comprehensively eliminate all impacts. Accordingly, the objectives consider multiple factors simultaneously, rather than being based on a single criterion:

- Blocking line-of-sight (l-o-s) – Acoustically, when a barrier blocks the line-of-sight between a critical sensitive or limit receptor and the stack height of a Heavy Truck, typically 12-feet above pavement level, the noise reduction achieved will usually be around 5-dB(A). Psychologically, residents are more apt to be dissatisfied with a noise abatement measure if traffic can still be seen. Regardless of the actual abatement provided, the reduction will be perceived as less effective. Because of its vital importance, establishing the minimum line-of-sight heights is foundational to all noise barrier designs.
- Eliminating impacts – Achieving the design goal noise reduction of 7 dB(A) at impacted receptors will not eliminate all impacts, if the predicted noise levels are higher than 72 dB(A). Consequently, a greater noise reduction between 8 and 15 dB(A)[27] needs to be pursued for higher noise levels. The objective for these receptors with higher levels is to reach a with-barrier noise level of 64 dB(A) or less, which should be perceptibly distinct from the Category B NAC.
- Minimizing "hot-spots" – In order to prevent "hot spots", the with-barrier uniformity range for neighboring properties within an NSA, ideally, should be 3 dB(A) or less. This means that one property's with-barrier levels should not be perceptibly different from an adjacent property. Establishing a maximum with-barrier level, such as 64 dB(A), for the critical sensitive and limit receptors usually is sufficient in accomplishing this objective.

The objectives are interdependent; the acoustic profile is established by blocking line-of-sight with aesthetic step considerations while attempting to eliminate impacts and minimize "hot-spots".

In seeking to accomplish these performance objectives, the noise analysis can better incorporate "what does it take" to achieve an optimum barrier design, as well as, identify where objectives cannot be reasonably met. This information helps direct any subsequent profile modifications, so that deviations from meeting the objectives can be minimized or at least documented[28]. This "top-down" approach could continue until a reasonable barrier is found or until only the bare minimum policy criteria are met, whichever occurs first. The policy criteria define the minimally acceptable design, which should only be pursued if it is the one remaining solution that would be feasible and reasonable[29].

4.4 Noise Barrier Design Process

The noise barrier design process typically includes the following steps:

1. Identifying issues (such as access) that would make a barrier system not feasible.
2. Establishing the noise barrier alignment(s) for Study while avoiding or minimizing site constraints where possible.

[27] TNM Output is capped at 15 dB(A) as part of the background noise level adjustment process, because it is nearly impossible to realize higher noise reduction when the barrier is constructed.
[28] Engineering judgment is used, or an agency consensus is sought, when significant objectives cannot be met or would need to be relaxed to achieve reasonable abatement.
[29] A "bottom-up" approach that started with a "minimum" barrier would fail to consider much of these performance objectives and could result in design decisions that cannot be readily defended. For example: Why is only 50 percent of the impacted NSA protected and how was that 50 percent prioritized?

3. Modeling receptors with enough density to understand the extent of the impacts within an NSA and the benefits generated by the studied barrier system.
4. Checking line-of-sight and setting appropriate noise reduction goals for critical sensitive and limit receptors.
5. Testing various Top of Wall profiles to see how well performance objectives can be achieved after background noise level adjustments are applied. All noise results presented in this section have been adjusted using a 55 dB(A) background noise level.
6. Preparing the barrier analysis results graphically and in tabular form to determine if the noise barrier design is feasible and reasonable.

The noise barrier design results for each studied barrier system are presented below. The NSAs warranting a barrier analysis and the studied barriers are depicted in the exhibits attached to this report.

4.5 I-495 (Capital Beltway in Maryland)

4.5.1 Noise Barrier Design Goals and the Four Phases

Preliminary noise barrier designs are presented in this Study. For new or replacement noise barriers, typically, constant height barriers were specified for each NSA. The barrier design is governed primarily by the goal of 7 dB(A) noise reduction at the *critical sensitive receptors*. Critical sensitive receptors are typically defined as first-row, ground level sites, where worst-case noise impacts are found. Noise attenuation at second-row receptors, upper level receptors or other locations not directly adjacent to the proposed barrier are considered a secondary benefit.

As previously explained, the I-495 corridor in Maryland was previously separated into four (4) phases, based on the status of the noise barrier in each NSA. These phases were retained for this Study in order to maintain consistency. Phase 1 includes NSAs that do not have an existing noise barrier. Phases 2 and 3 contain existing noise barriers, and Phase 4 includes non-residential noise-sensitive land uses. The existing barriers along 495 were built in two general phases: Phase 2 includes barriers analyzed and designed prior to 1995 (built in 1982-1998), and Phase 3 includes those built in the early 2000s. Phases 2 and 3 are evaluated equally by the MLS project as existing barriers. The Phase 2 and 3 designations are maintained in order to distinguish at what phase of the roadway's life cycle the barriers were constructed. Some barriers have been analyzed in segments, in accordance to the “Phase” the NSA that the segment of the barrier protects. Although these barriers are divided into segments by NSA in this report, contiguous barriers would be joined during construction. In each analysis of barrier effectiveness, barriers in adjacent NSAs were included in the model.

Note that receptors showing ‘n/a’ in the Barrier Predicted Insertion Loss, Noise Levels and Benefits tables do not affect the noise barrier design recommendation. The receptors shown may represent more than one residence, therefore the total benefits may be larger than the number of representative receptors in the table.

The procedure for the analysis of noise barriers is dependent on ‘phase’ as follows.

A. Phase 1

Phase 1 NSAs (1-xx) are presently not protected by a noise barrier and warrant an investigation into the feasibility and reasonableness of noise abatement. The analysis for Phase 1 areas follows Federal and

State guidelines for Type 1 noise barriers. Feasibility and Reasonableness Criteria are presented in Section 4.2 of this report. To determine if a proposed noise barrier is feasible and/or reasonable, only those factors relating to barrier noise effectiveness, warrant, and cost benefit have been considered in the following Phase 1 analysis results.

B. Phase 2

Phase 2 NSAs (2-xx) have existing noise barriers designed prior to 1995. Since these barriers are presently in place, 'warrant' and 'cost effectiveness' have been previously determined.

There are three basic scenarios that can occur in a Phase 2 area.

- The entire barrier is disturbed by the construction of the proposed highway improvement. In this case, a replacement barrier is designed. The barrier is referred to as 'newly aligned' if the proposed alignment differs significantly from the existing alignment. It is referred to as 'replaced-disturbed' if the newly aligned barrier is offset from the existing alignment by only a few feet.
- Part [or parts] of the barrier is disturbed by the construction of the proposed highway improvement. In this case, existing and replacement barrier segments are integrated into one design.
- None of the existing barrier is disturbed by construction. In this case, the existing barrier serves as the base design.

In each case, the barrier design – existing or proposed – is evaluated based on the modeled noise reduction (insertion loss) at critical sensitive receptors. If there are no impacts behind the existing barrier then no additional analysis is required. If impacts are predicted, barrier performance is reviewed based on a comparison of '2040 Build Barrier' predicted noise levels to '2040 No Build' predicted noise levels to verify that the noise barrier satisfies the requirements of MDOT SHA Highway Noise Analysis Planning and Engineering Guidelines (2020). If necessary, recommendations to increase the height (or length) of undisturbed barriers or sections have been included to ensure this. Any square footage values presented for replacement barriers are for informational purposes only.

C. Phase 3

Phase 3 NSAs (3-xx) have existing noise barriers designed during or after 1995. Analysis is identical to that of Phase 2 NSAs. Refer to Phase 2 analysis description above.

D. Phase 4

Areas that are non-residential areas that are Noise Sensitive land uses. NSA 4-01 and NSA 4-03 are primarily golf courses; these areas are considered a transient land use and are therefore not an outdoor use of sufficient frequency or duration and noise barriers are not proposed, although noise levels have been determined and reported in Section 3. NSA 4-02 is primarily a hospital including outdoor spaces adjacent to the ROW. It presently does not have a noise barrier and was analyzed per Phase 1 criteria. A portion of the Sligo Creek Trail is included in NSA 4-02. This area is considered a transient part of the trail and is therefore not an outdoor use of sufficient frequency or duration. NSA 4-04 is primarily Montgomery Blair High School with recreation areas adjacent to the ROW and an existing noise barrier that was constructed by Montgomery County as part of the overall site development. This barrier was analyzed per Phase 2 criteria.

4.5.2 BARRIER SYSTEM 495 MD-1

A. NSA 1-01

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA 1-01. The cost-reasonableness evaluation threshold for this barrier system is 2700 square feet per benefited residence (SF-p-r). The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-2**. The barrier location and benefit locations are shown on Map No. 1 for Alternative 5 and on Map No. 27 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-01.

Table 4-3 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-2: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-01

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-01-01	75	9	66	75	6	69
M1-01-02	74	12	62	74	12	62
M1-01-03	66	7	59	66	7	59
M1-01-04	65	0	65	67	0	67
R1-01-01	66	7	59	67	7	60
R1-01-02	70	10	60	71	11	60
R1-01-03	80	0	80	82	0	82
R1-01-04	62	1	61	64	1	63
R1-01-05	64	1	63	66	1	65
R1-01-06	64	0	64	67	1	66
R1-01-07	63	0	63	64	0	64
R1-01-08	57	1	56	57	1	56
R1-01-09	65	0	65	69	0	69
R1-01-10	69	0	69	71	0	71

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits		Alt 5	Alt 8, 9, 10,
Number of Impacted, Benefited Residences		8	13
Number of Non-Impacted, Benefited Residences		16	7
Total Number of Benefited Locations		24	20
SF per Benefited Residence		1,727	2,428

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-3: Noise Barrier Design Summary

NSA 1-01	Length (ft.)	Height (ft.)	Area (ft^2)
New Alignment – Alt 5	1,480	28	41,440
New Alignment – Alt 8, 9, 10, 13B, 13C	1,734	28	48,567

4.5.3 BARRIER SYSTEMS 495 MD-2 AND 495 MD-4

A. NSA 1-02, NSA 1-04 and NSA 1-05

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of two barriers and provides abatement to NSAs 1-02, 1-04 and 1-05. This system was initially analyzed as two separate systems, but the barriers only have a small break between them for Persimmon Tree Road, therefore the barrier segments for each system influence the results behind each barrier so the results have been combined in order to determine if noise abatement criteria is met. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-4**, **Table 4-5**, and **Table 4-6**. The barrier location and benefit locations are shown on Map No. 1 and 2 for Alternative 5 and on Map No. 27, 28, and 29 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSAs 1-02, 1-04, and 1-05.

Table 4-7 and **Table 4-8** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-4: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-02

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-02-01	66	6	60	66	5	61
M1-02-02	66	9	57	66	8	58
M1-02-03	75	11	64	76	6	70
M1-02-04	74	11	63	80	15	65
M1-02-05	65	5	60	67	6	61
R1-02-01	74	4	70	74	3	71
R1-02-02	64	0	64	66	1	65
R1-02-03	61	2	59	61	1	60
R1-02-04	66	8	58	66	7	59
R1-02-05	63	5	58	64	6	58
R1-02-06	65	7	58	66	8	58
R1-02-07	61	4	57	62	5	57
R1-02-08	61	3	58	62	3	59
R1-02-09	64	0	64	67	0	67
R1-02-10	62	0	62	64	0	64

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
Benefits			**Alt 5**		**Alt 8, 9, 10, 13B, 13C**	
Number of Impacted, Benefited Residences			9		21	
Number of Non-Impacted, Benefited Residences			13		4	
Total Number of Benefited Locations			22		25	
SF per Benefited Residence (segment 1-02 only)			3,587		3,147	
Combined SF per Benefited Residence (full system)			2,444		2,211	

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-5: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-04

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-04-01	71	10	61	73	10	63
M1-04-02	74	12	62	76	14	62
M1-04-03	71	11	60	70	9	61
M1-04-04	67	7	60	68	8	60
M1-04-05	70	10	60	70	9	61
M1-04-06	72	11	61	75	12	63
M1-04-07	68	8	60	70	9	61
R1-04-01	68	4	64	70	4	66
R1-04-02	60	2	58	61	3	58
R1-04-03	60	3	57	60	3	57
R1-04-04	57	1	56	57	1	56
R1-04-05	59	2	57	60	2	58
R1-04-06	71	10	61	71	10	61
R1-04-07	63	5	58	63	4	59
R1-04-08	56	1	55	56	1	55
R1-04-09	63	4	59	64	4	60
R1-04-10	59	2	57	60	3	57
R1-04-11	63	5	58	63	5	58
R1-04-12	57	1	56	57	1	56
R1-04-13	62	4	58	62	4	58
R1-04-14	62	3	59	60	2	58
R1-04-15	64	4	60	64	5	59
R1-04-16	66	4	62	66	5	61
R1-04-17	66	5	61	65	4	61

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	31	43
Number of Non-Impacted, Benefited Residences	19	15
Total Number of Benefited Locations	50	58
SF per Benefited Residence (segment 1-04 only)	1,871	1,616
Combined SF per Benefited Residence (full system)	2,444	2,211

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-6: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-05

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-05-01	69	1	68	70	3	67
M1-05-02	73	7	66	73	10	63
M1-05-03	70	11	59	72	12	60
M1-05-04	68	8	60	68	8	60
M1-05-05	71	11	60	72	11	61
M1-05-06	65	3	62	67	3	64
R1-05-01	66	1	65	67	1	66
R1-05-02	63	3	60	62	1	61
R1-05-03	66	2	64	67	4	63
R1-05-04	66	2	64	67	4	63
R1-05-05	56	1	55	57	1	56
R1-05-06	67	7	60	72	13	59
R1-05-07	65	6	59	66	7	59
R1-05-08	62	3	59	63	3	60
R1-05-09	64	5	59	63	4	59
R1-05-10	60	1	59	60	0	60
R1-05-11	61	0	61	63	0	63

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	27	27
Number of Non-Impacted, Benefited Residences	2	2
Total Number of Benefited Locations	29	29
SF per Benefited Residence (segment 1-05 only)	2,566	2,592
Combined SF per Benefited Residence (full system)	2,444	2,211

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-7: Noise Barrier Design Summary

Alternative 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment (NSA 1-02)	2,630	30	78,907
New Alignment - Ground Mounted (NSA 1-04)	3,599	26	93,530
New Alignment - Ground Mounted (NSA 1-05)	1,780	26	46,274
New Alignment - Structure Mounted (NSA 1-05)	1,173	24	28,152
TOTAL - New Barrier	**9,182**	**26.9**	**246,863**

Table 4-8: Noise Barrier Design Summary

Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment (NSA 1-02)	2,622	30	78,667
New Alignment - Ground Mounted (NSA 1-04)	3,606	26	93,741
New Alignment - Ground Mounted (NSA 1-05)	1,815	26	47,021
New Alignment - Structure Mounted (NSA 1-05)	1,173	24	28,152
TOTAL - New Barrier	**9,216**	**26.9**	**247,581**

4.5.4 BARRIER SYSTEM 495 MD-3

A. NSA 1-03 & NSA 2-01

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of an existing barrier that will require relocation and a proposed extension of the existing barrier to provide abatement to NSAs 1-03 and 2-01. The existing barrier will be relocated adjacent to NSA 2-01 to match the performance of the current barrier. The barrier extension will be analyzed for concurrence with feasibility and reasonableness criteria. The cost-reasonableness evaluation threshold for the barrier extension is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-9** and **Table 4-10**. The barrier location and benefit locations are shown on Map No 2 for Alternative 5 and on Map No. 28 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-03.

Table 4-11 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-9: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-03

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-03-01	66	7	59	67	7	60
M1-03-02	70	10	60	71	11	60
M1-03-03	76	15	61	76	15	61
R1-03-01	62	1	61	64	1	63
R1-03-02	58	1	57	59	2	57
R1-03-03	58	2	56	59	3	56
R1-03-04	64	6	58	65	7	58
R1-03-05	62	5	57	62	5	57
R1-03-06	66	7	59	66	7	59
R1-03-07	60	3	57	60	3	57
R1-03-08	64	5	59	65	6	59
R1-03-09	57	1	56	57	0	57
R1-03-10	62	2	60	62	2	60
R1-03-11	62	1	61	64	1	63

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	14	17
Number of Non-Impacted, Benefited Residences	13	10
Total Number of Benefited Locations	27	27
SF per Benefited Residence	2437	2578

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-10: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-01

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-01-01	72	9	63	72	9	63
M2-01-02	71	8	63	72	8	64
M2-01-03	70	7	63	73	9	64
M2-01-04	66	3	63	67	3	64
M2-01-05	66	2	64	67	2	65
M2-01-06	71	3	68	73	5	68
R2-01-01	65	1	64	66	1	65
R2-01-02	67	1	66	68	1	67
R2-01-03	65	1	64	66	1	65
R2-01-04	69	3	66	70	3	67
R2-01-05	55	0	55	55	0	55

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	8	12
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	8	12

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-11: Noise Barrier Design Summary

NSA 1-03 & NSA 2-01	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment (NSA 1-03 – Alt 5)	2,192	30.0	65,803
New Alignment (NSA 1-03 – Alt 8, 9, 10, 13B, 13C)	2,309	30.1	69,610
Replaced (Disturbed) - Ground Mounted (NSA 2-01)	1,256	30.0	39,103
Replaced (Disturbed) - Structure Mounted (NSA 2-01)	186	22.0	4,092
TOTAL – Alt 8, 9, 10, 13B, 13C	**3,751**	**30.0**	**112,805**

4.5.5 BARRIER SYSTEM 495 MD-5

A. NSA 1-06 and NSA 3-01

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSAs 1-06 and 3-01. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-12** and **Table 4-13**. The barrier location and benefit locations are shown on Map No 4 for Alternative 5 and on Map No. 30 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** when the SF per benefited residence is combined for the entire barrier system for NSAs 1-06 and 3-01.

Table 4-14 and **Table 4-15** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-12: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-06

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-06-01	75	7	68	75	6	69
M1-06-02	75	6	69	75	7	68
M1-06-03	75	4	71	75	4	71
R1-06-01	60	1	59	63	1	62
R1-06-02	64	2	62	65	1	64
R1-06-03	58	1	57	59	1	58
R1-06-04	56	0	56	57	0	57
R1-06-05	62	1	61	63	1	62
R1-06-06	55	0	55	55	0	55

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	2	4
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	2	4
SF per Benefited Residence	13,031	7,646
Combined SF per Benefited Residence	1,534	863

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-13: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-01

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-01-01	71	7	64	72	9	63
M3-01-02	71	9	62	72	10	62
M3-01-03	74	13	61	76	15	61
M3-01-06	73	13	60	75	15	60
M3-01-07	78	17	61	79	15	64
M3-01-08	75	10	65	75	10	65
M3-01-09	60	3	57	60	3	57
M3-01-10	74	10	64	74	10	64
M3-01-11	79	11	68	79	11	68
M3-01-12	66	7	59	67	9	58
M3-01-13	77	14	63	77	15	62
M3-01-14	68	9	59	69	11	58
M3-01-15	74	11	63	74	13	61
M3-01-16	77	13	64	77	15	62
M3-01-17	67	8	59	67	8	59
M3-01-18	75	10	65	76	15	61
M3-01-19	70	8	62	70	10	60
M3-01-20	75	12	63	76	15	61
M3-01-21	74	10	64	74	13	61
M3-01-22	79	14	65	79	15	64
M3-01-23	72	8	64	72	11	61
M3-01-24	78	12	66	79	15	64
M3-01-25	77	7	70	78	14	64
M3-01-26	78	11	67	79	15	64
M3-01-27	75	10	65	76	13	63
M3-01-28	78	15	63	79	15	64
M3-01-29	78	9	69	79	10	69
R3-01-01	57	1	56	58	2	56
R3-01-02	56	1	55	56	1	55

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R3-01-03	59	3	56	59	3	56
R3-01-04	59	3	56	59	3	56
R3-01-05	63	6	57	64	7	57
R3-01-06	59	3	56	59	3	56
R3-01-07	56	1	55	56	1	55
R3-01-08	60	3	57	61	4	57
R3-01-09	58	2	56	59	3	56
R3-01-10	62	5	57	62	5	57
R3-01-11	57	1	56	57	1	56
R3-01-12	57	1	56	57	1	56
R3-01-13	57	1	56	57	1	56
R3-01-14	57	1	56	58	2	56
R3-01-15	56	0	56	56	0	56
R3-01-16	57	1	56	58	2	56
R3-01-17	63	5	58	65	7	58
R3-01-18	58	2	56	60	4	56
R3-01-19	57	1	56	58	2	56
R3-01-20	66	7	59	68	9	59

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	49	56
Number of Non-Impacted, Benefited Residences	73	135
Total Number of Benefited Locations	122	191

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-14: Noise Barrier Design Summary

Alternative 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment – NSA 1-06	998	26.1	26,061
New Alignment NSA 3-01 – Ground Mounted	1,708	24.9	42,452
New Alignment NSA 3-01 – Structure Mounted	954	24.0	22,896
TOTAL - New Barrier	**3,660**	**25.0**	**102,045**
Existing (Intact) – NSA 3-01	3,039	19-32	88,131

Table 4-15: Noise Barrier Design Summary

Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment – NSA 1-06	955	32.0	30,583
New Alignment NSA 3-01 – Ground Mounted	1,639	40.0	73,744
New Alignment NSA 3-01 – Structure Mounted	954	24.0	22,896
TOTAL - New Barrier	**3,548**	**35.0**	**80,114**
Existing (Intact) – NSA 3-01	3,039	19-32	88,131

4.5.6 BARRIER SYSTEM 495 MD-6

A. NSA 2-02

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-02. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-16**. The barrier location and benefit locations are shown on Map No. 4 for Alternative 5 and on Map No. 30 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-02. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-17 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-16: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-02

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-02-01	78	11	67	79	11	68
M2-02-02	68	6	62	68	4	64
M2-02-03	78	11	67	80	11	69
M2-02-04	78	8	70	78	13	65
M2-02-05	65	2	63	66	4	62
M2-02-06	64	3	61	66	5	61
M2-02-07	74	11	63	72	9	63

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-02-08	78	5	73	81	14	67
M2-02-09	75	8	67	78	9	69
M2-02-10	66	5	61	69	7	62
R2-02-01	69	5	64	70	4	66
R2-02-02	72	5	67	72	3	69
R2-02-03	75	8	67	76	6	70
R2-02-04	72	5	67	73	3	70
R2-02-05	65	4	61	65	3	62
R2-02-06	67	7	60	66	6	60
R2-02-07	61	2	59	62	3	59
R2-02-08	68	8	60	68	8	60
R2-02-09	64	4	60	66	6	60
R2-02-10	76	11	65	79	13	66
R2-02-11	60	2	58	61	2	59
R2-02-12	65	0	65	69	0	69
R2-02-13	76	4	72	81	5	76
R2-02-14	59	1	58	60	0	60
R2-02-15	62	2	60	63	1	62
R2-02-16	58	1	57	58	0	58
R2-02-17	57	1	56	57	0	57
R2-02-18	57	1	56	57	1	56
R2-02-19	61	3	58	61	3	58
R2-02-20	60	3	57	59	2	57
R2-02-21	57	1	56	57	1	56
R2-02-22	60	3	57	59	2	57
R2-02-23	57	1	56	57	1	56
R2-02-24	57	1	56	57	1	56
R2-02-25	58	1	57	59	1	58
R2-02-26	58	1	57	60	0	60

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	**Alt 5**	**Alt 8, 9, 10, 13B, 13C**
Number of Impacted, Benefited Residences	43	47
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	43	47
SF per Benefited Residence	1,984	2,148

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.						
2. A receptor may represent more than 1 equivalent residence.						
3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).						
4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.						

Table 4-17: Noise Barrier Design Summary

Alt 5	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	4,024	17.9	72,194
New Alignment – Ground Mounted	128	18.0	2,304
TOTAL - New Barrier	**4,152**	**17.9**	**74,498**
Existing (Intact)	554	19-20	10,803
TOTAL - Full Barrier System	**4,706**	**18.1**	**85,301**
Alt 8, 9, 10, 13B, 13C	**Length (ft.)**	**Height (ft.)**	**Area (ft^2)**
Replaced (Disturbed) - Ground Mounted	4,054	21.7	87,856
New Alignment – Ground Mounted	128	18.0	2,304
TOTAL - New Barrier	**4,182**	**21.6**	**90,160**
Existing (Intact)	554	19-20	10,803
TOTAL - Full Barrier System	**4,736**	**21.3**	**100,963**

4.5.7 BARRIER SYSTEM 495 MD-7

This barrier system was analyzed with the I-270 barriers, see Barrier System 270-12 for NSA 5-37.

4.5.8 BARRIER SYSTEM 495 MD-8

A. NSA 3-02

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 3-02. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-18**. The barrier location and benefit locations are shown on Map No 5 for Alternative 5 and on Map No. 31 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 3-02. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-19 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-18: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-02

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-02-01	81	15	66	81	15	66
M3-02-02	63	2	61	63	5	58
M3-02-06	67	3	64	67	3	64
M3-02-07	75	9	66	75	9	66
M3-02-08	76	9	67	76	9	67
R3-02-01	61	1	60	59	2	57
R3-02-02	60	3	57	60	3	57
R3-02-03	59	1	58	58	2	56
R3-02-04	64	6	58	64	6	58

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	27	28
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	27	28
SF per Benefited Residence	2,234	2,154

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-19: Noise Barrier Design Summary

NSA 3-02	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground	2,513	24	60,315
TOTAL - New Barrier	**2,513**	**24**	**60,315**

4.5.9 BARRIER SYSTEM 495 MD-9

This barrier system was analyzed with the I-270 barriers, see Barrier System 270-11 for NSA 5-36.

4.5.10 BARRIER SYSTEM 495 MD-10

A. NSA 2-03

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-03. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-20**. The barrier location and benefit locations are shown on Map No 5 for Alternative 5 and on Map No. 31 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-03. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-21 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-20: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-03

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-03-01	59	0	59	60	1	59
M2-03-02	76	14	62	77	15	62
M2-03-03	64	4	60	64	4	60
M2-03-04	59	2	57	60	3	57
M2-03-05	64	5	59	63	4	59
R2-03-01	56	0	56	56	0	56
R2-03-02	56	1	55	56	1	55
R2-03-03	57	0	57	58	1	57
R2-03-04	56	0	56	56	0	56
R2-03-05	56	1	55	56	0	56
R2-03-06	57	1	56	57	1	56

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	10	13
Number of Non-Impacted, Benefited Residences	7	2
Total Number of Benefited Locations	17	15
SF per Benefited Residence	2,288	2,593

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-21: Noise Barrier Design Summary

NSA 2-03	Length (ft.)	Ave. Height (ft.)	Area (ft²)
Replaced (Disturbed) - Ground	1,621	24	38,899
TOTAL - New Barrier	**1,621**	**24**	**38,899**

4.5.11 BARRIER SYSTEM 495 MD-11

A. NSA 1-08 & NSA 3-04

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of two barriers (one of which is a replacement of an existing barrier, and one of which is a new barrier); it provides abatement to NSA 1-08 and NSA 3-04. The cost-reasonableness evaluation threshold for this barrier system is 1700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-22** and **Table 4-23**. The barrier location and benefit locations are shown on Map No 5 for Alternative 5 and on Map No. 31 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** but ***is not considered reasonable*** for NSA 1-08. However, when combined with the barrier for NSA 3-04, the noise barrier system ***is considered both feasible and reasonable***.

Table 4-24 and **Table 4-25** provides a breakdown of the noise barrier quantities by barrier type**. Table 4-26** provides a summary of the two barriers in the system combined.

Table 4-22: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-08

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-08-01	68	7	61	69	8	61
M1-08-02	71	10	61	72	10	62
M1-08-03	67	7	60	68	7	61
R1-08-01	59	2	57	60	2	58
R1-08-02	57	1	56	57	1	56
R1-08-03	58	1	57	59	1	58
R1-08-04	56	1	55	56	0	56

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	3	3
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	3	3
SF per Benefited Residence	5,700	5,700

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-23: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-04

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-04-01	72	8	64	72	8	64
M3-04-02	61	2	59	61	2	59
M3-04-03	68	6	62	68	6	62
M3-04-04	63	4	59	63	4	59
M3-04-05	65	5	60	65	5	60
M3-04-06	67	7	60	67	7	60
R3-04-01	61	4	57	60	3	57
R3-04-02	60	2	58	60	2	58
R3-04-03	60	2	58	60	2	58
R3-04-04	57	1	56	57	1	56
R3-04-05	74	12	62	74	12	62
R3-04-06	56	1	55	56	1	55
R3-04-07	57	1	56	57	1	56
R3-04-08	61	4	57	61	4	57
R3-04-09	58	2	56	58	2	56

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	17	17
Number of Non-Impacted, Benefited Residences	21	21
Total Number of Benefited Locations	38	38
SF per Benefited Residence	1,301	1,301

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3.Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-24: Noise Barrier Design Summary

NSA 1-08	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	857	20	17,099
TOTAL - New Barrier	**857**	**20**	**17,099**

Table 4-25: Noise Barrier Design Summary

NSA 3-04	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground	2,544	19.4	49,453
TOTAL - New Barrier	**2,544**	**19.4**	**49,453**
Existing (Intact)	3,401	19.6	66,552

Table 4-26: Two Barrier Combined Noise Barrier Design Summary

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	21	22
Number of Non-Impacted, Benefited Residences	20	19
Total Number of Benefited Locations	41	41
SF per Benefited Residence	1,623	1,623

4.5.12 BARRIER SYSTEM 495 MD-12

A. NSA 2-04

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-04. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-27**. The barrier location and benefit locations are shown on Map No 6 for Alternative 5 and on Map No. 32 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-04. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-28 and **Table 4-29** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-27: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-04

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-04-01	76	12	64	77	14	63
M2-04-02	66	6	60	67	6	61
M2-04-03	75	12	63	76	14	62
M2-04-04	66	6	60	67	8	59
M2-04-05	68	7	61	70	8	62
M2-04-06	77	13	64	78	14	64
M2-04-07	64	3	61	67	6	61
M2-04-08	70	8	62	77	14	63
M2-04-09	67	6	61	69	9	60

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-04-10	68	8	60	71	11	60
M2-04-11	69	7	62	71	10	61
M2-04-12	78	13	65	81	15	66
R2-04-01	58	2	56	58	2	56
R2-04-02	58	2	56	58	2	56
R2-04-03	57	1	56	58	2	56
R2-04-04	65	6	59	66	8	58
R2-04-05	57	1	56	57	1	56
R2-04-06	57	1	56	58	2	56
R2-04-07	57	1	56	58	2	56
R2-04-08	58	2	56	59	3	56
R2-04-09	61	4	57	61	3	58
R2-04-10	62	4	58	63	6	57
R2-04-11	62	5	57	63	6	57
R2-04-12	62	3	59	62	4	58
R2-04-13	67	6	61	68	8	60
R2-04-14	68	1	67	69	8	61
R2-04-15	62	0	62	62	1	61
R2-04-16	58	2	56	59	3	56
R2-04-17	62	5	57	63	6	57

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	67	94
Number of Non-Impacted, Benefited Residences	32	30
Total Number of Benefited Locations	99	124
SF per Benefited Residence	758	654

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-28: Noise Barrier Design Summary

NSA 2-04 - Alt 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground	3,741	20	75,081
TOTAL - New Barrier	**3,741**	**20**	**75,081**

Table 4-29: Noise Barrier Design Summary

NSA 2-04 - Alt 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground	4,042	20.1	81,084
TOTAL - New Barrier	**4,042**	**20.1**	**81,084**

4.5.13 BARRIER SYSTEM 495 MD-13

A. NSA 2-05

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-05. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-30**. The barrier location and benefit locations are shown on Map No 6 for Alternative 5 and on Map No. 32 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-05. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-31 and **Table 4-32** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-30: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-05

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-05-01	69	8	61	70	9	61
M2-05-02	76	13	63	76	12	64
M2-05-03	74	11	63	74	11	63
M2-05-04	68	8	60	69	8	61
M2-05-05	69	8	61	72	10	62
M2-05-06	79	15	64	80	14	66
M2-05-07	70	9	61	73	11	62
M2-05-08	74	11	63	78	14	64
M2-05-09	64	3	61	64	3	61
M2-05-10	66	7	59	68	8	60
M2-05-11	65	5	60	66	5	61
M2-05-12	66	5	61	69	7	62
R2-05-01	59	2	57	60	2	58
R2-05-02	61	3	58	62	4	58
R2-05-03	62	4	58	63	5	58
R2-05-04	59	3	56	60	4	56
R2-05-05	61	4	57	63	5	58

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R2-05-06	61	4	57	63	6	57
R2-05-07	66	6	60	68	8	60
R2-05-08	60	4	56	61	4	57
R2-05-09	67	7	60	69	8	61
R2-05-10	62	4	58	63	5	58
R2-05-11	64	5	59	65	6	59
R2-05-12	63	1	62	64	2	62
R2-05-13	59	3	56	60	4	56
R2-05-14	59	3	56	60	3	57
R2-05-15	57	1	56	58	2	56
R2-05-16	59	3	56	59	3	56
R2-05-17	60	3	57	61	4	57

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	29	53
Number of Non-Impacted, Benefited Residences	94	81
Total Number of Benefited Locations	123	134
SF per Benefited Residence	746	680

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-31 : Noise Barrier Design Summary

NSA 2-05 - Alt 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground	4,648	19.7	91,782
TOTAL - New Barrier	**4,648**	**19.7**	**91,782**

Table 4-32: Noise Barrier Design Summary

NSA 2-05 - Alt 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground	4,614	19.7	91,111
TOTAL - New Barrier	**4,614**	**19.7**	**91,111**

4.5.14 BARRIER SYSTEM 495 MD-14

A. NSA 1-09 & NSA 2-06

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of two barriers (one of which is a replacement of an existing barrier, and one of which is a new barrier); it provides abatement to NSA 1-09 and NSA 2-06. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-33** and **Table 4-34**. The barrier location and benefit locations are shown on Map No 7 for Alternative 5 and on Map No. 33 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-09 and NSA 2-06.

Table 4-35 through **Table 4-38** provide a breakdown of the noise barrier quantities by barrier type.

4.5.15 BARRIER SYSTEM 495 MD-15

A. NSA 1-10

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA 1-10. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-39**. The barrier location and benefit locations are shown on Map No 7 for Alternative 5 and on Map No. 33 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-10.

Table 4-40 and **Table 4-41** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-33: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-09

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-09-01	76	11	65	79	14	65
M1-09-02	73	10	63	78	13	65
M1-09-03	62	0	62	59	0	59
R1-09-01	64	3	61	66	6	60
R1-09-02	61	2	59	63	4	59
R1-09-03	62	2	60	63	4	59
R1-09-04	59	1	58	61	3	58
R1-09-05	59	1	58	60	2	58
R1-09-06	60	0	60	60	1	59
R1-09-07	59	0	59	59	1	58
R1-09-08	61	0	61	60	0	60

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	7	8
Number of Non-Impacted, Benefited Residences	0	6
Total Number of Benefited Locations	7	14
SF per Benefited Residence	2,211	1,897
Combined per SF Benefited Residence	944	881

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-34: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-06

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-06-01	66	4	62	67	6	61
M2-06-02	73	9	64	72	10	62
M2-06-03	66	5	61	66	6	60
M2-06-04	71	7	64	71	9	62
M2-06-05	69	6	63	70	9	61
M2-06-06	74	8	66	75	12	63
R2-06-01	60	1	59	60	1	59

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R2-06-02	66	2	64	67	3	64
R2-06-03	63	4	59	64	6	58
R2-06-04	57	1	56	58	2	56
R2-06-05	63	4	59	64	6	58
R2-06-06	58	1	57	58	2	56

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	24	33
Number of Non-Impacted, Benefited Residences	10	3
Total Number of Benefited Locations	34	36
SF per Benefited Residence	683	486

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-35: Noise Barrier Design Summary

NSA 1-09 - Alt 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	1,084	14.3	15,478
TOTAL - New Barrier	**1,084**	**14.3**	**15,478**

Table 4-36: Noise Barrier Design Summary

NSA 1-09 - Alt 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	1,659	16	26,564
TOTAL - New Barrier	**1,659**	**16**	**26,564**

Table 4-37: Noise Barrier Design Summary

NSA 2-06 - Alt 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	1,345	17.3	23,231
TOTAL - New Barrier	**1,345**	**17.3**	**23,231**

Table 4-38: Noise Barrier Design Summary

NSA 2-06 - Alt 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	991	17.7	17,507
TOTAL - New Barrier	**991**	**17.7**	**17,507**

Table 4-39: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-10

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-10-01	74	10	64	76	11	65
M1-10-02	74	12	62	76	15	61
M1-10-03	64	4	60	67	7	60
M1-10-04	77	13	64	77	12	65
M1-10-05	76	9	67	77	9	68
M1-10-06	73	8	65	73	8	65
M1-10-07	65	0	65	62	0	62
M1-10-08	74	10	64	76	11	65
R1-10-01	64	2	62	65	1	64
R1-10-02	59	1	58	60	2	58
R1-10-03	65	6	59	64	6	58
R1-10-04	68	7	61	68	8	60
R1-10-05	63	4	59	64	5	59
R1-10-06	59	2	57	59	2	57
R1-10-07	64	4	60	66	5	61
R1-10-08	62	2	60	63	4	59
R1-10-09	64	3	61	64	2	62
R1-10-10	61	2	59	62	1	61
R1-10-11	61	3	58	61	2	59
R1-10-12	76	7	69	76	7	69
R1-10-13	63	2	61	62	2	60
R1-10-14	62	2	60	63	5	58
R1-10-15	69	1	68	70	0	70
R1-10-16	61	0	61	60	1	59
R1-10-17	60	0	60	58	0	58
R1-10-18	63	0	63	62	1	61
R1-10-19	62	1	61	60	0	60
R1-10-20	71	0	71	71	0	71
R1-10-21	64	2	62	65	3	62
R1-10-22	70	5	65	70	5	65
R1-10-23	74	7	67	74	7	67
R1-10-24	74	4	70	75	5	70

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
Benefits			**Alt 5**		**Alt 8, 9, 10, 13B, 13C**	
Number of Impacted, Benefited Residences			56		73	
Number of Non-Impacted, Benefited Residences			42		45	
Total Number of Benefited Locations			98		118	
SF per Benefited Residence			940		782	

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-40: Noise Barrier Design Summary

NSA 1-10 - Alt 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	3,839	24	92,148
TOTAL - New Barrier	**3,839**	**24**	**92,148**

Table 4-41: Noise Barrier Design Summary

NSA 1-10 - Alt 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	3,866	23.9	92,271
TOTAL - New Barrier	**3,866**	**23.9**	**92,271**

4.5.16 BARRIER SYSTEM 495 MD-16

A. NSA 1-11 and NSA 1-13

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA 1-11 and NSA 1-13. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-42** and **Table 4-43**. The barrier location and benefit locations are shown on Map No 8 & 9 for Alternative 5 and on Map No. 34 & 35 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-11 and NSA 1-13.

Table 4-44, Table 4-45, Table 4-46, and **Table 4-47** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-42: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-11

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-11-01	67	7	60	68	7	61
M1-11-02	74	5	69	77	7	70
M1-11-03	65	0	65	66	7	59
M1-11-04	76	14	62	74	11	63
R1-11-01	65	5	60	67	7	60
R1-11-02	59	1	58	60	2	58
R1-11-03	66	2	64	67	3	64
R1-11-04	63	1	62	63	1	62
R1-11-05	65	0	65	65	0	65
R1-11-06	59	0	59	60	2	58
R1-11-07	58	0	58	58	1	57
R1-11-08	65	0	65	67	6	61
R1-11-09	63	0	63	65	6	59
R1-11-10	63	1	62	65	7	58
R1-11-11	62	1	61	63	6	57
R1-11-12	64	4	60	65	6	59
R1-11-13	60	1	59	61	3	58
R1-11-14	67	5	62	68	6	62
R1-11-15	71	9	62	72	10	62
R1-11-16	71	10	61	72	10	62

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[2] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	23	63
Number of Non-Impacted, Benefited Residences	0	23
Total Number of Benefited Locations	23	86
SF per Benefited Residence	1,579	804

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-43: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-13

Receptor Number[1]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-13-01	68	8	60	69	6	63
M1-13-02	66	6	60	67	6	61
R1-13-01	69	10	59	71	10	61
R1-13-02	67	9	58	69	10	59
R1-13-03	70	9	61	71	9	62
R1-13-04	68	8	60	70	9	61
R1-13-05	64	4	60	65	4	61

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	29	42
Number of Non-Impacted, Benefited Residences	22	4
Total Number of Benefited Locations	51	46
SF per Benefited Residence	1,560	1,737
Combined SF per Benefited Residence	1,566	1,129

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-44: Noise Barrier Design Summary

NSA 1-11 - Alt 5	Length (ft.)	Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	1,651	22	36,325
TOTAL - New Barrier	**1,651**	**22**	**36,325**

Table 4-45: Noise Barrier Design Summary

NSA 1-11 - Alt 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	4,085	16.9	69,101
TOTAL - New Barrier	**4,085**	**16.9**	**69,101**

Table 4-46: Noise Barrier Design Summary

NSA 1-13 - Alt 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	4,321	18.4	79,564
TOTAL - New Barrier	**4,321**	**18.4**	**79,564**

Table 4-47: Noise Barrier Design Summary

NSA 1-13 - Alt 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	4,404	18.1	79,909
TOTAL - New Barrier	**4,404**	**18.1**	**79,909**

4.5.17 BARRIER SYSTEM 495 MD-17

A. NSA 1-12 & NSA 2-07

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of two barriers and provides abatement to NSA 1-12 and NSA 2-07. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-48** and **Table 4-49**. The barrier location and benefit locations are shown on Map No 8 for Alternative 5 and on Map No. 34 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** but ***is not considered reasonable*** when considering NSA 1-12 on its own. However, when combined with the barrier for NSA 2-07, the noise barrier system ***is considered both feasible and reasonable***.

Table 4-50 and **Table 4-51** provide a breakdown of the noise barrier quantities by barrier type. **Table 4-52** provides a summary of the two barriers in the system combined.

Table 4-48: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-12

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-12-01	67	7	60	68	8	60
M1-12-02	68	7	62	70	8	62
R1-12-01	62	4	58	62	4	58
R1-12-02	62	4	58	64	6	58
R1-12-03	62	3	59	63	4	59
R1-12-04	61	3	58	62	3	59
R1-12-05	60	3	57	61	4	57
R1-12-06	60	3	57	61	4	57
R1-12-07	63	4	59	64	5	59
R1-12-08	69	5	64	71	6	65

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	7	11
Number of Non-Impacted, Benefited Residences	20	16
Total Number of Benefited Locations	27	27
SF per Benefited Residence	541	541

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-49: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-07

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-07-02	68	0	68	67	7	60
M2-07-03	63	5	58	63	5	58
M2-07-04	73	5	68	73	6	67
M2-07-05	65	3	62	65	3	62
M2-07-06	76	12	64	76	13	63
R2-07-01	62	4	58	62	4	58
R2-07-02	63	3	60	63	3	60
R2-07-03	59	2	57	59	1	58
R2-07-04	61	4	57	61	4	57
R2-07-05	60	2	58	60	2	58
R2-07-06	61	2	59	61	2	59
R2-07-07	63	5	58	63	5	58
R2-07-08	71	2	69	69	1	68

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	26	36
Number of Non-Impacted, Benefited Residences	5	16
Total Number of Benefited Locations	31	52
SF per Benefited Residence	1,843	1,097

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-50: Noise Barrier Design Summary

NSA 1-12	Length (ft.)	Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	900	16.2	14,616
TOTAL - New Barrier	**900**	**16.2**	**14,616**

Table 4-51: Noise Barrier Design Summary

NSA 2-07	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced - Ground Mounted	2,379	24	57,130
TOTAL - New Barrier	**2,379**	**---**	**57,130**

Table 4-52: Two Barrier Combined Noise Barrier Design Summary

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	33	47
Number of Non-Impacted, Benefited Residences	25	32
Total Number of Benefited Locations	58	79
SF per Benefited Residence	1,237	908

4.5.18 BARRIER SYSTEM 495 MD-18

A. NSA 2-08

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-08. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-53**. The barrier location and benefit locations are shown on Map No 8 for Alternative 5 and on Map No. 34 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-08. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-54 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-53: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-08

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-08-01	71	9	62	71	8	63
M2-08-02	77	13	64	78	13	65
M2-08-03	70	9	61	71	9	62
M2-08-04	74	11	63	75	11	64
M2-08-05	65	5	60	67	6	61
M2-08-06	69	7	62	70	8	62
R2-08-01	66	5	61	67	5	62
R2-08-02	64	6	58	66	7	59
R2-08-03	59	2	57	62	5	57
R2-08-04	60	3	57	62	4	58
R2-08-05	68	8	60	69	8	61
R2-08-06	57	1	56	58	2	56

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	36	33
Number of Non-Impacted, Benefited Residences	16	67
Total Number of Benefited Locations	52	100
SF per Benefited Residence	695	361

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-54: Noise Barrier Design Summary

NSA 2-08	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced - Ground Mounted	2,007	18.0	36,137
TOTAL - New Barrier	**2,007**	**18.0**	**36,137**

4.5.19 BARRIER SYSTEM 495 MD-19

A. NSA 3-05

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

The existing noise barrier is approximately 592 feet long and 27 feet high on average. With the proposed limit-of-disturbance, none of the existing barrier is impacted by construction of the either build alternate. The existing barrier is shown in its present location on Map No. 9 for the Build Alternative 5 and on Map No. 35 for the Build Alternative 8, 9, 10, 13B, and 13C.

The 2040 Build Barrier predicted noise reduction (insertion loss) and noise levels are presented below in **Table 4-55**. The existing barrier provides 7 dB(A) insertion loss for most critical sensitive receptors in NSA 3-05.

The existing barrier is effective. There is NO additional cost to protect this NSA.

Table 4-55: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-05

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-05-01	62	1	61	62	1	61

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-05-02	74	13	61	75	13	62
M3-05-03	66	5	61	67	6	61
M3-05-04	65	1	64	66	1	65
R3-05-01	61	1	60	62	1	61
R3-05-02	58	1	57	58	0	58
R3-05-03	58	0	58	59	0	59
R3-05-04	63	0	63	65	1	64
R3-05-05	55	0	55	73	0	73
R3-05-06	55	0	55	59	0	59

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.5.20 BARRIER SYSTEM 495 MD-20

A. NSA 1-14

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA 1-14. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-56**. The barrier location and benefit locations are shown on Map No 9, 10 & 11 for Alternative 5 and on Map No. 35, 36 & 37 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-14.

Table 4-57 and **Table 4-58** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-56: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-14

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-14-01	65	3	62	66	3	63
M1-14-02	66	5	61	68	6	62
M1-14-03	66	5	61	68	7	61
M1-14-04	71	9	62	72	10	62
M1-14-05	66	5	61	67	5	62
M1-14-06	74	11	63	75	12	63
R1-14-01	63	2	61	65	3	62
R1-14-02	64	3	61	65	3	62
R1-14-03	65	5	60	66	6	60
R1-14-04	68	8	60	69	9	60
R1-14-05	66	6	60	67	7	60
R1-14-06	71	8	63	72	8	64
R1-14-07	72	9	63	73	9	64
R1-14-08	66	7	59	68	9	59
R1-14-09	64	6	58	67	9	58
R1-14-10	68	6	62	69	6	63
R1-14-11	66	6	60	68	8	60
R1-14-12	64	5	59	66	7	59
R1-14-13	62	4	58	64	5	59
R1-14-14	63	3	60	65	4	61
R1-14-15	66	5	61	66	4	62
R1-14-16	68	5	63	69	5	64
R1-14-17	68	7	61	68	6	62
R1-14-18	72	8	64	73	9	64
R1-14-19	74	12	62	75	13	62
R1-14-20	64	6	58	66	7	59
R1-14-21	70	9	61	72	11	61
R1-14-22	67	8	59	68	9	59
R1-14-23	70	7	63	71	7	64
R1-14-24	67	7	60	69	9	60
R1-14-25	66	6	60	70	9	61

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	54	72
Number of Non-Impacted, Benefited Residences	26	3
Total Number of Benefited Locations	80	75

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
SF per Benefited Residence			1,795		1,954	

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-57: Noise Barrier Design Summary

NSA 1-14 – Alt 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	3,509	23.2	81,503
New Alignment - Structure Mounted	3,222	19.3	62,140
TOTAL - New Barrier	**6,731**	**21.3**	**143,643**

Table 4-58: Noise Barrier Design Summary

NSA 1-14 – Alt 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	3,094	22.3	69,103
New Alignment - Structure Mounted	3,599	21.5	77,413
TOTAL - New Barrier	**6,693**	**21.9**	**146,516**

4.5.21 BARRIER SYSTEM 495 MD-21

A. NSA 1-36, NSA 2-09 & NSA 3-06

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 1-36, NSA 2-09 & NSA 3-06. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked. An extension was evaluated for NSA 1-36, however due to the topography the extension was not able to achieve 7-dB(A) at any of the impacted receptors.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-59,** Table 4-60**,** and Table 4-60. The barrier location and benefit locations are shown on Map No 9, 10 & 11 for Alternative 5 and on Map No. 35, 36 & 37 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSAs 2-09 & NSA 3-06. The existing barrier will be replaced to meet or exceed the current abatement levels. An extension of the existing barrier was investigated for NSA 1-36, however the extension is not reasonable because it is unable to provide sufficient insertion losses due to the ramp geometry.

Table 4-61 and **Table 4-62** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-59: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-09

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-09-01	70	8	62	71	8	63
M2-09-02	71	10	61	72	10	62
M2-09-03	67	6	61	69	4	65
M2-09-04	68	5	63	69	5	64
M2-09-05	75	9	66	77	10	67
M2-09-06	71	2	69	74	4	70
R2-09-01	67	2	65	69	3	66
R2-09-02	67	7	60	68	6	62
R2-09-03	65	4	61	67	4	63
R2-09-04	63	5	58	64	6	58
R2-09-05	63	3	60	64	4	60
R2-09-06	58	2	56	59	2	57
R2-09-07	65	2	63	66	2	64
R2-09-08	67	2	65	68	2	66
R2-09-09	63	3	60	64	2	62
R2-09-10	67	2	65	68	2	66
R2-09-11	68	1	67	69	1	68
R2-09-12	61	1	60	62	1	61
R2-09-13	57	0	57	57	0	57
R2-09-14	55	0	55	55	0	55

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	36	10
Number of Non-Impacted, Benefited Residences	21	29
Total Number of Benefited Locations	57	39
SF per Benefited Residence	762	1,114

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-60: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-06

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-06-01	71	7	64	72	6	66
M3-06-02	72	9	63	73	8	65
M3-06-03	68	5	63	69	5	64
M3-06-04	72	11	61	74	12	62
M3-06-05	66	6	60	68	7	61
M3-06-06	77	8	69	78	8	70
M3-06-07	74	4	70	75	4	71
M3-06-08	77	10	67	78	10	68
M3-06-09	68	4	64	69	4	65
M3-06-10	74	9	65	75	9	66
M3-06-11	74	9	65	75	8	67
M3-06-12	67	8	59	68	8	60
M3-06-13	70	0	70	71	1	70
M3-06-14	64	3	61	65	5	60
M3-06-15	79	9	70	80	8	72
M3-06-16	76	7	69	77	7	70
M3-06-17	71	9	62	72	9	63
M3-06-18	65	6	59	67	6	61
M3-06-19	67	9	58	69	9	60
M3-06-20	71	10	61	75	10	65
R3-06-01	56	1	55	56	1	55
R3-06-02	71	11	60	74	14	60
R3-06-03	62	2	60	63	2	61
R3-06-04	63	6	57	63	4	59
R3-06-05	56	1	55	57	1	56
R3-06-06	56	0	56	57	1	56
R3-06-07	61	4	57	62	5	57
R3-06-08	67	5	62	70	2	68
R3-06-09	55	0	55	69	8	61
R3-06-10	55	0	55	68	9	59

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	31	42
Number of Non-Impacted, Benefited Residences	38	0
Total Number of Benefited Locations	69	42
SF per Benefited Residence	1,775	2,316

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-61a: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-36

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R1-36-01	63	0	63	64	0	64
R1-36-02	61	0	61	63	1	62
R1-36-03	65	1	64	67	1	66
R1-36-04	63	1	62	65	2	63
R1-36-05	67	1	66	69	1	68
R1-36-06	63	1	62	65	1	64
R1-36-07	58	0	58	60	1	59
R1-36-08	72	1	71	73	1	72
R1-36-09	60	1	59	61	1	60

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	0	0
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	0	0
SF per Benefited Residence	N/A	N/A

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-62: Noise Barrier Design Summary

NSA 2-09	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,355	20.0	27,140
Replaced (Disturbed) - Structure Mounted	529	20.0	10,580
TOTAL - New Barrier	**1,884**	**20.0**	**37,720**
Existing (Intact)	343	16.7	5,720

Table 4-63: Noise Barrier Design Summary

NSA 3-06	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (disturbed) Ground Mounted	2,689	28.0	75,292
Replaced (disturbed) Parapet Mounted	337	22.0	7,414
Replaced (disturbed) R. Wall Mounted	1,658	24.0	39,792
TOTAL - New Barrier	**4,684**	**26.2**	**122,498**

4.5.22 BARRIER SYSTEM 495 MD-22

A. NSA 2-10

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-10. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-63**. The barrier location and benefit locations are shown on Map No 11 for Alternative 5 and on Map No. 37 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-10. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-64 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-64: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-10

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-10-01	75	11	64	75	12	63
M2-10-02	72	11	61	72	11	61
M2-10-03	71	9	62	71	9	62
M2-10-04	77	14	63	78	14	64
M2-10-05	80	15	65	81	15	66
R2-10-01	72	6	66	73	7	66
R2-10-02	66	7	59	66	8	58
R2-10-03	66	7	59	68	10	58
R2-10-04	71	10	61	72	11	61
R2-10-05	63	6	57	63	6	57
R2-10-06	69	10	59	69	10	59
R2-10-07	73	12	61	74	12	62
R2-10-08	66	8	58	66	8	58

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R2-10-09	67	9	58	67	8	59
R2-10-10	69	10	59	70	10	60
R2-10-11	63	4	59	64	5	59
R2-10-12	67	7	60	68	8	60
R2-10-13	69	3	66	69	2	67

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	168	180
Number of Non-Impacted, Benefited Residences	34	6
Total Number of Benefited Locations	202	186
SF per Benefited Residence	383	417

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-65: Noise Barrier Design Summary

NSA 2-10	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,936	22.0	42,582
Replaced (Disturbed) - Retaining Wall Mounted	1,326	22.0	29,195
New Alignment - Ground Mounted	252	22.0	5,544
TOTAL - New Barrier	**3,514**	**22.0**	**77,321**

4.5.23 BARRIER SYSTEM 495 MD-23

A. NSA 2-11 & NSA 3-07

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSAs 2-11 & 3-07. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-65** and **Table 4-66**. The barrier location and benefit locations are shown on Map No 11 for Alternative 5 and on Map No. 37 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSAs 2-11 & 3-07. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-67 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-66: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-11

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-11-01	73	9	64	73	10	63
M2-11-02	76	11	65	76	10	66
M2-11-05	71	8	63	72	9	63
M2-11-07	68	8	60	69	8	61
R2-11-01	59	2	57	59	1	58
R2-11-02	65	6	59	66	7	59
R2-11-03	72	9	63	73	9	64
R2-11-04	57	1	56	57	1	56
R2-11-05	72	10	62	72	10	62
R2-11-06	63	5	58	64	5	59
R2-11-07	59	2	57	59	2	57
R2-11-08	67	7	60	67	6	61
R2-11-09	56	0	56	56	0	56

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	84	93
Number of Non-Impacted, Benefited Residences	11	0
Total Number of Benefited Locations	95	93
SF per Benefited Residence	518	529

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-67: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-07

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-07-01	65	4	61	66	3	63
M3-07-02	63	3	60	64	3	61
M3-07-03	67	7	60	68	7	61
M3-07-04	80	15	65	81	15	66
R3-07-01	56	1	55	56	0	56

Bold	Critical Sensitive Receptors
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	9	11
Number of Non-Impacted, Benefited Residences	9	0
Total Number of Benefited Locations	18	11
SF per Benefited Residence	1,451	2,374

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-68: Noise Barrier Design Summary

Barrier Segments	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
NSA 2-11 Replaced (Disturbed) - Ground Mounted	918	20	18,360
NSA 2-11 Replaced (Disturbed) - Retaining Wall Mounted	1,351	20	27,020
NSA 2-11 Replaced (Disturbed) - Ground Mounted	191	20	3,820
NSA 3-07 Replaced (Disturbed) - Ground Mounted	933	28	26,124
TOTAL - New Barrier	**3,393**	**22.2**	**75,324**

4.5.24 BARRIER SYSTEM 495 MD-24

A. NSA 3-08 & NSA 4-02

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 3-08. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

There are no outdoor activities present at the Holy Cross Hospital within NSA 4-02, therefore impacts at this location are based on interior noise levels. FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance provides building noise reduction factors due to typical exterior construction

conditions, and a masonry building with double glazed windows would provide the greatest interior reduction of 35 dBA. The hospital was constructed with an exterior non-load bearing curtainwall system that was designed to reduce interior noise levels using glass and aluminum to dampen the roadway noise and vibrations, and it is assumed that this construction would provide at least 35 dBA. Therefore, there are no interior noise level impacts at the hospital. A portion of the Sligo Creek Trail is included in this NSA. This area is considered a transient part of the trail and is therefore not an outdoor use of sufficient frequency or duration.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-68**. The barrier location and benefit locations are shown on Map No 12 for Alternative 5 and on Map No. 38 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 3-08. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-69 provides a breakdown of the noise barrier quantities by barrier type.

4.5.25 BARRIER SYSTEM 495 MD-25

A. NSA 3-09

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 3-09. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-70**. The barrier location and benefit locations are shown on Map No 12 for Alternative 5 and on Map No. 38 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 3-09. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-71 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-69: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-08

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-08-01	71	10	61	70	9	61
M3-08-02	70	7	63	70	6	64
M3-08-03	69	8	61	66	6	60
M3-08-04	78	14	64	79	16	63
M3-08-05	72	11	61	72	11	61
R3-08-01	62	2	60	63	2	61
R3-08-02	64	4	60	65	5	60
R3-08-03	57	0	57	57	0	57
R3-08-04	69	10	59	68	9	59
R3-08-05	65	7	58	66	8	58
R3-08-06	63	5	58	63	5	58
R3-08-07	70	10	60	70	10	60
R3-08-08	63	2	61	64	3	61
R3-08-09	60	1	59	60	1	59

Bold	Critical Sensitive Receptors
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	59	57
Number of Non-Impacted, Benefited Residences	15	2
Total Number of Benefited Locations	74	59
SF per Benefited Residence	454	586

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-70: Noise Barrier Design Summary

NSA 3-08	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	234	20.0	4,680
Replaced (Disturbed) - Retaining Wall Mounted	1,129	20.0	22,580
TOTAL - New Barrier	**1,363**	**20.0**	**27,260**
Existing (Intact)	253	24.8	6,283

Table 4-71: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-09

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-09-01	72	10	62	73	11	62
M3-09-04	69	7	62	70	7	63
M3-09-05	63	3	60	64	4	60
M3-09-06	62	2	60	63	3	60
R3-09-01	62	4	58	62	4	58
R3-09-02	64	6	58	65	6	59
R3-09-03	66	6	60	67	7	60
R3-09-04	69	10	59	70	11	59
R3-09-05	65	6	59	66	6	60
R3-09-06	63	2	61	64	2	62
R3-09-07	63	2	61	63	1	62
R3-09-08	62	0	62	63	0	63
R3-09-09	66	0	66	67	0	67
R3-09-10	70	0	70	70	0	70

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	68	75
Number of Non-Impacted, Benefited Residences	3	0
Total Number of Benefited Locations	71	75
SF per Benefited Residence	557	527

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-72: Noise Barrier Design Summary

NSA 3-09	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	406	18.0	7,308
Replaced (Disturbed) - Structure Mounted	1,320	18.0	23,760
New Alignment - Ground Mounted	299	18.0	5,382
TOTAL - New Barrier	**2,025**	**18.0**	**36,450**
Existing (Intact)	189	16.5	**3,123**

4.5.26 BARRIER SYSTEM 495 MD-26

A. NSA 2-12

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-12. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-72**. The barrier location and benefit locations are shown on Map No 12 &13 for Alternative 5 and on Map No. 38 & 39 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-12. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-73 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-73: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-12

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-12-01	79	15	64	80	15	65
M2-12-02	81	15	66	82	12	70
M2-12-04	73	12	61	73	10	63
M2-12-05	76	14	62	70	7	63
M2-12-06	75	14	61	73	9	64
M2-12-07	70	11	59	68	8	60
R2-12-01[4]	64	1	63	64	0	64
R2-12-02	59	0	59	60	1	59
R2-12-03	60	2	58	61	3	58
R2-12-04	59	2	57	60	3	57
R2-12-05	69	10	59	71	10	61
R2-12-06	64	7	57	65	7	58
R2-12-07	72	12	60	72	9	63
R2-12-08	66	8	58	67	7	60
R2-12-09	63	6	57	64	6	58
R2-12-10	66	7	59	66	5	61
R2-12-11	67	9	58	66	7	59
R2-12-12	64	6	58	64	5	59
R2-12-13	62	3	59	62	3	59
R2-12-14	69	2	67	69	2	67
R2-12-15	68	5	63	68	5	63
R2-12-16	75	7	68	75	7	68
R2-12-17	73	4	69	73	4	69

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R2-12-18	76	5	71	76	5	71

Bold	Critical Sensitive Receptors
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[5]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	81	101
Number of Non-Impacted, Benefited Residences	63	45
Total Number of Benefited Locations	146	146
SF per Benefited Residence	673	673

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Receiver R2-12-1 is not behind existing noise barrier and is not used to design proposed barrier.

5. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-74: Noise Barrier Design Summary

NSA 2-12	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,129	24.0	27,099
Replaced (Disturbed) - Retaining Wall Mounted	1,594	24.0	38,237
Replaced (Disturbed) - Bridge Mounted	283	22.0	6,244
New Alignment - Ground Mounted	1,136	24.0	26,747
TOTAL - New Barrier	**4,142**	**23.7**	**98,327**

4.5.27 BARRIER SYSTEM 495 MD-27

A. NSA 2-13

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-13. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-74**. The barrier location and benefit locations are shown on Map No 12 & 13 for Alternative 5 and on Map No. 38 & 39 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-13. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-75 and **Table 4-76** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-75: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-13

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-13-02	73	5	68	75	7	68
M2-13-03	72	9	63	70	8	62
M2-13-04	70	9	61	69	8	61
M2-13-05	69	9	60	68	8	60
M2-13-06	66	7	59	66	7	59
M2-13-08	64	6	58	64	6	58
M2-13-09	66	6	60	65	5	60
M2-13-10	71	10	61	72	11	61
M2-13-11	77	14	63	78	14	64
M2-13-12	71	11	60	71	10	61
R2-13-01	70	4	66	71	4	67
R2-13-02	70	7	63	71	7	64
R2-13-03	70	9	61	71	9	62
R2-13-04	60	3	57	60	3	57
R2-13-05	66	7	59	67	8	59
R2-13-06	59	1	58	60	0	60

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	68	69
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	68	69
SF per Benefited Residence	774	772

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-76: Noise Barrier Design Summary

NSA 2-13 Alternative 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,690	22.0	37,147
New Alignment – Ground Mounted	706	22.0	15,496
TOTAL - New Barrier	**2,396**	**22.0**	**52,643**

Table 4-77: Noise Barrier Design Summary

NSA 2-13 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,756	22.0	38,644
New Alignment – Ground Mounted	664	22.0	14,624
TOTAL - New Barrier	**2,420**	**22.0**	**53,268**

4.5.28 BARRIER SYSTEM 495 MD-28

A. NSA 4-04

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier and provides abatement to NSA 4-04. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-77**. The barrier location and benefit locations are shown on Map No 13 for Alternative 5 and on Map No. 39 for Alternative 8, 9, 10, 13B, and 13C.

The existing barrier is effective. A small portion of the barrier will need to be reconstructed as a result of the construction.

4.5.29 BARRIER SYSTEM 495 MD-29

A. NSA 2-14

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-14. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-78**. The barrier location and benefit locations are shown on Map No 13 for Alternative 5 and on Map No. 39 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-14. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-79 and **Table 4-80** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-78: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 4-04

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M4-04-02	74	10	64	74	9	65
M4-04-03	78	13	65	79	13	66
M4-04-04	66	6	60	67	7	60
R4-04-01	74	11	63	75	12	63
R4-04-02	68	6	62	69	7	62
R4-04-03	64	6	58	61	3	58
R4-04-04	67	7	60	68	8	60
R4-04-05	79	16	63	80	16	64

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	**Alt 5**	**Alt 8, 9, 10, 13B, 13C**
Number of Impacted, Benefited Residences	13	13
Number of Non-Impacted, Benefited Residences	7	2
Total Number of Benefited Locations	20	15
SF per Benefited Residence	2,031	2,658

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-79: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-14

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-14-01	65	6	59	66	7	59
M2-14-02	76	14	62	76	13	63
M2-14-03	65	7	58	66	7	59
M2-14-04	73	12	61	74	12	62
M2-14-05	69	10	59	70	10	60
M2-14-06	66	9	57	67	9	58
M2-14-07	71	10	61	70	9	61
M2-14-08	78	13	65	80	14	66
M2-14-09	63	5	58	66	8	58
M2-14-10	62	4	58	63	4	59

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R2-14-01	64	6	58	66	7	59
R2-14-02	60	2	58	60	2	58
R2-14-03	77	14	63	80	15	65
R2-14-04	65	7	58	65	7	58
R2-14-05	61	4	57	61	4	57
R2-14-06	62	5	57	63	5	58
R2-14-07	58	2	56	59	2	57
R2-14-08	57	1	56	57	1	56
R2-14-09	73	11	62	74	11	63
R2-14-10	58	1	57	59	2	57
R2-14-11[4]	65	1	64	66	1	65
R2-14-12	58	1	57	59	1	58
R2-14-13	56	0	56	56	0	56

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[5]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	18	64
Number of Non-Impacted, Benefited Residences	56	6
Total Number of Benefited Locations	74	70
SF per Benefited Residence	966	1010

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Receptor is unprotected by existing noise barrier and will not be protected by proposed noise barrier.

5. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-80: Noise Barrier Design Summary

NSA 2-14 Alternative 5	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	2,170	20	43,469
Replaced (Disturbed) - Structure Mounted	563	20	11,264
TOTAL - New Barrier	**2,733**	**20**	**54,733**
Existing (Intact)	1,040	14-20	**16,730**

Table 4-81: Noise Barrier Design Summary

NSA 2-14 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	2,698	20	53,970
Existing (Intact)	1,040	14-20	**16,730**

4.5.30 BARRIER SYSTEM 495 MD-30

A. NSA 2-15 & NSA 2-17

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-15 and NSA 2-17. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked. The conference center (Tommy Douglass Conference Center) and housing complex (Holly Hall) at the eastern limit of NSA 2-17 do not have any outdoor uses adjacent to I-495, therefore the barrier does not extend to protect this area.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-81** and **Table 4-82**. The barrier location and benefit locations are shown on Map No 14 for Alternative 5 and on Map No. 40 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for the combination of NSA 2-15 and NSA 2-17. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-83 and **Table 4-84** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-82: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-15

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-15-01	73	11	62	73	10	63
M2-15-02	65	5	60	65	5	60
M2-15-04	69	9	60	70	8	62
M2-15-05	72	9	63	73	8	65
M2-15-06	73	10	63	74	9	65
M2-15-07	63	4	59	64	4	60
M2-15-08	69	6	63	69	6	63
M2-15-09	75	11	64	76	12	64
M2-15-10	68	7	61	69	9	60

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R2-15-01	67	9	58	69	10	59
R2-15-02	63	2	61	64	2	62
R2-15-03	63	3	60	64	3	61
R2-15-04	61	3	58	62	3	59
R2-15-05	60	3	57	61	3	58
R2-15-06	64	5	59	64	4	60
R2-15-07	66	8	58	66	7	59
R2-15-08	65	5	60	65	5	60
R2-15-09	63	4	59	64	4	60
R2-15-10	66	6	60	66	7	59

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	72	78
Number of Non-Impacted, Benefited Residences	41	37
Total Number of Benefited Locations	113	115
SF per Benefited Residence	656	503

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-83: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-17

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M-2-17-01	74	7	67	75	12	63
M-2-17-02	72	6	66	73	9	64
M-2-17-03	79	13	66	79	12	67
M-2-17-04	59	-1	60	59	0	59
M-2-17-05	78	10	68	79	12	67
R02-17-01	68	6	62	68	8	60
R02-17-02	68	6	62	69	8	61
R02-17-03	61	3	58	62	5	57

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R02-17-04	59	2	57	60	3	57
R02-17-05	59	1	58	60	2	58
R02-17-06	67	3	64	67	3	64
R02-17-07	68	1	67	68	4	64
R2-17-8	59	2	57	57	0	57
R2-17-9	61	4	57	61	4	57
R2-17-10	69	0	69	69	9	60

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	24	35
Number of Non-Impacted, Benefited Residences	14	42
Total Number of Benefited Locations	38	77
SF per Benefited Residence	1,542	1,143

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-84: Noise Barrier Design Summary

NSA 2-15 and NSA 2-17 Alternative 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted (NSA 2-15)	3,190	20.0	63,841
New Alignment (NSA 2-15)	512	20.0	10,253
Replaced (Disturbed) - Ground Mounted (NSA 2-17)	1,697	20.0	33,911
TOTAL - New Barrier	**5,399**	**20.0**	**108,005**
Existing (Intact NSA 2-17)	1,192	20.7	**24,692**

Table 4-85: Noise Barrier Design Summary

NSA 2-15 and NSA 2-17 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted (NSA 2-15)	2,460	18.8	46,231
New Alignment (NSA 2-15)	720	16.7	12,028
Replaced (Disturbed) - Ground Mounted (NSA 2-17)	2,622	24.1	63,299
TOTAL - New Barrier	**5,802**	**21.0**	**121,558**
Existing (Intact NSA 2-17)	1,192	20.7	**24,692**

4.5.31 BARRIER SYSTEM 495 MD-31

A. NSA 2-16 & NSA 1-35

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of two barriers (one of which is a replacement of an existing barrier, and one of which is a new barrier); it provides abatement to NSA 2-16 and NSA 1-35. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-85** and **Table 4-86**. The barrier location and benefit locations are shown on Map No 14 for Alternative 5 and on Map No. 40 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for the combination of NSA 2-16 and NSA 1-35. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-87 and **Table 4-88** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-86: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-16

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-16-01	74	10	64	78	14	64
M2-16-02	63	1	62	63	0	63
M2-16-03	77	10	67	77	10	67
M2-16-04	77	8	69	77	11	66
M2-16-05	67	5	62	68	5	63
M2-16-06	71	8	63	72	8	64
M2-16-07	68	5	63	70	7	63
M2-16-08	78	13	65	80	15	65
M2-16-09	74	11	63	76	13	63
R2-16-01	59	0	59	60	1	59
R2-16-02	58	0	58	58	0	58
R2-16-03	56	0	56	56	0	56
R2-16-04	59	1	58	59	1	58
R2-16-05	64	3	61	64	3	61
R2-16-06	63	3	60	64	3	61
R2-16-07	67	5	62	68	5	63

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	**Alt 5**	**Alt 8, 9, 10, 13B, 13C**

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
Number of Impacted, Benefited Residences			34		36	
Number of Non-Impacted, Benefited Residences			30		29	
Total Number of Benefited Locations			64		65	
SF per Benefited Residence			1,389		1,418	

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-87: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-35

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M-1-35-01	74	7	67	75	6	69
R01-35-01	69	7	62	70	2	68
R01-35-02	66	7	59	67	1	66
R01-35-03	66	6	60	66	2	64
R01-35-04	59	3	56	59	2	57
R01-35-05	56	1	55	56	0	56
R01-35-06	72	7	65	72	7	65
R01-35-07	66	6	60	66	6	60
R01-35-08	75	11	64	76	11	65
R01-35-09	64	6	58	64	6	58
R01-35-10	61	4	57	61	4	57
R01-35-11	67	6	61	68	7	61
R01-35-12	66	7	59	66	7	59
R1-35-13	57	0	57	59	0	59
R1-35-14	60	4	56	60	0	60

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	21	25
Number of Non-Impacted, Benefited Residences	48	30
Total Number of Benefited Locations	69	55
SF per Benefited Residence	909	1,141
Combined SF per Benefited Residence	1,140	1,291

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.						
2. A receptor may represent more than 1 equivalent residence.						
3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).						

Table 4-88: Noise Barrier Design Summary, Alt 5

NSA 2-16 and NSA 1-35	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted (NSA 2-16)	4,826	18.4	88,881
New Alignment - Ground Mounted (NSA 1-35)	2,852	22.0	62,738
TOTAL - New Barrier	**7,678**	**19.7**	**151,619**

Table 4-89: Noise Barrier Design Summary, Alt 8, 9, 10, 13B, and 13C

NSA 2-16 and NSA 1-35	Length (ft.)	Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted (NSA 2-16)	4,831	19.1	92,184
New Alignment - Ground Mounted (NSA 1-35)	2,852	22.0	62,738
TOTAL - New Barrier	**7,683**	**20.2**	**154,922**

4.5.32 BARRIER SYSTEM 495 MD-32

A. NSA 2-18

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-18. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-89**. The barrier location and benefit locations are shown on Map No 14 for Alternative 5 and on Map No. 40 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-18. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-90 provides a breakdown of the noise barrier quantities by barrier type.

4.5.33 BARRIER SYSTEM 495 MD-33

A. NSA 2-19

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-19. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-91**. The barrier location and benefit locations are shown on Map No 15 for Alternative 5 and on Map No. 41 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-19. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-92 and **Table 4-93** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-90: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-18

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-18-01	68	8	60	68	8	60
M2-18-02	66	6	60	66	6	60
M2-18-03	63	4	59	64	5	59
M2-18-04	73	10	63	75	12	63
M2-18-05	71	11	60	73	13	60
R2-18-01	77	13	64	77	13	64
R2-18-02	61	4	57	61	4	57
R2-18-03	66	6	60	67	7	60
R2-18-04	71	9	62	71	9	62
R2-18-05	77	11	66	77	11	66
R2-18-06	58	1	57	59	2	57
R2-18-07	59	2	57	60	3	57
R2-18-08	68	1	67	69	1	68

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	55	53
Number of Non-Impacted, Benefited Residences	35	34
Total Number of Benefited Locations	90	87
SF per Benefited Residence	422	436

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-91: Noise Barrier Design Summary

NSA 2-18	Length (ft.)	Height (ft.)	Area (ft^2)
New Alignment- Ground Mounted	1,163	22	25,553
Replaced (Disturbed) - Structure Mounted	779	22	17,135
TOTAL - New Barrier	**1,942**	**---**	**42,688**
Existing (Intact)	163	15	**2,451**

Table 4-92: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-19

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-19-01	73	7	66	72	7	65
M2-19-02	73	9	64	72	9	63
M2-19-03	66	6	60	65	4	61
M2-19-04	71	9	62	69	6	63
R2-19-01[4]	71	1	70	71	7	64
R2-19-02	68	2	66	69	5	64
R2-19-03	72	6	66	72	8	64
R2-19-04	70	8	62	70	9	61
R2-19-05	71	9	62	70	9	61
R2-19-06	69	9	60	68	8	60
R2-19-07	66	7	59	66	7	59

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[5]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	47	51
Number of Non-Impacted, Benefited Residences	0	7
Total Number of Benefited Locations	47	58
SF per Benefited Residence	759	1151

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. R02-19-01 is in a commercial area and is therefore not protected by the proposed barrier.

5. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-93: Noise Barrier Design Summary

NSA 2-19 Alternative 5	Length (ft.)	Height (ft.)	Area (ft^2)
New Alignment – Ground Mounted	376	20	7,529
Replaced – Structure Mounted	1,409	20	28,154
TOTAL - New Barrier	**1,785**	**---**	**35,700**

Table 4-94: Noise Barrier Design Summary

NSA 2-19 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced – Ground Mounted	3,388	16-20	66,736

4.5.34 BARRIER SYSTEM 495 MD-34

A. NSA 2-20

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-20. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-94**. The barrier location and benefit locations are shown on Map No 15 for Alternative 5 and on Map No. 41 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-20. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-95 and **Table 4-96** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-95: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-20

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-20-01	69	6	63	71	10	61
M2-20-02	63	4	59	65	6	59
M2-20-03	66	7	59	68	10	58
M2-20-04	68	7	61	69	8	61
M2-20-05	73	10	63	72	9	63
R2-20-01	63	2	61	66	6	60
R2-20-02	68	6	62	72	10	62
R2-20-03	65	6	59	68	9	59
R2-20-04	64	4	60	66	6	60
R2-20-05	60	3	57	62	5	57
R2-20-06	66	7	59	67	8	59
R2-20-07	61	4	57	62	5	57
R2-20-08	61	3	58	62	4	58
R2-20-09	78	5	73	78	5	73
R2-20-10	67	9	58	67	9	58
R2-20-11	68	9	59	68	9	59
R2-20-12	71	9	62	71	9	62
R2-20-13	72	4	68	72	4	68
R2-20-14	72	2	70	72	2	70
R2-20-15	70	10	60	70	10	60
R2-20-16	74	11	63	74	11	63
R2-20-17	75	11	64	75	11	64
R2-20-18	75	8	67	75	8	67

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	32	62
Number of Non-Impacted, Benefited Residences	36	36
Total Number of Benefited Locations	68	98
SF per Benefited Residence	1,240	901

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-96: Noise Barrier Design Summary

NSA 2-20 Alternative 5	Length (ft.)	Ave. Height (ft.)	Area (ft²)
New and Relocated Alignment - Ground Mounted	2,392	26.4	63,202
New and Relocated Alignment - Structure Mounted	622	24.0	14,932
TOTAL - New Barrier	**3,014**	**25.9**	**78,134**
Existing (Intact)	490	12.6	6,161

Table 4-97: Noise Barrier Design Summary

NSA 2-20 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft²)
New and Relocated Alignment - Ground Mounted	2,678	25.7	68,835
New and Relocated Alignment - Structure Mounted	622	24.0	14,932
TOTAL - New Barrier	**3,300**	**25.4**	**83,767**
Existing (Intact)	260	17.3	**4,502**

4.5.35 BARRIER SYSTEM 495 MD-35

A. NSA 3-17

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

The existing noise barrier system consists of three existing barriers that combined are approximately 2,610 feet long and 15.4 feet high on average. With the proposed limit-of-disturbance, none of the existing barrier is impacted by construction of the either build alternate. The existing barrier is shown in its present location on Map No. 15 for the Build Alternative 5 and on Map No. 41 for the Build Alternative 8, 9, 10, 13B, and 13C.

The 2040 Build Barrier predicted noise reduction (insertion loss) and noise levels are presented below in **Table 4-97**. The existing barrier provides 7 dB(A) insertion loss for most critical sensitive receptors in NSA 3-17.

The existing barrier is effective. There is NO additional cost to protect this NSA

Table 4-98: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-17

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-17-01	73	11	62	74	12	62
M3-17-02	74	11	63	75	12	63
M3-17-03	72	10	62	73	11	62
M3-17-04	70	9	61	72	10	62
M3-17-05	67	6	61	68	6	62
M3-17-06	66	6	60	67	7	60
M3-17-07	62	4	58	62	4	58
M3-17-08	70	11	59	70	11	59
M3-17-09	74	13	61	74	13	61
M3-17-10	62	4	58	62	4	58
M3-17-11	63	4	59	64	4	60
M3-17-12	60	2	58	61	2	59
M3-17-13	60	2	58	62	3	59
M3-17-14	63	3	60	65	4	61
M3-17-15	63	3	60	65	4	61
M3-17-16	65	4	61	66	4	62
M3-17-17	66	5	61	67	6	61
M3-17-18	66	5	61	67	6	61
M3-17-19	67	7	60	67	6	61
M3-17-20	66	6	60	67	6	61
M3-17-21	61	3	58	61	3	58
M3-17-22	59	2	57	60	2	58
M3-17-23	60	2	58	60	1	59
R3-17-01	67	1	66	67	0	67

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.5.36 BARRIER SYSTEM 495 MD-36

A. NSA 1-16

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA 1-16. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-98**. The barrier location and benefit locations are shown on Map No 15 for Alternative 5 and on Map No. 41 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-16.

Table 4-99 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-99: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-16

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-16-01	68	7	61	68	7	61
M1-16-02	78	17	61	78	18	60
M1-16-03	70	10	60	65	7	58
M1-16-04	68	8	60	63	5	58
M1-16-05	67	7	60	61	3	58
M1-16-06	60	4	56	58	2	56
R1-16-01	66	0	66	66	0	66
R1-16-02	59	0	59	58	1	57
R1-16-03	59	1	58	58	1	57
R1-16-04	67	8	59	68	9	59
R1-16-05	59	2	57	60	2	58
R1-16-06	57	0	57	57	1	56
R1-16-07	60	3	57	58	1	57
R1-16-08	65	7	58	61	4	57
R1-16-09	62	5	57	58	2	56
R1-16-10	64	6	58	60	4	56
R1-16-11	64	6	58	60	3	57
R1-16-12	64	6	58	59	2	57

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
Benefits			**Alt 5**		**Alt 8, 9, 10, 13B, 13C**	
Number of Impacted, Benefited Residences			25		28	
Number of Non-Impacted, Benefited Residences			31		3	
Total Number of Benefited Locations			56		31	
SF per Benefited Residence			1,476		2,666	

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-100: Noise Barrier Design Summary

NSA 1-16	Length (ft.)	Height (ft.)	Area (ft²)
New Alignment - Ground Mounted	3,180	26	82,633

4.5.37 BARRIER SYSTEM 495 MD-36A

A. NSA 1-17

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA 1-17. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-99A**. The barrier location and benefit locations are shown on Map No 15A for Alternative 5 and on Map No. 41A for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-17.

Table 4-99B provides a breakdown of the noise barrier quantities by barrier type.

Table 4-101: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-17

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-17-01	65	3	62	65	3	62
M1-17-02	75	12	63	75	12	63
M1-17-03	66	5	61	66	5	61
M1-17-04	65	5	60	66	6	60

R1-17-01	63	2	61	63	2	61
R1-17-02	69	8	61	69	8	61
R1-17-03	63	4	59	63	4	59
R1-17-04	67	7	60	67	7	60
R1-17-05	63	4	59	64	5	59

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences[4]	27	27
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	27	27
SF per Benefited Residence	2,294	2,294

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Equivalent residences based upon the approximately 375 LF of linear frontage of the picnic area

Table 4-102: Noise Barrier Design Summary

NSA 1-17	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment – All Alternatives	3,692	16.8	61,939

4.5.38 BARRIER SYSTEM 495 MD-37

A. NSA 2-21, NSA 2-22 & NSA 3-18

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-21, NSA 2-22 and NSA 3-1. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-100, Table 4-101, and Table 4-102**. The barrier location and benefit locations are shown on Map No 16 for Alternative 5 and on Map No. 42 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for the combined barrier system for NSA 2-21, NSA 2-22, and NSA 3-18. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-103, Table 4-104, Table 4-105, and Table 4-106 provide a breakdown of the noise barrier quantities by barrier type.

Table 4-103: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-21

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-21-01	66	7	59	67	8	59
M2-21-02	68	7	61	69	8	61
M2-21-03	68	7	61	69	7	62
M2-21-04	72	10	62	72	9	63
M2-21-05	72	9	63	70	7	63
M2-21-06	68	8	60	67	6	61
R2-21-01	65	6	59	66	6	60
R2-21-02	64	5	59	64	4	60
R2-21-03	63	4	59	63	4	59
R2-21-04	60	3	57	60	3	57
R2-21-05	63	5	58	63	4	59
R2-21-06	67	4	63	67	3	64
R2-21-07	70	2	68	70	0	70

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	30	34
Number of Non-Impacted, Benefited Residences	32	10
Total Number of Benefited Locations	62	44
SF per Benefited Residence	673	808

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-104: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-22

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-22-01	74	7	67	73	7	66
M2-22-02	70	6	64	69	7	62
M2-22-03	78	12	66	79	14	65
M2-22-04	70	9	61	70	8	62
M2-22-05	74	11	63	75	11	64
M2-22-06	71	10	61	73	11	62
R2-22-01	65	6	59	65	5	60
R2-22-02	63	5	58	63	5	58
R2-22-03	65	6	59	66	7	59

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	41	41
Number of Non-Impacted, Benefited Residences	18	19
Total Number of Benefited Locations	59	60
SF per Benefited Residence	460	669

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-105: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-18

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-18-01	68	7	61	71	10	61
M3-18-02	68	8	60	70	10	60
M3-18-03	71	9	62	73	11	62
M3-18-04	64	5	59	66	7	59
M3-18-05	61	4	57	64	6	58
M3-18-06	60	3	57	62	5	57
M3-18-07	58	2	56	58	2	56
M3-18-08	64	6	58	66	8	58

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-18-09	66	8	58	67	9	58
M3-18-10	61	4	57	63	6	57
M3-18-11	59	3	56	61	4	57
M3-18-12	66	8	58	67	9	58
M3-18-13	62	5	57	63	6	57
M3-18-14	58	2	56	59	3	56
M3-18-15	67	7	60	68	10	58
M3-18-16	67	2	65	68	6	62
R3-18-01	68	8	60	72	11	61
R3-18-02	60	3	57	62	5	57
R3-18-03	58	2	56	59	3	56
R3-18-04	56	0	56	57	1	56
R3-18-05	56	1	55	56	1	55

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	11	18
Number of Non-Impacted, Benefited Residences	12	12
Total Number of Benefited Locations	23	30
SF per Benefited Residence	1,661	1,056

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-106: Noise Barrier Design Summary

NSA 2-21 Alternative 5	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,897	22.0	41,745

Table 4-107: Noise Barrier Design Summary

NSA 2-22 and NSA 3-18 Alternative 5	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted (NSA 2-22)	942	22	20,757
Replaced (Disturbed) - Retaining Wall Mounted (NSA 2-22)	290	22	6,392
Replaced (Disturbed) - Ground Mounted (NSA 3-18)	1,736	22	38,195
TOTAL - New Barrier	**2,968**	**22**	**65,344**

Table 4-108: Noise Barrier Design Summary

NSA 2-21 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,775	20.0	35,548

Table 4-109: Noise Barrier Design Summary

NSA 2-22 and NSA 3-18 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted (NSA 2-22)	1,725	23.3	40,143
Replaced (Disturbed) - Ground Mounted (NSA 3-18)	1,834	17.3	31,679
TOTAL - New Barrier	**3,559**	**20.2**	**71,822**

4.5.39 BARRIER SYSTEM 495 MD-38

A. NSA 2-23

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-23. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-107**. The barrier location and benefit locations are shown on Map No 16 for Alternative 5 and on Map No. 42 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-23. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-108 and Table 4-109 provide a breakdown of the noise barrier quantities by barrier type.

Table 4-110: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-23

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-23-01	73	6	67	73	7	66
M2-23-02	69	4	65	69	4	65
M2-23-03	80	13	67	82	15	67
M2-23-04	70	6	64	70	7	63
M2-23-05	81	14	67	81	15	66
M2-23-06	78	12	66	79	14	65
M2-23-07	70	7	63	72	9	63
M2-23-08	79	12	67	80	15	65
M2-23-09	77	11	66	78	14	64
M2-23-10	67	5	62	69	8	61
M2-23-11	73	7	66	74	11	63
R2-23-01	72	5	67	72	6	66

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R2-23-02	63	1	62	63	2	61
R2-23-03	63	4	59	63	5	58
R2-23-04	71	8	63	72	10	62
R2-23-05	61	3	58	61	4	57
R2-23-06	68	6	62	69	10	59
R2-23-07	66	6	60	67	8	59
R2-23-08	63	1	62	63	3	60
R2-23-09	68	1	67	69	1	68
R2-23-10	71	1	70	71	3	68
R2-23-11	67	2	65	67	4	63

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	63	80
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	63	80
SF per Benefited Residence	563	741

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-111: Noise Barrier Design Summary

NSA 2-23 Alternative 5	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	2,172	14	30,428
New Alignment - Ground Mounted	358	14	5,018

Table 4-112: Noise Barrier Design Summary

NSA 2-23 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	2,653	14-20	51,425
New Alignment - Ground Mounted	563	14	7,888

4.5.40 BARRIER SYSTEM 495 MD-39

The barrier for NSA 2-22 and NSA 3-18 has been combined with the barrier for NSA 2-21 into one barrier system, see Barrier System 495 MD-37 discussion for results.

4.5.41 BARRIER SYSTEM 495 MD-40

A. NSA 1-20

It is possible that this area is currently or will be considered for redevelopment. The status of any proposed redevelopment of this area will need to be monitored through the design phase of the proposed Beltway improvement project. A reassessment of noise impacts would be required if redevelopment results in any changes in land use.

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA 1-20. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-110**. The barrier location and benefit locations are shown on Map No 17 for Alternative 5 and on Map No. 43 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-20.

Table 4-111 and Table 4-112 provide a breakdown of the noise barrier quantities by barrier type.

Table 4-113: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-20

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-20-01	65	5	60	66	3	63
M1-20-02	68	7	61	68	3	65
M1-20-03	73	10	63	72	6	66
M1-20-05	73	9	64	74	10	64
M1-20-06	67	7	60	67	5	62
M1-20-07	72	9	63	73	10	63
M1-20-08	76	12	64	77	13	64
M1-20-10	67	7	60	69	9	60
M1-20-11	72	10	62	73	11	62
M1-20-12	67	8	59	68	9	59
M1-20-13	76	12	64	78	13	65
M1-20-14	76	11	65	78	12	66
M1-20-15	76	11	65	78	13	65
M1-20-16	68	9	59	70	10	60
M1-20-17	67	7	60	68	8	60
M1-20-18	68	7	61	70	9	61
M1-20-19	76	11	65	78	12	66
M1-20-20	68	8	60	69	9	60

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-20-21	73	13	60	74	13	61
M1-20-22	61	3	58	61	3	58
M1-20-23	65	2	63	65	3	62
M1-20-24	63	1	62	62	0	62
M1-20-25	73	11	62	73	11	62
R1-20-01	57	0	57	57	0	57
R1-20-02	61	3	58	62	4	58
R1-20-03	67	8	59	67	8	59
R1-20-04	72	8	64	74	10	64
R1-20-05	64	5	59	65	7	58
R1-20-06	65	6	59	67	8	59
R1-20-07	74	10	64	75	11	64
R1-20-08	64	4	60	65	5	60
R1-20-09	60	3	57	61	4	57
R1-20-10	60	2	58	60	2	58
R1-20-11	64	5	59	65	6	59
R1-20-12	57	1	56	57	1	56
R1-20-13	56	0	56	56	0	56
R1-20-14	64	0	64	64	0	64
R1-20-15	74	0	74	75	0	75

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	181	98
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	181	98
SF per Benefited Residence	330	623

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-114: Noise Barrier Design Summary

NSA 1-20 Alternative 5	Length (ft.)	Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	3,222	18	58,093
New Alignment - Structure Mounted	96	18	1,719
TOTAL - New Barrier	**3,318**	**18**	**59,812**

Table 4-115: Noise Barrier Design Summary

NSA 1-20 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	3,289	16-22	61,062

4.5.42 BARRIER SYSTEM 495 MD-40A

A. NSA 1-21

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA 1-21. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-112A**. The barrier location and benefit locations are shown on Map No 17A for Alternative 5 and on Map No. 43A for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-16.

Table 4-112B provides a breakdown of the noise barrier quantities by barrier type.

Table 4-116: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-21

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-21-01	59	3	56	60	3	57
M1-21-02	78	15	63	80	15	65
M1-21-03	59	1	58	60	1	59
R1-21-01	70	8	62	71	8	63
R1-21-02	59	1	58	60	1	59
R1-21-03	63	3	60	64	2	62
R1-21-04	61	1	60	65	1	61
R1-21-05	58	1	57	58	1	57
R1-21-06	77	13	64	79	13	66
R1-21-07	77	12	65	80	14	66
R1-21-08	74	7	67	76	9	67
R1-21-09	62	0	62	63	2	61
R1-21-10	60	0	60	60	0	60
R1-21-11	65	1	64	67	2	65
R1-21-12	64	0	64	66	0	66

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences[4]	74	74
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	74	74
SF per Benefited Residence	956	956

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Equivalent residences based upon the approximately 375 LF of linear frontage of the picnic area

Table 4-117: Noise Barrier Design Summary

NSA 1-21	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment – All Alternatives	3,556	19.9	70,715

4.5.43 BARRIER SYSTEM 495 MD-40B

A. NSA 1-22

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA 1-22. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. Line of sight is effectively blocked, however only a third of the impacted residences are predicted to receive at least a 7-db(A) noise reduction.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-113**. The barrier location and benefit locations are shown on Map No 17A for Alternative 5 and on Map No. 43A for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is not considered feasible or reasonable*** for NSA 1-22 because it does not meet the design goal and cost effectiveness criteria.

Table 4-114 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-118: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-22

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-22-01	72	5	67	72	5	67
R1-22-01	66	4	62	68	4	64
R1-22-02	62	0	62	63	0	63
R1-22-03	73	0	73	76	0	76
R1-22-04	78	15	63	79	15	64
R1-22-05	67	0	67	71	0	71
R1-22-06	65	0	65	73	0	73
R1-22-07	56	0	56	63	0	63
R1-22-08	56	0	56	68	0	68

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences[4]	3	3
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	3	3
SF per Benefited Residence	12,340	12,340

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).
4. Equivalent residences based upon the approximately 375 LF of linear frontage of the picnic area

Table 4-119: Noise Barrier Design Summary

NSA 1-22	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	1,360	27.2	37,019

4.5.44 BARRIER SYSTEM 495 MD-41

A. NSA 1-23

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA 1-23. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-115**. The barrier location and benefit locations are shown on Map No 18 for Alternative 5 and on Map No. 44 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-23.

Table 4-116 and Table 4-117 provide a breakdown of the noise barrier quantities by barrier type.

Table 4-120: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-23

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-23-01	77	12	65	79	13	66
M1-23-02	62	3	59	62	3	59
M1-23-03	59	1	58	59	1	58
M1-23-04	75	7	68	77	10	67
M1-23-05	61	3	58	60	3	57
M1-23-06	67	5	62	67	6	61
M1-23-07	62	4	58	61	4	57
M1-23-08	58	1	57	58	1	57
R1-23-01	68	8	60	68	0	68
R1-23-02	67	6	61	76	0	76
R1-23-03	66	4	62	78	0	78
R1-23-04	58	2	56	58	1	57
R1-23-05	60	2	58	60	2	58
R1-23-06	70	6	64	71	6	65
R1-23-07	61	3	58	61	3	58

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R1-23-08	56	0	56	56	0	56
R1-23-09	60	2	58	59	1	58
R1-23-10	59	1	58	59	1	58
R1-23-11	78	10	68	78	12	66
R1-23-12	64	3	61	63	3	60
R1-23-13	58	2	56	58	2	56
R1-23-14	57	1	56	57	1	56
R1-23-15	63	3	60	63	5	58
R1-23-16	57	1	56	57	1	56
R1-23-17	74	11	63	73	10	63
R1-23-18	59	2	57	59	1	58
R1-23-19	66	6	60	69	2	67
R1-23-20	74	12	62	75	12	63

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	142	65
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	142	65
SF per Benefited Residence	852	1,492

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-121: Noise Barrier Design Summary

NSA 1-23 Alternative 5	Length (ft.)	Height (ft.)	Area (ft²)
New Alignment - Ground Mounted	4,784	20	95,667
New Alignment - Structure Mounted	1,261	20	25,261
TOTAL - New Barrier	**6,045**	**20**	**120,928**

Table 4-122: Noise Barrier Design Summary

NSA 1-23 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft²)
New Alignment - Ground Mounted	4,720	14-22	96,960

4.5.45 BARRIER SYSTEM 495 MD-42

A. NSA 2-24

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-24. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-118**. The barrier location and benefit locations are shown on Map No 18 for Alternative 5 and on Map No. 44 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-24. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-119 and **Table 4-120** provide a breakdown of the noise barrier quantities by barrier type.

4.5.46 BARRIER SYSTEM 495 MD-43

A. NSA 2-25 & NSA 1-25

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of two barriers (one of which is a replacement of an existing barrier, and one of which is a new barrier); it provides abatement to NSA 2-25 and NSA 1-25. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-121** and **Table 4-122**. The barrier location and benefit locations are shown on Map No 19 for Alternative 5 and on Map No. 45 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for the combination of NSA 2-25 and NSA 1-25. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-123 and **Table 4-124** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-123: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-24

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-24-01	76	12	64	77	13	64
M2-24-02	70	8	62	66	4	62
M2-24-03	71	7	64	66	2	64
M2-24-04	70	6	64	68	3	65
M2-24-05	70	6	64	69	5	64
M2-24-06	76	9	67	73	7	66
M2-24-07	68	6	62	67	6	61
M2-24-08	66	6	60	65	5	60
M2-24-09	73	8	65	71	8	63
M2-24-10	70	7	63	70	7	63
M2-24-11	69	6	63	69	6	63
M2-24-12	79	15	64	79	14	65
R2-24-01	65	6	59	63	4	59
R2-24-02	69	8	61	67	6	61
R2-24-03	65	7	58	63	5	58
R2-24-04	58	1	57	58	1	57
R2-24-05	59	1	58	59	1	58

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	96	78
Number of Non-Impacted, Benefited Residences	0	18
Total Number of Benefited Locations	96	96
SF per Benefited Residence	838	1,062

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-124: Noise Barrier Design Summary

NSA 2-24 Alternative 5	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,404	20	28,045
Replaced (Disturbed) - Retaining Wall Mounted	1,009	20	20,175
New Alignment - Ground Mounted	969	20	19,363
TOTAL - New Barrier	**3,382**	**20**	**67,583**
Existing (Intact)	652	14-21	12,827

Table 4-125: Noise Barrier Design Summary

NSA 2-24 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	4,361	20	87,133
Existing (Intact)	740	20-21	14,774

Table 4-126: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-25

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-25-01	66	5	61	66	5	61
M2-25-02	68	6	62	68	6	62
M2-25-03	71	10	61	72	10	62
M2-25-04	72	9	63	73	9	64
M2-25-05	73	10	63	75	11	64
M2-25-06	73	9	64	77	11	66
M2-25-07	64	4	60	67	3	64
R2-25-01	67	3	64	68	5	63
R2-25-02	63	3	60	65	5	60
R2-25-03	66	6	60	67	7	60
R2-25-04	64	6	58	65	6	59
R2-25-05	66	7	59	67	6	61
R2-25-06	61	4	57	62	4	58

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	7	31
Number of Non-Impacted, Benefited Residences	59	0
Total Number of Benefited Locations	66	31
SF per Benefited Residence	490	1,044

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Receptors were originally grouped in Phase 1 NSA, but are actually on the edge of a Phase 2 community.

Table 4-127: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-25

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M-1-25-1	72	10	62	75	10	65
M-1-25-2	62	5	57	63	5	58
M-1-25-3	69	10	59	72	10	62
M-1-25-4	61	5	56	65	7	58
R1-25-01	71	11	60	72	9	63
R1-25-02	60	4	56	61	4	57
R1-25-03	59	3	56	63	5	58
R1-25-04	59	3	56	63	5	58

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	4	6
Number of Non-Impacted, Benefited Residences	25	14
Total Number of Benefited Locations	29	20
SF per Benefited Residence	1,280	1,760
Combined SF per Benefited Residence	731	1,325

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Receptors were originally grouped in Phase 1 NSA, but are actually on the edge of a Phase 2 community.

Table 4-128: Noise Barrier Design Summary

NSA 2-25 and NSA 1-25 Alternative 5	Length (ft.)	Height (ft.)	Area (ft²)
Replaced (Disturbed) - Ground Mounted (NSA 2-25)	763	20	15,257
New Alignment - Ground Mounted (NSA 1-25)	1,857	20	37,125
Existing (Intact) (NSA 2-25)	1,005	12-25	17,098

Table 4-129: Noise Barrier Design Summary

NSA 2-25 and NSA 1-25 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft²)
Replaced (Disturbed) - Ground Mounted (NSA 2-25)	763	20	15,257
New Alignment - Ground Mounted (NSA 1-25)	1,688	20-22	35,206
Existing (Intact) (NSA 2-25)	1,005	12-25	17,098

4.5.47 BARRIER SYSTEM 495 MD-44

A. NSA 2-27

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-27. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-125**. The barrier location and benefit locations are shown on Map No 19 for Alternative 5 and on Map No. 45 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-27. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-126 and **Table 4-127** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-130: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-27

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-27-01	78	15	63	66	3	63
M2-27-02	68	6	62	67	5	62
M2-27-03	65	6	59	64	4	60
M2-27-04	73	9	64	70	5	65
M2-27-05	69	8	61	69	8	61
M2-27-06	72	9	63	71	9	62
M2-27-07	78	14	64	79	15	64
M2-27-08	69	8	61	69	8	61
M2-27-09	81	15	66	66	1	65
M2-27-10	66	3	63	66	1	65
M2-27-11	70	5	65	70	2	68

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-27-12	77	14	63	78	13	65
R2-27-01	72	9	63	75	13	62
R2-27-02	62	4	58	64	5	59
R2-27-03	64	6	58	64	6	58
R2-27-04	59	2	57	59	2	57
R2-27-05	57	0	57	59	1	58
R2-27-06	68	1	67	69	1	68
R2-27-07	72	0	72	74	0	74

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	50	56
Number of Non-Impacted, Benefited Residences	24	2
Total Number of Benefited Locations	74	58
SF per Benefited Residence	865	1,002

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-131: Noise Barrier Design Summary

NSA 2-27 Alternative 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	2,728	22.5	61,457
New Alignment – Ground Mounted	158	16.0	2,527

Table 4-132: Noise Barrier Design Summary

NSA 2-27 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	3,116	17.8	55,597
New Alignment – Ground Mounted	158	16.0	2,527

4.5.48 BARRIER SYSTEM 495 MD-45

A. NSA 2-26

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-26. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-128**. The barrier location and benefit locations are shown on Map No 19 for Alternative 5 and on Map No. 45 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-26. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-129 and **Table 4-130** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-133: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-26

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-26-01	68	6	62	68	6	62
M2-26-02	70	7	63	69	7	62
M2-26-03	65	5	60	66	6	60
M2-26-04	68	6	62	69	6	63
M2-26-05	65	6	59	66	7	59
M2-26-06	77	14	63	75	11	64
M2-26-07	68	5	63	70	5	65
M2-26-08	78	12	66	81	0	81
M2-26-09	70	6	64	71	6	65
M2-26-10	66	5	61	67	5	62
M2-26-11	69	6	63	69	6	63
M2-26-12	72	9	63	70	7	63
M2-26-13	68	6	62	68	6	62
M2-26-15	69	6	63	69	5	64
M2-26-17	72	8	64	71	7	64
R2-26-01	63	3	60	63	3	60
R2-26-02	64	5	59	64	5	59
R2-26-03	63	5	58	63	5	58
R2-26-04	62	5	57	61	4	57
R2-26-05	64	6	58	65	7	58
R2-26-06	66	8	58	66	7	59
R2-26-07	57	1	56	57	0	57
R2-26-08	66	4	62	67	3	64

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R2-26-09	64	4	60	64	3	61
R2-26-10	71	9	62	71	8	63
R2-26-11	67	9	58	67	9	58
R2-26-12	67	6	61	68	6	62
R2-26-13	74	9	65	75	9	66
R2-26-14	65	4	61	66	3	63
R2-26-15	64	1	63	65	0	65
R2-26-16	62	0	62	64	1	63
R2-26-17	68	0	68	70	0	70

Bold	Critical Sensitive Receptors
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	133	160
Number of Non-Impacted, Benefited Residences	24	44
Total Number of Benefited Locations	157	204
SF per Benefited Residence	781	763

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-134: Noise Barrier Design Summary

NSA 2-26 NSA 3-10 & NSA 1-33 Alternative 5	Length (ft.)	Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	624	20	12,462
Replaced (Disturbed) - Ground Mounted	4,376	20	87,478
Existing (Intact)	1,717	5-19	22,710

Table 4-135: Noise Barrier Design Summary

NSA 2-26 NSA 3-10 & NSA 1-33 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	624	20	12,462
Replaced (Disturbed) - Ground Mounted	5,558	20-28	117,980
Existing (Intact)	1,865	3-19	25,260

4.5.49 BARRIER SYSTEM 495 MD-46

A. NSA 3-10 and NSA 1-33

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of two barriers (one of which is a replacement of an existing barrier, and one of which is a new barrier); it provides abatement to NSA 3-10 and NSA 1-33. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-131** and **Table 4-132**. The barrier location and benefit locations are shown on Map No 20 for Alternative 5 and on Map No. 46 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for the combination of NSA 3-10 and NSA 1-33. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-133 and **Table 4-134** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-136: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-10

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-10-01	68	9	59	68	8	61
M3-10-02	77	14	63	77	13	67
M3-10-03	70	10	60	70	10	61
M3-10-04	76	13	63	76	12	65
M3-10-05	73	9	64	74	7	69
M3-10-06	64	5	59	65	5	61
M3-10-07	79	14	65	82	18	67
M3-10-08	65	3	62	67	3	63
R3-10-01	66	1	65	66	0	66
R3-10-02	72	4	68	69	0	69
R3-10-03	61	3	58	62	4	58
R3-10-04	59	3	56	60	3	57

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	42	35
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	42	35
SF per Benefited Residence	1,307	1,503

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-137: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-33

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-33-01	76	11	65	81	17	64
M1-33-02	62	0	62	66	0	66
M1-33-03	61	0	61	64	0	64
M1-33-04	62	1	61	62	0	62
M1-33-05	61	0	61	62	0	62
M1-33-06	72	0	72	72	0	72
R1-33-01	67	2	65	69	3	66
R1-33-02	60	0	60	62	0	62
R1-33-03	60	0	60	62	0	62
R1-33-04	64	0	64	65	0	65

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	3	3
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	3	3
SF per Benefited Residence	1,334	2,250
Combined SF per Benefited Residence	1,309	1,561

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-138: Noise Barrier Design Summary

NSA 3-10 & NSA 1-33 Alternative 5	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted (NSA 3-10)	729	24	17,500
Replaced (Disturbed) – R. Wall Mounted (NSA 3-10)	1,164	24	27,931
New Alignment - Ground Mounted (NSA 1-33)	167	24	4,004
TOTAL - New Barrier	**2,060**	**24**	**49,435**
Existing (Intact) (NSA 3-10)	407	22-24	9,471

Table 4-139: Noise Barrier Design Summary

NSA 3-10 & NSA 1-33 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted (NSA 3-10)	1,796	24	43,126
New Alignment - Ground Mounted (NSA 1-33)	281	24	6,750
TOTAL - New Barrier	**2,077**	**24**	**49,876**
Existing (Intact) (NSA 3-10)	407	22-24	9,471

4.5.50 BARRIER SYSTEM 495 MD-47

A. NSA 2-28

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-28. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-135**. The barrier location and benefit locations are shown on Map No 20 for Alternative 5 and on Map No. 46 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-28. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-136 and **Table 4-137** provide a breakdown of the noise barrier quantities by barrier type.

4.5.51 BARRIER SYSTEM 495 MD-48

A. NSA 2-29

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-29. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-138**. The barrier location and benefit locations are shown on Map No 20 for Alternative 5 and on Map No. 46 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-29. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-139 and **Table 4-140** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-140: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-28

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-28-01	68	6	62	69	7	62
M2-28-02	66	4	62	66	4	62
R2-28-01	59	0	59	59	0	59
R2-28-02	62	1	61	62	0	62
R2-28-03	57	0	57	57	0	57
R2-28-04	57	0	57	57	0	57
R2-28-05	56	0	56	56	0	56
R2-28-06	65	0	65	68	1	67

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	22	29
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	22	29
SF per Benefited Residence	1,270	1,071

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-141: Noise Barrier Design Summary

NSA 2-28 Alternative 5	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,553	18	27,949

Table 4-142: Noise Barrier Design Summary

NSA 2-28 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,553	20	31,055

Table 4-143: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-29

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-29-01	77	10	67	78	15	63
M2-29-02	81	15	66	81	15	66
M2-29-03	67	4	63	66	6	60
M2-29-04	68	3	65	68	7	61
R2-29-01	65	3	62	65	5	60
R2-29-02	63	3	60	62	4	58
R2-29-03	63	2	61	63	4	59
R2-29-04	62	1	61	63	3	60
R2-29-05	57	0	57	57	0	57

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	17	19
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	17	19
SF per Benefited Residence	1,283	1,639

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-144: Noise Barrier Design Summary

NSA 2-29 Alternative 5	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,558	14	21,803

Table 4-145: Noise Barrier Design Summary

NSA 2-29 Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,558	20	31,148

4.5.52 BARRIER SYSTEM 495 MD-49

A. NSA 3-11

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 3-11. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-141**. The barrier location and benefit locations are shown on Map No 20 for Alternative 5 and on Map No. 46 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 3-11. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-142 provides a breakdown of the noise barrier quantities by barrier type.

4.5.53 BARRIER SYSTEM 495 MD-50

A. NSA 2-30

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of three existing barriers that will be replaced; it provides abatement to NSA 2-30. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-143**. The barrier location and benefit locations are shown on Map No 21 for Alternative 5 and on Map No. 47 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-30. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-144 and **Table 4-145** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-146: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-11

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-11-01[4]	73	0	73	78	0	78
M3-11-02	69	3	66	73	1	72
M3-11-03	70	8	62	71	8	63
M3-11-04	65	4	61	66	5	61
M3-11-05	73	10	63	72	10	62
M3-11-06	66	4	62	66	5	61
M3-11-07	74	9	65	74	9	65
M3-11-08	67	5	62	68	6	62
R3-11-01	60	1	59	61	1	60
R3-11-02	75	12	63	75	12	63
R3-11-03	72	9	63	74	5	69
R3-11-04	62	1	61	63	1	62
R3-11-05	62	0	62	62	0	62

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[5]	**Alt 5**	**Alt 8, 9, 10, 13B, 13C**
Number of Impacted, Benefited Residences	4	4
Number of Non-Impacted, Benefited Residences	23	23
Total Number of Benefited Locations	27	27
SF per Benefited Residence	1,747	1,747

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Receptor M3-11-01 is not protected by existing barrier because the church at this location does not have any outdoor uses.

5. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-147: Noise Barrier Design Summary

NSA 3-11	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground	1,714	17.7	30,368
TOTAL - New Barrier	**1,714**	**17.7**	**30,368**
Existing (Intact)	800	15-27	16,800

Table 4-148: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-30

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-30-01[4]	67	4	63	69	4	65
M2-30-02	74	9	65	76	10	66
M2-30-03	72	7	65	73	7	66
M2-30-04	66	5	61	67	6	61
M2-30-05	75	10	65	76	11	65
M2-30-06	76	10	66	77	9	68
M2-30-07	70	8	62	69	6	63
M2-30-08	73	7	66	72	6	66
M2-30-09	66	4	62	66	5	61
M2-30-10	71	10	61	72	10	62
R2-30-01	58	1	57	58	1	57
R2-30-02	57	0	57	58	0	58
R2-30-03	60	3	57	60	3	57
R2-30-04	57	1	56	58	2	56
R2-30-05	67	6	61	66	5	61
R2-30-06	69	7	62	69	6	63
R2-30-07	64	4	60	64	4	60
R2-30-08	59	2	57	59	1	58
R2-30-09	57	1	56	57	1	56

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[5]	**Alt 5**	**Alt 8, 9, 10, 13B, 13C**
Number of Impacted, Benefited Residences	68	69
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	68	69
SF per Benefited Residence	1,252	1,219

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. M2-30-1 is located near end of barrier. Further analysis is required to determine length of barrier extension needed to provide 7 dB(A) insertion loss.

5. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-149: Noise Barrier Design Summary

Alternative 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	2,544	20.0	50,812
TOTAL - New Barrier	**2,544**	**20.0**	**50,812**
Existing (Intact)	1,848	18.6	34,294

Table 4-150: Noise Barrier Design Summary

Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	3,155	19.2	63,603
TOTAL - New Barrier	**3,155**	**19.2**	**63,603**
Existing (Intact)	1,068	19.2	20,544

4.5.54 BARRIER SYSTEM 495 MD-51

A. NSA 2-31

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of two existing barriers that will be replaced; it provides abatement to NSA 2-31. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-146**. The barrier location and benefit locations are shown on Map No 21 for Alternative 5 and on Map No. 47 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-31. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-147 and **Table 4-148** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-151: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-31

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-31-01[4]	73	5	68	74	6	68
M2-31-02	77	13	64	78	14	64
M2-31-03	69	8	61	70	9	61
M2-31-04	69	9	60	72	12	60
M2-31-05	71	8	63	73	9	64
M2-31-06	72	8	64	77	13	64
M2-31-07	77	12	65	75	10	65
M2-31-08	70	8	62	68	6	62
M2-31-09	78	14	64	79	14	65

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-31-10	73	10	63	75	11	64
M2-31-11	74	11	63	76	12	64
M2-31-12	68	6	62	69	6	63
M2-31-13	75	10	65	76	10	66
M2-31-14[3]	73	4	69	73	6	67
R2-31-01	65	3	62	65	2	63
R2-31-02	68	7	61	68	7	61
R2-31-03	57	1	56	59	3	56
R2-31-04	63	4	59	65	7	58
R2-31-05	68	5	63	68	4	64
R2-31-06	68	7	61	68	6	62
R2-31-07	58	1	57	58	1	57
R2-31-08	63	5	58	64	5	59
R2-31-09	59	3	56	60	4	56
R2-31-10	65	6	59	65	5	60
R2-31-11	60	2	58	60	2	58

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[5]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	91	93
Number of Non-Impacted, Benefited Residences	0	2
Total Number of Benefited Locations	91	95
SF per Benefited Residence	1,011	973

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. M2-31-1 and M2-31-14 are located near the ends of the barrier. Further analysis is required to determine length of barrier extension needed to provide 7 dB(A) insertion loss.

5. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-152: Noise Barrier Design Summary

Alternative 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) – Ground	2,916	21.1	61,484
TOTAL - New Barrier	**2,916**	**21.1**	**61,484**
Existing (Intact)	1,620	18.8	30,516

Table 4-153: Noise Barrier Design Summary

Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground	3,000	21.1	63,362
TOTAL - New Barrier	**3,000**	**21.1**	**63,362**
Existing (Intact)	1,480	19.6	29,051

4.5.55 BARRIER SYSTEM 495 MD-52

A. NSA 3-12

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 3-12. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-149** The barrier location and benefit locations are shown on Map No 22 for Alternative 5 and on Map No. 48 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 3-12. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-150 provides a breakdown of the noise barrier quantities by barrier type.

4.5.56 BARRIER SYSTEM 495 MD-53

A. NSA 1-26

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of two barriers to provide abatement to NSA 1-26. The cost-reasonableness evaluation threshold for this barrier system is 2700 SF-p-r. For the southern barrier, the majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked, however for the northern barrier along MD 214 the barrier does not provide a 7-dB(A) noise reduction at a majority of the impacted residences.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-151**. The barrier location and benefit locations are shown on Map No 23 for Alternative 5 and on Map No. 49 for Alternative 8, 9, 10, 13B, and 13C.

The barrier just north of Richie Marlboro Road ***is considered feasible*** and ***considered reasonable*** for NSA 1-26, however the barrier located at the north end of NSA 1-26 just south MD 214 ***is not reasonable*** due to exceeding the allowable SF per benefit cost criteria and not achieving 7-dB(A) noise reductions.

Tables 4-152, 4-153, and **4-154** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-154: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-12

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-12-01	78	15	63	79	15	64
M3-12-02	78	15	63	79	15	64
M3-12-03	61	2	59	62	3	59
M3-12-04	65	4	61	67	5	62
M3-12-05	78	15	63	79	15	64
R3-12-01	62	5	57	63	6	57
R3-12-02	59	1	58	59	1	58
R3-12-03	59	2	57	60	3	57
R3-12-04	71	6	65	72	6	66

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	45	48
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	45	48
SF per Benefited Residence	922	864

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-155: Noise Barrier Design Summary

NSA 3-12	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground	208	25.0	5,200
TOTAL - New Barrier	**208**	**25.0**	**5,200**
Existing (Intact)	1,622	22.4	36,272

Table 4-156: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-26

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-26-01	75	13	62	76	14	62

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-26-02	64	5	59	65	5	60
M1-26-03	75	11	64	75	11	64
M1-26-04	65	5	60	66	5	61
R1-26-01	63	0	63	63	0	63
R1-26-02	62	1	61	63	1	62
R1-26-03	65	5	60	65	5	60
R1-26-04	59	2	57	60	3	57
R1-26-05	64	6	58	65	6	59
R1-26-06	75	12	63	73	10	63
R1-26-07	77	13	64	75	11	64
R1-26-08	57	1	56	57	1	56
R1-26-09	67	6	61	69	8	61
R1-26-10	68	6	62	69	7	62
R1-26-11	66	5	61	67	6	61
R1-26-12	57	1	56	58	1	57
R1-26-13	61	3	58	61	3	58
R1-26-14	73	8	65	74	10	64
R1-26-15	66	4	62	66	4	62
R1-26-16	65	5	60	66	5	61
R1-26-17	66	7	59	67	7	60
R1-26-18	62	3	59	63	3	60
R1-26-19	62	1	61	63	1	62
R1-26-20	60	1	59	60	1	59
R1-26-21	67	6	61	67	6	61
R1-26-22	64	5	59	65	5	60
R1-26-23	66	4	62	67	5	62
R1-26-24	65	4	61	67	5	62
R1-26-25	62	3	59	63	3	60

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits (South of MD 214)	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	4	6
Number of Non-Impacted, Benefited Residences	0	1
Total Number of Benefited Locations	4	7
SF per Benefited Residence	11,706	6,689
Benefits (North of Richie Marlboro Rd)	**Alt 5**	**Alt 8, 9, 10, 13B, 13C**
Number of Impacted, Benefited Residences	77	83

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
Number of Non-Impacted, Benefited Residences			6		0	
Total Number of Benefited Locations			83		83	
SF per Benefited Residence			1,138		1,068	

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-157: Noise Barrier Design Summary

NSA 1-26 South of MD 214	Length (ft.)	Ave. Height (ft.)	Area (ft²)
New Alignment - Ground Mounted	1,672	28	46,825
TOTAL - New Barrier	**1,672**	**28**	**46,825**

Table 4-158: Noise Barrier Design Summary

NSA 1-26 North of Richie Marlboro Rd (Alt 5)	Length (ft.)	Ave. Height (ft.)	Area (ft²)
New Alignment - Ground Mounted	4,610	19.7	90,828
New Alignment - Structure Mounted	254	14.2	3,610
TOTAL - New Barrier	**4,864**	**19.4**	**94,438**

Table 4-159: Noise Barrier Design Summary

NSA 1-26 North of Richie Marlboro Rd (Alt 8, 9, 10, 13B,	Length (ft.)	Ave. Height (ft.)	Area (ft²)
New Alignment - Ground Mounted	4,447	19.1	85,073
New Alignment - Structure Mounted	254	14.2	3,610
TOTAL - New Barrier	**4,701**	**18.9**	**88,683**

4.5.57 BARRIER SYSTEM 495 MD-53A

A. NSA 1-37

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier to protect NSA 1-37. The cost-reasonableness evaluation threshold for this barrier system is 1700 SF-p-r. Line of sight is effectively blocked, however a majority of the impacted residences are not predicted to receive at least a 7-db(A) noise reduction.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-155**. The barrier location and benefit locations are shown on Map No 23A for Alternative 5 and on Map No. 49A for Alternative 8, 9, 10, 13B, and 13C.

The barrier is ***considered feasible*** and ***considered not reasonable*** for NSA 1-37.

Table 4-156 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-160: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-37

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-37-01	69	10	59	70	10	60
M1-37-02	70	12	58	71	12	59
R1-37-01	67	7	60	69	8	61
R1-37-02	64	3	61	66	4	62
R1-37-03	63	4	59	65	5	60
R1-37-04	64	5	59	65	5	60
R1-37-05	59	1	58	60	1	59
R1-37-06	59	2	57	60	2	58
R1-37-07	61	2	59	62	2	60
R1-37-08	64	5	59	66	7	59
R1-37-09	57	1	56	58	2	56
R1-37-10	59	2	57	61	4	57
R1-37-11	62	3	59	64	4	60
R1-37-12	63	6	57	63	5	58
R1-37-13	66	7	59	67	7	60

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	14	21
Number of Non-Impacted, Benefited Residences	16	7
Total Number of Benefited Locations	30	28
SF per Benefited Residence	2,172	2,322

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-161: Noise Barrier Design Summary

NSA 1-37 South of Richie Marlboro Rd	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	2,645	24.6	65,167
TOTAL - New Barrier	**2,645**	**24.6**	**65,167**

4.5.58 BARRIER SYSTEM 495 MD-54

A. NSA 1-28

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of two barriers and provides abatement to NSA 1-28. The cost-reasonableness evaluation threshold for this barrier system is 1700 SF-p-r. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-157**. The barrier location and benefit locations are shown on Map No 24 for Alternative 5 and on Map No. 50 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 1-28.

Table 4-158 and **Table 4-159** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-162: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-28

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-28-01	72	8	64	72	9	63
M1-28-02	69	7	62	70	8	62
M1-28-03	70	8	62	70	8	62
M1-28-04	71	7	64	72	10	62
R1-28-01	69	9	60	69	9	60
R1-28-02	64	7	57	65	8	57
R1-28-03	63	5	58	63	5	58
R1-28-04	61	4	57	62	5	57
R1-28-05	64	5	59	64	5	59
R1-28-06	63	4	59	64	5	59
R1-28-07	64	4	60	64	4	60
R1-28-08	67	6	61	67	5	62
R1-28-09	67	7	60	67	6	61
R1-28-10	67	8	59	67	8	59
R1-28-11	70	7	63	70	7	63
R1-28-12	71	7	64	72	8	64
R1-28-13	72	10	62	73	11	62
R1-28-14	70	12	58	71	13	58
R1-28-15	74	7	67	74	8	66
R1-28-16	71	8	63	N/A	N/A	N/A

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	142	151
Number of Non-Impacted, Benefited Residences	64	63
Total Number of Benefited Locations	206	214
SF per Benefited Residence	387	543

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-163: Noise Barrier Design Summary

Alternative 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	4,832	16.5	79,820
TOTAL - New Barrier	**4,832**	**16.5**	**79,820**

Table 4-164: Noise Barrier Design Summary

Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New Alignment - Ground Mounted	5,342	21.8	116,202
TOTAL - New Barrier	**5,342**	**21.8**	**116,202**

4.5.59 BARRIER SYSTEM 495 MD-55

A. NSA 3-13

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of two existing barriers that will be replaced; it provides abatement to NSA 3-13. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-160**. The barrier location and benefit locations are shown on Map No 24 & 25 for Alternative 5 and on Map No. 50 & 51 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 3-13. The existing barrier system will be replaced to meet or exceed the current abatement levels.

Table 4-161 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-165: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-13

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-13-01	77	12	65	78	12	66
M3-13-02	75	12	63	76	12	64
M3-13-03	68	7	61	69	8	61
M3-13-04	76	14	62	76	13	63
M3-13-05	69	8	61	77	9	68
M3-13-06	72	12	60	76	12	64
R3-13-01	66	7	59	68	9	59
R3-13-02	58	2	56	59	2	57
R3-13-03	61	4	57	62	5	57
R3-13-04	60	2	58	62	3	59
R3-13-05	58	1	57	60	2	58
R3-13-06	59	2	57	61	3	58
R3-13-07	59	2	57	61	3	58
R3-13-08	59	2	57	60	2	58
R3-13-09	60	2	58	61	2	59
R3-13-10	60	1	59	61	1	60
R3-13-11	61	1	60	62	1	61
R3-13-12	63	1	62	64	1	63
R3-13-13	74	9	65	75	9	66

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[2] at Critical Sensitive Receptor

Benefits[3]	**Alt 5**	**Alt 8, 9, 10, 13B, 13C**
Number of Impacted, Benefited Residences	80	89
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	80	89
SF per Benefited Residence	974	818

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-166: Noise Barrier Design Summary

NSA 3-13	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Replaced (Disturbed) - Ground Mounted	1,836	20.0	36,744
TOTAL - New Barrier	**1,836**	**20.0**	**36,744**
Existing (Intact)	1,940	21.2	41,180

4.5.60 BARRIER SYSTEM 495 MD-56

A. NSA 1-29 and NSA 3-14

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of an existing barrier that will require a partial relocation and provides abatement to NSAs 1-29 and 3-14. The existing barrier will be relocated adjacent to NSA 3-14 to match the performance of the current barrier. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-162** and **Table 4-163**. The barrier location and benefit locations are shown on Map No 24 for Alternative 5 and on Map No. 51 for Alternative 8, 9, 10, 13B, and 13C.

When the existing barrier and barrier extension are combined, the noise barrier system ***is considered feasible*** and ***is considered reasonable*** for NSA 1-29 and 3-14.

Table 4-163 and **Table 4-164** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-167: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 1-29

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M1-29-03	77	13	64	77	13	64
M1-29-04	68	7	61	68	7	61
R1-29-04	66	3	63	66	3	63
R1-29-05	65	3	62	66	4	62
R1-29-06	62	3	59	62	3	59

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	8	8
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	8	8
SF per Benefited Residence	3,170	3,832

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
Combined SF per Benefited Residence			1,733		1,486	

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-168: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-14

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-14-01	68	7	61	69	7	62
M3-14-02	71	10	61	72	11	61
M3-14-03	74	13	61	75	13	62
M3-14-04	65	2	63	66	2	64
M3-14-05	74	11	63	74	10	64
M3-14-06	78	13	65	78	12	66
M3-14-07	68	4	64	68	3	65
M3-14-08	63	3	60	65	4	61
R3-14-01	65	4	61	65	4	61
R3-14-02	58	1	57	59	2	57
R3-14-03	61	1	60	62	1	61
R3-14-04	68	6	62	69	6	63
R3-14-05	57	1	56	57	1	56

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	33	46
Number of Non-Impacted, Benefited Residences	14	1
Total Number of Benefited Locations	47	47
SF per Benefited Residence	1,488	1,086

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-169: Noise Barrier Design Summary

Alternative 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New and Relocated Alignment - Ground Mounted	878	28.9	25,365
TOTAL - New Barrier	**878**	**28.9**	**25,365**
Existing (Intact)	3,137	22.3	69,937

Table 4-170: Noise Barrier Design Summary

Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
New and Relocated Alignment - Ground Mounted	878	34.9	30,663
TOTAL - New Barrier	**878**	**34.9**	**30,663**
Existing (Intact)	2,464	20.7	51,040

4.5.61 BARRIER SYSTEM 495 MD-57

A. NSA 2-32

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier that will be replaced; it provides abatement to NSA 2-32. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-166**. The barrier location and benefit locations are shown on Map No 25 for Alternative 5 and on Map No. 51 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 2-32. The existing barrier will be replaced to meet or exceed the current abatement levels.

Table 4-167 and **Table 4-168** provide a breakdown of the noise barrier quantities by barrier type.

Table 4-171: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 2-32

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M2-32-01	78	12	66	79	12	67
M2-32-02	68	7	61	69	6	63
M2-32-03	73	10	63	76	12	64
M2-32-04	79	12	67	79	12	67
M2-32-05	69	6	63	70	6	64
M2-32-06	75	7	68	75	7	68
M2-32-07	68	1	67	69	1	68
R2-32-01	61	2	59	63	2	61
R2-32-02	62	3	59	64	4	60
R2-32-03	65	6	59	67	6	61
R2-32-04	63	5	58	65	6	59
R2-32-05	67	8	59	68	7	61
R2-32-06	60	1	59	61	2	59
R2-32-07	65	2	63	66	2	64
R2-32-08	60	1	59	61	1	60
R2-32-09	65	0	65	64	0	64

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	49	52
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	49	52
SF per Benefited Residence	842	852

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-172: Noise Barrier Design Summary

Alternative 5	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Existing (Intact)	2,124	19.4	41,234

Table 4-173: Noise Barrier Design Summary

Alternative 8, 9, 10, 13B, 13C	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Relocated Alignment - Ground Mounted	930	22.3	20,737
TOTAL - New Barrier	**930**	**22.3**	**20,737**
Existing (Intact)	1,170	20.2	23,586

4.5.62 BARRIER SYSTEM 495 MD-58

A. NSA 3-15

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier and provides abatement to NSA 3-15. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-169**. The barrier location and benefit locations are shown on Map No 25A for Alternative 5 and on Map No. 51A for Alternative 8, 9, 10, 13B, and 13C.

The existing barrier is effective. There is NO additional cost to protect this NSA.

Table 4-170 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-174: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-15

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-15-01	65	2	63	67	2	65
M3-15-02	64	1	63	65	0	65
M3-15-03	63	0	63	64	0	64
M3-15-04	67	6	61	67	5	62
M3-15-05	68	6	62	69	7	62
M3-15-06	66	5	61	66	5	61
M3-15-07	73	10	63	74	11	63
M3-15-08	72	8	64	74	10	64
M3-15-09	62	3	59	62	3	59
M3-15-10	66	6	60	67	7	60
R3-15-01	61	1	60	62	2	60
R3-15-02	59	1	58	59	1	58
R3-15-03	60	1	59	60	1	59

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
	Bold	**Critical Sensitive Receptors**				
		Effective Noise Reduction[3] at Critical Sensitive Receptor				

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	11	13
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	11	13

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-175: Noise Barrier Design Summary

NSA 3-15	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Existing (Intact)	1,744	14.8	25,824

4.5.63 BARRIER SYSTEM 495 MD-59

A. NSA 3-16

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier and provides abatement to NSA 3-16. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-171**. The barrier location and benefit locations are shown on Map No 25A & 26 for Alternative 5 and on Map No. 51A & 52 for Alternative 8, 9, 10, 13B, and 13C.

The existing barrier is effective. There is NO additional cost to protect this NSA.

Table 4-172 provides a breakdown of the noise barrier quantities by barrier type.

Table 4-176: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 3-16

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-16-01	63	0	63	63	0	63

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
M3-16-02	59	0	59	58	0	58
M3-16-03	61	1	60	61	0	61
M3-16-04	61	1	60	61	1	60
M3-16-05	65	5	60	64	4	60
M3-16-06	68	7	61	68	7	61
M3-16-07	78	15	63	78	15	63
M3-16-08	73	10	63	73	10	63
M3-16-09	66	7	59	66	7	59
M3-16-10	61	4	57	61	4	57
M3-16-11	72	9	63	72	9	63
M3-16-12	69	7	62	71	9	62
M3-16-13	68	7	61	69	8	61
M3-16-14	65	4	61	65	3	62
M3-16-15	74	8	66	75	9	66
M3-16-16	67	3	64	68	4	64
M3-16-17	74	10	64	73	9	64
M3-16-18	67	5	62	66	5	61
M3-16-19	66	4	62	66	4	62
M3-16-20	78	13	65	78	14	64
M3-16-21	64	4	60	63	3	60
M3-16-22	71	8	63	71	8	63
M3-16-23	77	15	62	77	15	62
M3-16-24	67	7	60	66	7	59
M3-16-25	61	2	59	61	2	59
M3-16-26	73	10	63	73	11	62
M3-16-27	65	4	61	64	4	60
R3-16-01	59	0	59	58	0	58
R3-16-02	60	0	60	60	0	60
R3-16-03	58	0	58	58	0	58
R3-16-04	63	3	60	63	3	60
R3-16-05	58	1	57	58	1	57
R3-16-06	62	1	61	62	0	62
R3-16-07	68	8	60	69	8	61
R3-16-08	66	5	61	67	6	61
R3-16-09	65	3	62	65	3	62
R3-16-10	67	5	62	66	4	62
R3-16-11	68	0	68	68	0	68
R3-16-12	66	0	66	66	0	66
R3-16-13	64	0	64	64	0	64

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R3-16-14	65	0	65	65	0	65
R3-16-15	60	0	60	60	0	60

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	74	73
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	74	73
SF per Benefited Residence	2,016	2,043

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

Table 4-177: Noise Barrier Design Summary

NSA 3-16	Length (ft.)	Ave. Height (ft.)	Area (ft^2)
Relocated Alignment – Ground Mounted	1,825	17.2	31,331
Existing (Intact)	5,836	20.2	117,842

4.6 I-270 (Dwight D. Eisenhower Memorial Highway)

Preliminary noise barrier designs are presented in this Study. For new or replacement noise barriers, typically, constant height barriers were specified for each NSA. The barrier design is governed primarily by the goal of 7 dB(A) noise reduction at the *critical sensitive receptors*. Critical sensitive receptors are typically defined as first-row, ground level sites, where worst-case noise impacts are found. Noise attenuation at second-row receptors, upper level receptors or other locations not directly adjacent to the proposed barrier are considered a secondary benefit.

4.6.1 EXISTING BARRIER SYSTEM at NSAs 5-01 and 5-02

Existing barriers near NSAs 5-01 and 5-02 would remain in place as they are currently constructed since all of the alternatives being considered would not displace them.

4.6.2 BARRIER SYSTEM 270-1

A. NSAs 5-06 and 5-07

Alternative 5 and Alternative 13B

To provide abatement at the critical sensitive receptors in NSA 5-06 and 5-07, a 12 to 15 foot, variable height, ground mounted noise barrier, approximately 3,834 feet long, is proposed.

The TNM analysis of this noise barrier shows that there are 5 impacted, benefited residences and 34 non-impacted, benefited residences for a total of 39 benefited residences, or residential equivalents. The barrier does not meet the acoustical consideration of 5 dBA for 70 percent of the impacted residences nor does it meet the design goal of achieving a minimum 7 dB(A) noise reduction for at least three or 50 percent of the impacted residences. The residential equivalents for the outdoor use areas were calculated based on MDOT SHA Highway Noise Abatement Planning and Engineering Guidelines (2020), using a combination of linear frontage and time/usage factors. The SF per benefited residence is 1,491. Because this is less than the 1,700 SF per benefit criterion, this noise barrier is considered to be cost effective, for either build alternate.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-173**. For Alternatives 5 and 13B, the majority of impacted receptors do not benefit from the barrier system.

A noise barrier ***is considered not feasible nor reasonable*** for NSAs 5-06 and 5-07 under Alternatives 5 and 13B.

Alternative 8, 9, 10, and 13C

To provide abatement at the critical sensitive receptors NSA 5-06 and 5-07, a 12 to 18 foot, variable height, ground mounted noise barrier, approximately 2,326 feet long, is proposed.

The TNM analysis of this noise barrier shows that there are 15 impacted, benefited residences and 70 non-impacted, benefited residences for a total of 85 benefited residences. The barrier satisfies the acoustical consideration of 5 dBA for 70 percent of the residences but does not meet the design goal of achieving a minimum 7 dB(A) noise reduction for at least three or 50 percent of the impacted residences. The SF per benefited residence is 745. Because this is less than the 1,700 SF per benefit criterion, this noise barrier is considered to be cost effective, for either build alternate.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-173**. For Alternatives 8, 9, 10, and 13C 70 percent of impacted receptors would not benefit from the barrier system and therefore is not feasible for noise abatement.

A noise barrier ***is not considered feasible*** for NSAs 5-06 and 5-07.

Table 4-178: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-06 and 5-07

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-06-1	61	6	55	62	7	55	62	7	55
R 5-06-2	63	8	55	64	9	55	64	9	55
R 5-06-3	68	11	57	68	11	57	68	11	57
R 5-06-4	67	9	58	67	9	58	67	9	58
R 5-06-5	63	8	55	64	9	55	64	9	55
R 5-06-6	66	10	56	66	10	56	66	10	56
R 5-06-7	68	12	56	68	11	57	68	11	57
R 5-06-8	66	9	57	66	8	58	66	8	58
R 5-06-9	67	9	58	68	9	59	68	9	59
R 5-06-10	66	9	57	67	9	58	67	9	58
R 5-06-11	67	8	59	67	9	58	67	9	58
R 5-06-12	67	9	58	67	9	58	67	9	58
R 5-06-13	66	8	58	67	10	57	67	10	57
R 5-06-14	61	7	54	61	6	55	61	6	55
R 5-06-15	67	9	58	67	9	58	67	9	58
R 5-06-16	68	8	60	68	8	60	68	8	60
R 5-06-17	68	5	63	69	7	62	69	7	62
R 5-06-18	69	4	65	69	5	64	69	5	64
R 5-06-19	69	1	68	70	3	67	70	3	67
R 5-06-20	70	1	69	70	1	69	70	1	69
R 5-06-21	70	1	69	70	1	69	70	1	69
R 5-06-22	68	9	59	68	10	58	68	10	58
R 5-06-23	68	7	61	69	9	60	69	9	60
R 5-06-24	69	5	64	69	7	62	69	7	62
R 5-06-25	69	3	66	69	4	65	69	4	65
R 5-06-26	69	1	68	70	3	67	70	3	67
R 5-06-27	70	1	69	70	1	69	70	1	69
R 5-06-28	70	1	69	71	1	70	71	1	70
R 5-06-29	70	0	70	71	1	70	71	1	70
R 5-07-1	66	5	61	65	4	61	65	4	61
R 5-07-2	69	6	63	69	7	62	69	7	62
R 5-07-3	76	6	70	76	6	70	76	6	70
R 5-07-4	65	3	62	66	5	61	66	5	61
R 5-07-5	66	4	62	66	5	61	66	5	61
R 5-07-6	64	4	60	64	4	60	64	4	60
R 5-07-7	64	5	59	64	5	59	64	5	59
R 5-07-8	64	4	60	65	5	60	65	5	60
R 5-07-9	65	4	61	65	4	61	65	4	61
R 5-07-10	64	4	60	64	4	60	64	4	60
R 5-07-11	63	5	58	63	5	58	63	5	58

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-07-12	63	5	58	63	5	58	63	5	58
R 5-07-13	63	5	58	63	6	57	63	6	57
R 5-07-14	62	5	57	62	5	57	62	5	57
R 5-07-15	62	4	58	63	5	58	63	5	58
R 5-07-16	69	3	66	69	5	64	69	5	64
R 5-07-17	70	2	68	70	3	67	70	3	67
R 5-07-18	65	5	60	65	6	59	65	6	59
R 5-07-19	67	4	63	68	6	62	68	6	62
R 5-07-20	68	3	65	69	6	63	69	6	63
R 5-07-21	69	2	67	69	4	65	69	4	65
R 5-07-22	65	5	60	65	6	59	65	6	59
R 5-07-23	67	5	62	67	5	62	67	5	62
R 5-07-24	68	4	64	68	5	63	68	5	63
R 5-07-25	68	2	66	69	5	64	69	5	64
R 5-07-26	65	4	61	66	6	60	66	6	60
R 5-07-27	68	4	64	68	5	63	68	5	63

LEGEND

Bold

Critical Sensitive Receptors

Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5, 13B	Alt 8, 9, 13C	Alt 10
Number of Impacted, Benefited Residences	5	15	15
Number of Non-Impacted, Benefited Residences	34	70	70
Total Number of Benefited Locations	39	85	85
SF per Benefited Residence	1,491	745	745

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.6.3 BARRIER SYSTEM 270-2

A. NSA 5-08 and NSA 5-09

Alternative 5 and Alternative 13B

A 22 foot, constant height, ground mounted noise barrier, approximately 1,164 feet long, was analyzed. The wall would not provide 7 dB(A) insertion loss at the critical sensitive receptors in NSA 5-08 and 5-09. Five floors of the apartment complex have been analyzed for benefits.

The TNM analysis of this noise barrier shows that there are 2 impacted, benefited residences and zero non-impacted, benefited residences for a total of 2 benefited residences. The SF per benefited residence is 6,987. Because this is more than the 1,700 SF per benefit criterion, this noise barrier is not cost effective.

Alternative 8, 9, 10, and 13C

A 22 foot, constant height, ground mounted noise barrier, approximately 1,164 feet long, was analyzed. There are zero benefited residences.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-174**.

A noise barrier ***is not considered feasible*** and ***is not considered reasonable*** for NSAs 5-08 and 5-09.

Table 4-179: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-08 and 5-09

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-08-1	64	1	63	64	0	64	65	0	65
R 5-08-2	67	1	66	67	1	66	68	1	67
R 5-08-3	69	1	68	69	1	68	70	1	69
R 5-08-4	70	2	68	70	1	69	71	1	70
R 5-08-5	70	0	70	70	0	70	71	0	71
R 5-08-6	64	2	62	65	3	62	66	3	63
R 5-08-7	64	3	61	65	3	62	66	3	63
R 5-08-8	68	4	64	68	3	65	69	3	66
R 5-08-9	69	3	66	69	3	66	70	3	67
R 5-08-10	69	0	69	70	1	69	71	1	70
R 5-08-11	70	1	69	70	0	70	71	0	71
R 5-08-12	64	3	61	64	3	61	65	3	62
R 5-08-13	68	4	64	68	3	65	69	3	66
R 5-08-14	69	3	66	69	3	66	70	3	67
R 5-08-15	70	1	69	70	1	69	71	1	70
R 5-08-16	70	0	70	70	0	70	71	0	71
R 5-08-17	66	5	61	66	4	62	67	4	63
R 5-08-18	50	0	50	50	0	50	51	0	51
R 5-08-19	68	0	68	68	0	68	69	0	69
R 5-08-20	69	0	69	69	0	69	70	0	70
R 5-08-21	70	1	69	70	1	69	71	1	70
R 5-08-22	70	0	70	70	0	70	71	0	71
R 5-08-23	70	0	70	71	1	70	72	1	71

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-09-1	65	2	63	65	2	63	66	2	64
R 5-09-2	61	2	59	61	2	59	62	2	60
R 5-09-3	51	0	51	51	0	51	52	0	52
R 5-09-4	51	0	51	51	0	51	52	0	52
R 5-09-5	58	1	57	58	1	57	59	1	58
R 5-09-6	65	1	64	65	1	64	66	1	65
R 5-09-7	51	0	51	51	0	51	52	0	52
R 5-09-8	52	0	52	52	0	52	53	0	53
R 5-09-9	61	1	60	61	0	61	62	0	62
R 5-09-10	66	0	66	66	0	66	67	0	67
R 5-09-11	70	3	67	70	3	67	71	3	68

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5, 13B	Alt 8, 9, 13C	Alt 10
Number of Impacted, Benefited Residences	2	0	0
Number of Non-Impacted, Benefited Residences	0	0	0
Total Number of Benefited Locations	2	0	0
SF per Benefited Residence	6987	0	0

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.
2. A receptor may represent more than 1 equivalent residence.
3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.6.4 BARRIER SYSTEM 270-3

A. NSA 5-10

Alternative 5 and Alternative 8, 9, 10, 13B and 13C

To provide abatement at the critical sensitive receptors in NSA 5-10, an 18 foot, constant height, ground mounted noise barrier, approximately 1,442 feet long was analyzed.

The TNM analysis of this noise barrier shows that there are 6 impacted, benefited residences and 0 non-impacted, benefited residences for a total of 6 benefited residences. The barrier satisfies the design goal of achieving a minimum 7 dB(A) noise reduction for at least three or 50 percent of the impacted

residences. The SF per benefited residence is 4,324. Because this is more than the 2,700 SF per benefit criterion, this noise barrier is considered to not be cost effective, for any build alternate.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-175**. For Alternatives 5, 8, 9, 10, 13B and 13C 70 percent of impacted receptors would not benefit from the barrier system and therefore is not feasible for noise abatement.

A noise barrier ***is not considered feasible*** and ***is not considered reasonable*** for NSA 5-10.

Table 4-180: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-10

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-10-3	70	5	65	70	5	65	71	5	66
R 5-10-2	74	6	68	75	7	68	76	7	69
R 5-10-1	73	7	66	73	6	67	74	6	68

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5, 13B	Alt 8, 9, 13C	Alt 10
Number of Impacted, Benefited Residences	6	6	6
Number of Non-Impacted, Benefited Residences	0	0	0
Total Number of Benefited Locations	6	6	6
SF per Benefited Residence	4324	4324	4324

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.
2. A receptor may represent more than 1 equivalent residence.
3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.6.5 EXISTING BARRIER SYSTEM at NSA 5-12

An existing barrier near NSA 5-12 would remain in place as currently constructed since all of the alternatives being considered would not displace it.

4.6.6 BARRIER SYSTEM 270-4

A. NSA 5-14

Alternative 5 and Alternative 13B

To provide abatement at the critical sensitive receptors in NSA 5-14, a 22 foot, constant height, ground mounted noise barrier, approximately 1,631 feet long was analyzed.

Alternative 8, 9, 10, and 13C

To provide abatement at the critical sensitive receptors in NSA 5-14, an 18 foot, constant height, ground mounted noise barrier, approximately 1,442 feet long was analyzed.

Alternative 5 and Alternative 8, 9, 10, 13B and 13C

The TNM analysis of this noise barrier shows that there are 6 impacted, benefited residences and 0 non-impacted, benefited residences for a total of 6 benefited residences. The SF per benefited residence is 5,985. Because this is more than the 1,700 SF per benefit criterion, this noise barrier is considered to not be cost effective, for any build alternate.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-176**. For Alternatives 5, 8, 9, 10, 13B and 13C 70 percent of impacted receptors would not benefit from the barrier system and therefore is not feasible for noise abatement.

A noise barrier ***is not considered feasible*** and ***is not considered reasonable*** for NSA 5-14.

Table 4-181: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-14

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-14-4	71	5	66	71	5	66	72	5	67
R 5-14-1	66	5	61	66	5	61	67	5	62
R 5-14-2	67	6	61	67	6	61	68	6	62
R 5-14-3	68	7	61	68	6	62	69	6	63

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5, 13B	Alt 8, 9, 13C	Alt 10
Number of Impacted, Benefited Residences	6	6	6
Number of Non-Impacted, Benefited Residences	0	0	0
Total Number of Benefited Locations	6	6	6
SF per Benefited Residence	5985	5985	5985

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.6.7 BARRIER SYSTEM 270-5

A. NSA 5-13 and 5-15

Alternative 5 and 13B

To provide abatement at the critical sensitive receptors in NSAs 5-13 & 5-15, a 13 to 30-foot, variable height, ground mounted noise barrier, approximately 2,643 feet long, is proposed.

The TNM analysis of this noise barrier shows that there are 13 impacted, benefited residences and 22 non-impacted, benefited residences for a total of 35 benefited residences. The barrier satisfies the design goal of achieving a minimum 7 dB(A) noise reduction for at least three or 50 percent of the impacted residences. Non-residential receptors, such as the park located nearby, were assigned a residential equivalent based on the linear length of property parallel to I-270 per Maryland SHA regulation. The SF per benefited residence is1,586. Because this is less than the 1,700 SF per benefit criterion, this noise barrier is considered to be cost effective, for either build alternative.

Alternative 8, 9, and 13C

To provide abatement at the critical sensitive receptors in NSAs 5-13 & 5-15, a 12 to 32-foot, variable height, ground mounted noise barrier, approximately 2,628 feet long, is proposed.

The TNM analysis of this noise barrier shows that there are 17 impacted, benefited residences and 22 non-impacted, benefited residences for a total of 39 benefited residences. The barrier satisfies the design goal of achieving a minimum 7 dB(A) noise reduction for at least three or 50 percent of the impacted residences. The SF per benefited residence is 1,468. Because this is less than the 1,700 SF per benefit criterion, this noise barrier is considered to be cost effective, for each build alternate.

Alternative 10

To provide abatement at the critical sensitive receptors in NSAs 5-13 & 5-15, a 12 to 32 foot, variable height, ground mounted noise barrier, approximately 2,628 feet long, is proposed.

The TNM analysis of this noise barrier shows that there are 22 and impacted, benefited residences and 17 non-impacted, benefited residences for a total of 39 benefited residences. The barrier satisfies the design goal of achieving a minimum 7 dB(A) noise reduction for at least three or 50 percent of the impacted residences. The SF per benefited residence is 1,468. Because this is less than the 1,700 SF per benefit criterion, this noise barrier is considered to be cost effective, for this build alternate.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-177**. For Alternatives 5, 8, 9, 10, 13B and 13C 70 percent of impacted receptors would benefit from the barrier system and it is therefore feasible for noise abatement.

The barrier location and benefited locations are shown on Map No 62 for Alternative 5 and on Map No. 67 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** under all alternatives for NSA 5-13 & 5-15.

Table 4-182: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-13 and 5-15

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-13-1	65	9	56	65	9	56	66	9	57
R 5-13-2	63	7	56	63	7	56	64	7	57
R 5-13-3	60	4	56	60	4	56	61	4	57
R 5-15-1	45	10	35	44	9	35	45	9	36
R 5-15-2	62	4	57	63	6	57	64	6	58
R 5-15-3	65	7	58	65	7	58	66	7	59
R 5-15-4	64	5	59	64	5	59	65	5	60
R 5-15-5	64	4	60	64	4	60	65	4	61
R 5-15-6	62	5	57	62	5	57	63	5	58
R 5-15-7	59	4	55	59	4	55	60	4	56
R 5-15-8	62	4	58	62	4	58	63	4	59
R 5-15-9	57	3	54	57	3	54	58	3	55
R 5-15-10	61	3	58	61	3	58	62	3	59
R 5-15-11	58	2	56	58	2	56	59	2	57
R 5-15-12	66	9	57	66	9	57	67	9	58
R 5-15-13	59	3	56	59	3	56	60	3	57
R 5-15-14	57	2	55	57	1	56	58	1	57
R 5-15-15	32	2	30	33	3	30	34	3	31
R 5-15-16	58	2	56	58	2	56	59	2	57
R 5-15-17	31	0	31	32	1	31	33	1	32
R 5-15-18	54	2	52	54	2	52	55	2	53
R 5-15-19	55	0	55	56	1	55	57	1	56
R 5-15-20	52	1	51	53	1	52	54	1	53
R-5-15-21	67	9	58	68	10	58	69	10	59
R 5-15-22	69	8	61	68	7	61	69	7	62
R 5-15-23	67	8	59	67	8	59	68	8	60
R 5-15-24	66	4	62	67	6	61	68	6	62
R 5-15-25	63	4	59	63	4	59	64	4	60
R 5-13-4	59	6	53	59	5	54	60	5	55

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	**Alt 5, 13B**	**Alt 8, 9, 13C**	**Alt 10**

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
Number of Impacted, Benefited Residences				13			17		22
Number of Non-Impacted, Benefited Residences				22			22		17
Total Number of Benefited Locations				35			39		39
SF per Benefited Residence				1586			1468		1468

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.
2. A receptor may represent more than 1 equivalent residence.
3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.6.8 BARRIER SYSTEM 270-6

A. NSA 5-18, 5-19, & 5-22

Alternative 5 and 13B

To provide abatement at the critical sensitive receptors in NSAs 5-18, 5-19, & 5-22, a 16- 22 foot, variable height, ground mounted noise barrier, approximately 4,330 feet long, is proposed.

The TNM analysis of this noise barrier shows that there are 6 impacted, benefited residences and 65 non-impacted, benefited residences for a total of 71 benefited residences. The barrier satisfies the design goal of achieving a minimum 7 dB(A) noise reduction for at least three or 50 percent of the impacted residences. The SF per benefited residence is 1,159. Because this is less than the 1,700 SF per benefit criterion, this noise barrier is considered to be cost effective, for either build alternate.

Alternative 8, 9, and 13C

To provide abatement at the critical sensitive receptors in NSAs 5-18, 5-19, & 5-22, a 16-20-foot, variable height, ground mounted noise barrier, approximately 4,331 feet long, is proposed.

The TNM analysis of this noise barrier shows that there are 21 impacted, benefited residences and 76 non-impacted, benefited residences for a total of 97 benefited residences. The barrier satisfies the design goal of achieving a minimum 7 dB(A) noise reduction for at least three or 50 percent of the impacted residences. The SF per benefited residence is 848. Because this is less than the 1,700 SF per benefit criterion, this noise barrier is considered to be cost effective, for each build alternate.

Alternative 10

To provide abatement at the critical sensitive receptors in NSAs 5-18, 5-19, & 5-22, a 16-20-foot, variable height, ground mounted noise barrier, approximately 4,331 feet long, is proposed.

The TNM analysis of this noise barrier shows that there are 28 impacted, benefited residences and 69 non-impacted, benefited residences for a total of 97 benefited residences. The SF per benefited residence

is 848. Because this is less than the 1,700 SF per benefit criterion, this noise barrier is considered to be cost effective, for this build alternate.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-178**. For ***Alternatives 5, 8, 9, 10, 13B and 13C.*** 70 percent of impacted receptors would benefit from the barrier system and it is therefore ***feasible*** for noise abatement. However, the barrier does not achieve the SHA's design goal that 50 percent of the impacted receptors have a minimum 7 dB(A) noise reduction and is therefore ***not reasonable.*** The barrier alignment evaluated does not account for the existing berm that is currently providing abatement to these NSAs. Further analysis of this NSA is required to determine whether the design goal can be achieved; this will be completed prior to the FEIS.

The barrier location and benefit locations are shown on Map No 61 for Alternative 5 and on Map No. 73 for Alternative 8, 9, 10, 13B, and 13C.

Table 4-183: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-18 and 5-19

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-18-1	63	2	61	65	3	62	66	3	63
R 5-18-2	67	2	65	68	2	66	69	2	67
R 5-18-4	59	2	57	60	2	58	61	2	59
R 5-18-5	60	3	57	61	3	58	62	3	59
R 5-18-6	61	4	57	62	4	58	63	4	59
R 5-18-7	61	4	57	62	5	57	63	5	58
R 5-18-8	23	3	20	24	3	21	25	3	22
R 5-18-9	63	4	59	64	4	60	65	4	61
R 5-19-1	59	4	55	60	4	56	61	4	57
R 5-19-2	60	5	55	61	5	56	62	5	57
R 5-19-3	60	5	55	61	5	56	62	5	57
R 5-19-4	60	4	56	61	4	57	62	4	58
R 5-19-5	61	5	56	62	5	57	63	5	58
R 5-19-6	61	5	56	62	5	57	63	5	58
R 5-19-7	62	5	57	63	5	58	64	5	59
R 5-19-8	62	5	57	63	5	58	64	5	59
R 5-19-9	63	6	57	64	6	58	65	6	59
R 5-19-10	63	6	57	64	6	58	65	6	59
R 5-19-11	63	5	58	64	5	59	65	5	60
R 5-19-12	64	6	58	65	6	59	66	6	60
R 5-19-13	64	5	59	65	5	60	66	5	61

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-19-14	57	3	54	59	4	55	60	4	56
R 5-19-15	58	4	54	59	4	55	60	4	56
R 5-19-16	58	4	54	59	4	55	60	4	56
R 5-19-17	58	4	54	59	4	55	60	4	56
R 5-19-18	59	5	54	60	5	55	61	5	56
R 5-19-19	59	5	54	60	5	55	61	5	56
R 5-19-20	59	4	55	60	4	56	61	4	57
R 5-19-21	60	5	55	61	5	56	62	5	57
R 5-19-22	60	5	55	61	5	56	62	5	57
R 5-19-23	60	5	55	61	5	56	62	5	57
R 5-19-24	61	5	56	62	5	57	63	5	58
R 5-19-25	61	5	56	62	5	57	63	5	58
R 5-19-26	62	6	56	63	6	57	64	6	58
R 5-19-27	54	3	51	55	3	52	56	3	53
R 5-19-28	55	2	53	56	2	54	57	2	55
R 5-19-29	55	1	54	56	1	55	57	1	56
R 5-19-30	56	1	55	57	1	56	58	1	57
R 5-19-31	56	1	55	57	2	55	58	2	56
R 5-19-32	60	4	56	61	4	57	62	4	58
R 5-19-33	58	3	55	59	3	56	60	3	57
R 5-19-34	59	3	56	60	3	57	61	3	58
R 5-19-35	59	3	56	60	3	57	61	3	58
R 5-19-36	60	5	55	61	5	56	62	5	57
R 5-19-37	59	4	55	60	4	56	61	4	57
R 5-19-38	59	4	55	60	4	56	61	4	57
R 5-19-39	59	5	54	60	5	55	61	5	56
R 5-19-40	61	5	56	62	5	57	63	5	58
R 5-19-41	59	4	55	60	4	56	61	4	57
R 5-19-42	59	4	55	60	4	56	61	4	57
R 5-19-43	59	4	55	61	5	56	62	5	57
R 5-19-44	60	3	57	62	5	57	63	5	58
R 5-19-45	60	4	56	62	6	56	63	6	57
R 5-19-46	64	7	57	66	9	57	67	9	58
R 5-19-47	68	8	60	70	10	60	71	10	61

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-19-48	67	8	59	69	9	60	70	9	61
R 5-19-49	69	8	61	71	10	61	72	10	62
R 5-19-50	69	9	60	71	10	61	72	10	62
R 5-19-51	69	8	61	71	10	61	72	10	62
R 5-19-52	61	4	57	62	5	57	63	5	58
R 5-19-53	61	4	57	62	5	57	63	5	58
R 5-19-54	60	4	56	62	5	57	63	5	58
R 5-19-55	61	4	57	63	6	57	64	6	58
R 5-19-56	63	5	58	65	7	58	66	7	59
R 5-19-57	59	4	55	60	4	56	61	4	57
R 5-19-58	60	5	55	61	5	56	62	5	57
R 5-19-59	62	5	57	64	7	57	65	7	58
R 5-19-60	65	8	57	67	10	57	68	10	58
R 5-19-61	64	8	56	66	9	57	67	9	58
R 5-19-62	63	7	56	65	9	56	66	9	57
R 5-19-63	63	8	55	65	9	56	66	9	57
R 5-19-64	63	8	55	65	9	56	66	9	57
R 5-19-65	62	7	55	64	8	56	65	8	57
R 5-19-66	62	7	55	64	8	56	65	8	57
R 5-19-67	61	6	55	63	7	56	64	7	57
R 5-19-68	61	6	55	63	7	56	64	7	57
R 5-19-69	61	6	55	63	7	56	64	7	57
R 5-19-70	65	7	58	67	9	58	68	9	59
R 5-19-71	66	8	58	68	9	59	69	9	60
R 5-22-1	64	4	60	65	4	61	66	4	62
R 5-22-2	65	6	59	67	8	59	68	8	60
R 5-22-3	65	7	58	66	7	59	67	7	60
R 5-22-4	64	6	58	66	8	58	67	8	59
R 5-22-5	62	6	56	63	6	57	64	6	58
R 5-22-6	63	6	57	64	7	57	65	7	58
R 5-22-7	64	7	57	65	7	58	66	7	59
R 5-22-8	60	3	57	62	5	57	63	5	58
R 5-22-9	62	5	57	63	5	58	64	5	59
R 5-22-10	62	4	58	63	4	59	64	4	60

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-22-11	37	5	32	39	6	33	40	6	34

LEGEND

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5, 13B	Alt 8, 9, 13C	Alt 10
Number of Impacted, Benefited Residences	6	21	28
Number of Non-Impacted, Benefited Residences	65	76	69
Total Number of Benefited Locations	71	97	97
SF per Benefited Residence	1159	848	848

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.
2. A receptor may represent more than 1 equivalent residence.
3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.6.9 EXISTING BARRIER SYSTEM AT NSAs 5-16, 5-17, 5-20, and 5-21

A. NSA 5-16, 5-17, 5-20, and 5-21

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

To provide 7 dB(A) insertion loss at the critical sensitive receptors in NSA 5-16, 5-17, 5-20, and 5-21, a variable height, ground mounted replacement noise barrier, approximately 4,920 feet long, is proposed. The Existing Barrier was shown to be effective if moved in kind to accommodate the roadway widening.

The TNM analysis of this noise barrier shows that there are between 63 and 68 impacted, benefited residences and between 1 and 10 non-impacted, benefited residence for a total of 69 to 76 benefited residences depending on the Alternative. The SF per benefited residence is 1,320 to 1,453 depending on the Alternative. Because this is less than the 2,700 SF per benefit criterion, this replacement noise barrier is considered to be cost effective, for any build alternate.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-179**. The barrier location and benefit locations are shown on Map No 61 for Alternative 5 and on Map No. 73 for Alternative 8, 9, 10, 13B, and 13C.

A replacement noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 5-16, 5-17, 5-20, and 5-21.

Table 4-184: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-16, 5-17, 5-20, and 5-21

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-16-2	62	2	62	63	1	62	64	1	63
R 5-17-1	72	0	65	73	0	65	74	0	65
R 5-17-2	73	7	65	73	8	65	74	8	66
R 5-17-3	73	8	66	74	7	66	75	7	66
R 5-17-4	74	7	66	74	8	66	75	8	67
R 5-17-5	75	8	66	75	7	66	76	7	67
R 5-17-6	75	9	66	76	8	66	76	8	67
R 5-17-7	76	9	67	76	9	67	77	9	67
R 5-17-8	78	9	69	79	9	69	80	9	69
R 5-17-9	76	9	64	77	10	64	78	10	65
R 5-17-10	74	12	63	75	12	63	76	12	63
R 5-17-11	73	11	62	73	12	62	74	12	62
R 5-17-12	71	11	61	72	11	61	73	11	61
R 5-17-13	70	10	60	70	11	60	71	11	61
R 5-17-14	68	10	59	69	9	59	70	9	60
R 5-17-15	69	9	61	70	9	61	71	9	61
R 5-17-16	70	8	61	71	9	61	72	9	62
R 5-17-17	71	9	63	72	9	63	73	9	63
R 5-17-18	73	8	63	74	9	63	74	9	63
R 5-17-19	74	10	63	75	11	63	76	11	63
R 5-17-20	75	11	62	75	12	62	76	12	63
R 5-17-21	72	13	62	72	12	62	73	12	62
R 5-17-22	69	10	61	69	10	61	70	10	61
R 5-17-23	68	8	60	68	8	60	69	8	61
R 5-17-24	67	8	60	67	7	60	68	7	61
R 5-17-25	65	7	59	65	6	59	66	6	60
R 5-17-26	64	6	58	65	5	58	66	5	59
R 5-17-27	65	6	59	65	6	59	66	6	59
R 5-17-28	66	6	59	66	6	59	67	6	60
R 5-17-29	66	7	60	67	6	60	67	6	60
R 5-17-30	67	6	60	67	7	60	68	7	61
R 5-17-31	68	7	61	68	6	61	69	6	62
R 5-17-32	69	7	62	70	6	62	71	6	62

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-17-33	71	7	63	71	8	63	72	8	63
R 5-17-34	69	8	62	69	8	62	70	8	62
R 5-17-35	68	7	61	68	7	61	69	7	61
R 5-17-36	67	7	61	68	7	61	68	7	61
R 5-17-37	66	6	60	67	7	60	68	7	60
R 5-17-38	66	6	59	66	7	59	67	7	60
R 5-17-39	66	7	59	66	6	59	67	6	60
R 5-17-40	65	7	60	65	6	60	66	6	60
R 5-17-41	68	5	61	69	5	61	69	5	61
R 5-17-42	69	7	61	69	8	61	70	8	62
R 5-17-43	70	8	62	70	7	62	71	7	62
R 5-17-44	70	8	62	70	8	62	71	8	63
R 5-17-45	71	8	63	71	7	63	72	7	63
R 5-17-46	71	8	63	71	8	63	72	8	64
R 5-17-47	64	8	56	64	7	56	65	7	57
R 5-17-48	60	8	56	60	7	56	61	7	56
R 5-17-49	60	4	56	60	4	56	61	4	56
R 5-17-50	59	4	54	59	4	54	60	4	55
R 5-17-51	59	5	55	59	4	55	60	4	55
R 5-17-52	57	4	55	58	4	55	59	4	56
R 5-17-53	80	2	66	80	2	66	81	2	66
R 5-17-54	58	14	55	59	14	55	60	14	55
R 5-17-55	57	3	55	58	4	55	59	4	55
R 5-17-56	59	2	55	59	3	55	60	3	55
R 5-17-57	58	4	54	59	4	54	59	4	55
R 5-17-58	59	4	55	59	4	55	60	4	55
R 5-17-59	58	4	55	59	4	55	60	4	55
R 5-17-60	58	3	55	59	4	55	59	4	56
R 5-17-61	59	3	55	59	3	55	60	3	55
R 5-17-62	58	4	55	59	4	55	60	4	55
R 5-17-63	60	3	58	60	4	58	61	4	58
R 5-17-64	62	2	60	62	2	60	63	2	61
R 5-17-65	60	2	57	60	1	57	61	1	58
R 5-17-66	60	3	57	60	2	57	61	2	58
R 5-17-67	60	3	57	60	2	57	61	2	58

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-17-68	65	3	59	65	2	59	66	2	60
R 5-17-69	61	6	57	61	5	57	62	5	57
R 5-17-70	64	4	60	64	4	60	65	4	61
R 5-17-71	60	4	57	61	3	57	62	3	58
R 5-17-72	53	3	49	54	3	49	55	3	51
R 5-17-73	62	4	59	62	3	59	63	3	59
R 5-17-74	61	3	58	61	3	58	62	3	58
R 5-17-75	59	3	56	59	3	56	60	3	57
R 5-17-76	59	3	57	59	2	57	60	2	57
R 5-17-77	58	2	56	59	2	56	59	2	56
R 5-17-78	62	2	61	63	3	61	63	3	61
R 5-17-79	58	1	56	59	2	56	60	2	57
R 5-17-80	59	2	57	60	2	57	61	2	58
R 5-17-81	59	2	57	60	2	57	61	2	58
R 5-20-1	66	2	62	66	2	62	67	2	62
R 5-20-2	66	4	62	66	4	62	67	4	62
R 5-20-3	67	4	62	67	4	62	68	4	63
R 5-20-4	69	5	63	69	4	63	70	4	63
R 5-20-5	70	6	64	70	6	64	71	6	64
R 5-20-6	71	6	64	72	6	64	73	6	65
R 5-20-7	72	7	66	73	7	66	74	7	67
R 5-20-8	74	6	67	75	6	67	76	6	68
R 5-20-9	74	7	68	74	7	68	75	7	68
R 5-20-10	75	6	69	76	6	69	77	6	70
R 5-20-11	75	6	69	76	6	69	77	6	69
R 5-20-12	76	6	67	77	7	67	77	7	68
R 5-20-13	75	9	65	76	9	65	77	9	66
R 5-20-14	62	10	59	62	10	59	63	10	59
R 5-20-15	62	3	58	62	3	58	63	3	59
R 5-20-16	61	4	58	61	3	58	62	3	58
R 5-20-17	60	3	57	60	3	57	61	3	58
R 5-20-18	61	3	58	61	2	58	62	2	59
R 5-20-19	60	3	58	61	2	58	61	2	59
R 5-20-20	59	2	57	60	2	57	61	2	58
R 5-20-21	64	2	60	65	2	60	65	2	61

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-20-22	63	4	60	64	4	60	65	4	61
R 5-20-23	69	3	62	69	3	62	70	3	62
R 5-20-24	67	7	61	67	7	61	68	7	61
R 5-20-25	60	6	57	60	6	57	61	6	58
R 5-20-26	62	3	59	63	2	59	64	2	60
R 5-20-27	64	3	60	65	3	60	66	3	60
R 5-20-28	61	4	57	61	5	57	62	5	58
R 5-20-29	63	4	59	63	3	59	64	3	59
R 5-20-30	62	4	59	63	4	59	64	4	59
R 5-20-31	61	3	58	62	4	58	63	4	59
R 5-20-32	67	3	62	67	3	62	68	3	62
R 5-21-1	63	5	59	63	5	59	64	5	59
R 5-21-2	58	4	55	58	4	55	59	4	55
R 5-21-3	60	3	58	60	3	58	61	3	58
R 5-21-4	67	2	64	68	2	64	69	2	64
R 5-21-5	74	3	67	74	4	67	75	4	67
R 5-21-6	74	7	67	74	7	67	75	7	67
R 5-21-7	78	7	70	78	7	70	79	7	70
R 5-21-8	77	8	72	78	8	72	79	8	72
R 5-21-9	76	5	75	77	6	75	78	6	75
R 5-21-10	75	1	75	76	2	75	77	2	75
R 5-21-11	69	0	69	70	1	69	71	1	69
R 5-21-12	75	0	75	76	1	75	77	1	75
R 5-21-13	65	0	65	66	1	65	67	1	65
R 5-21-14	61	0	61	63	1	61	64	1	61
R 5-21-15	59	0	59	60	2	59	61	2	59
R 5-21-16	64	0	61	65	1	61	66	1	61
R 5-21-17	63	3	61	64	4	61	65	4	61
R 5-21-18	60	2	59	61	3	59	62	3	59
R 5-21-19	59	1	57	59	2	57	60	2	57
R 5-21-20	57	2	56	58	2	56	59	2	56
R 5-21-21	60	1	59	61	2	59	62	2	59
R 5-21-22	59	1	58	60	2	58	61	2	58
R 5-21-23	58	1	57	58	2	57	59	2	57
R 5-21-24	57	1	56	58	1	56	59	1	56

Receptor Number[1,2]	2040 Build Alt 5, 13B Predicted Noise Level	2040 Build Barrier Alt 5, 13B Noise Reduction	2040 Build Barrier Alt 5, 13B Predicted Noise Level	2040 Build Alt 8, 9, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 13C Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level
R 5-21-25	56	1	56	57	2	56	58	2	56
R 5-21-26	57	0	56	57	1	56	58	1	56
R 5-21-27	58	1	58	58	1	58	59	1	58
R 5-21-28	51	0	50	51	0	50	52	0	50
R 5-21-29	52	1	51	52	1	51	53	1	51
R 5-21-30	54	1	54	54	1	54	55	1	54

LEGEND

Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5, 13B	Alt 8, 9, 13C	Alt 10
Number of Impacted, Benefited Residences	66	63	68
Number of Non-Impacted, Benefited Residences	10	6	1
Total Number of Benefited Locations	76	69	69
SF per Benefited Residence	1320	1453	1453

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

4.6.10 EXISTING BARRIER SYSTEM AT NSA 5-29

A. NSA 5-29

Alternative 5, 8, 9, 10, 13B, and 13C

To provide 7 dB(A) insertion loss at the critical sensitive receptors in NSA 5-29, a variable height, ground mounted replacement noise barrier, approximately 4,932 feet long, is proposed. The Existing Barrier was shown to be effective if moved in kind to accommodate the roadway widening.

The TNM analysis of this noise barrier shows that there are between 47 and 50 impacted, benefited residences and between 36 and 41 non-impacted, benefited residence for a total of 88 benefited residences per Alternative. The SF per benefited residence is 1,165. Because this is less than the 2,700 SF per benefit criterion, this noise barrier is considered to be cost effective, for any build alternate.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-180**. The barrier location and benefit locations are shown on Map No 58 and 59 for Alternative 5 and on Map No. 70 and 71 for Alternative 8, 9, 10, 13B, and 13C.

A replacement noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 5-29.

Table 4-185: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-29

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8 and 9 Predicted Noise Level	2040 Build Barrier Alt 8 and 9 Noise Reduction	2040 Build Barrier Alt 8 and 9 Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level	2040 Build Alt 13B Predicted Noise Level	2040 Build Barrier Alt 13B Noise Reduction	2040 Build Barrier Alt 13B Predicted Noise Level	2040 Build Alt 13C Predicted Noise Level	2040 Build Barrier Alt 13C Noise Reduction	2040 Build Barrier Alt 13C Predicted Noise Level
R 5-29-2	64	0	64	65	0	65	65	0	65	63	0	63	63	0	63
R 5-29-3	63	1	62	64	1	63	64	1	64	62	1	62	62	1	61
R 5-29-4	63	0	63	64	0	64	64	0	64	62	0	62	62	0	62
R 5-29-5	63	0	63	64	0	64	66	0	66	64	0	64	62	0	62
R 5-29-6	65	0	65	66	0	66	65	0	64	63	0	62	64	0	64
R 5-29-7	64	1	63	65	1	64	65	1	65	63	1	63	63	1	62
R 5-29-8	64	0	64	65	0	65	67	0	67	65	0	65	63	0	63
R 5-29-9	66	0	66	67	0	67	69	0	69	67	0	67	65	0	65
R 5-29-10	68	0	68	69	0	69	65	0	65	63	0	63	67	0	67
R 5-29-11	64	0	64	65	0	65	65	0	64	63	0	62	63	0	63
R 5-29-12	64	1	63	65	1	64	69	1	68	67	1	66	63	1	62
R 5-29-13	68	1	67	69	1	68	68	1	67	66	1	65	67	1	66
R 5-29-14	67	1	66	68	1	67	67	1	66	65	1	64	66	1	65
R 5-29-15	66	1	65	67	1	66	70	1	69	68	1	67	65	1	64
R 5-29-16	69	1	68	70	1	69	78	1	70	76	1	68	68	1	67
R 5-29-17	77	8	69	78	8	70	79	8	70	77	8	68	76	8	68
R 5-29-18	78	9	69	79	9	70	79	9	70	77	9	68	77	9	68
R 5-29-19	78	9	69	79	9	70	79	9	71	77	9	69	77	9	68
R 5-29-20	78	8	70	79	8	71	79	8	70	77	8	68	77	8	69
R 5-29-21	78	9	69	79	9	70	79	9	70	77	9	68	77	9	68
R 5-29-22	78	9	69	79	9	70	79	9	68	77	9	66	77	9	68
R 5-29-23	78	11	67	79	11	68	78	11	67	76	11	65	77	11	66

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8 and 9 Predicted Noise Level	2040 Build Barrier Alt 8 and 9 Noise Reduction	2040 Build Barrier Alt 8 and 9 Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level	2040 Build Alt 13B Predicted Noise Level	2040 Build Barrier Alt 13B Noise Reduction	2040 Build Barrier Alt 13B Predicted Noise Level	2040 Build Alt 13C Predicted Noise Level	2040 Build Barrier Alt 13C Noise Reduction	2040 Build Barrier Alt 13C Predicted Noise Level
R 5-29-24	77	11	66	78	11	67	74	11	64	72	11	62	76	11	65
R 5-29-25	73	10	63	74	10	64	72	10	64	70	10	62	72	10	62
R 5-29-26	71	8	63	72	8	64	71	8	64	69	8	62	70	8	62
R 5-29-27	70	7	63	71	7	64	70	7	63	68	7	61	69	7	62
R 5-29-28	69	7	62	70	7	63	69	7	63	67	7	61	68	7	61
R 5-29-29	68	6	62	69	6	63	70	6	63	68	6	61	67	6	61
R 5-29-30	69	7	62	70	7	63	71	7	62	69	7	60	68	7	61
R 5-29-31	70	9	61	71	9	62	73	9	64	71	9	62	69	9	60
R 5-29-32	72	9	63	73	9	64	76	9	65	74	9	63	71	9	62
R 5-29-33	75	11	64	76	11	65	73	11	63	71	11	61	74	11	63
R 5-29-34	72	10	62	73	10	63	73	10	62	71	10	60	71	10	61
R 5-29-35	72	11	61	73	11	62	73	11	62	71	11	60	71	11	60
R 5-29-36	72	11	61	73	11	62	74	11	64	72	11	62	71	11	60
R 5-29-37	73	10	63	74	10	64	72	10	63	70	10	61	72	10	62
R 5-29-38	71	9	62	72	9	63	74	9	64	72	9	62	70	9	61
R 5-29-39	73	10	63	74	10	64	74	10	64	72	10	62	72	10	62
R 5-29-40	73	10	63	74	10	64	72	10	64	70	10	62	72	10	62
R 5-29-41	71	8	63	72	8	64	71	8	64	69	8	62	70	8	62
R 5-29-42	70	7	63	71	7	64	76	7	65	74	7	63	69	7	62
R 5-29-43	75	11	64	76	11	65	74	11	65	72	11	63	74	11	63
R 5-29-44	73	9	64	74	9	65	68	9	60	66	9	58	72	9	63
R 5-29-45	67	8	59	68	8	60	65	8	59	63	8	57	66	8	58
R 5-29-46	64	6	58	65	6	59	64	6	58	62	6	56	63	6	57

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8 and 9 Predicted Noise Level	2040 Build Barrier Alt 8 and 9 Noise Reduction	2040 Build Barrier Alt 8 and 9 Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level	2040 Build Alt 13B Predicted Noise Level	2040 Build Barrier Alt 13B Noise Reduction	2040 Build Barrier Alt 13B Predicted Noise Level	2040 Build Alt 13C Predicted Noise Level	2040 Build Barrier Alt 13C Noise Reduction	2040 Build Barrier Alt 13C Predicted Noise Level
R 5-29-47	63	6	57	64	6	58	62	6	58	60	6	56	62	6	56
R 5-29-48	61	4	57	62	4	58	61	4	57	59	4	55	60	4	56
R 5-29-49	60	4	56	61	4	57	60	4	57	58	4	55	59	4	55
R 5-29-50	59	3	56	60	3	57	64	3	58	62	3	56	58	3	55
R 5-29-51	63	6	57	64	6	58	66	6	61	64	6	59	62	6	56
R 5-29-52	65	5	60	66	5	61	67	5	61	65	5	59	64	5	59
R 5-29-53	66	6	60	67	6	61	65	6	60	63	6	58	65	6	59
R 5-29-54	64	5	59	65	5	60	62	5	58	60	5	56	63	5	58
R 5-29-55	61	4	57	62	4	58	61	4	57	59	4	55	60	4	56
R 5-29-56	60	4	56	61	4	57	62	4	57	60	4	55	59	4	55
R 5-29-57	61	5	56	62	5	57	62	5	58	60	5	56	60	5	55
R 5-29-58	61	4	57	62	4	58	68	4	63	66	4	61	60	4	56
R 5-29-59	67	5	62	68	5	63	68	5	64	66	5	62	66	5	61
R 5-29-60	67	4	63	68	4	64	70	4	67	68	4	65	66	4	62
R 5-29-61	69	3	66	70	3	67	64	3	59	62	3	57	68	3	65
R 5-29-62	63	5	58	64	5	59	63	5	60	61	5	58	62	5	57
R 5-29-63	62	3	59	63	3	60	61	3	58	59	3	56	61	3	58
R 5-29-64	60	3	57	61	3	58	61	3	58	59	3	56	59	3	56
R 5-29-65	60	3	57	61	3	58	64	3	60	62	3	58	59	3	56
R 5-29-66	63	4	59	64	4	60	65	4	60	63	4	58	62	4	58
R 5-29-67	64	5	59	65	5	60	63	5	60	61	5	58	63	5	58
R 5-29-68	62	3	59	63	3	60	62	3	58	60	3	56	61	3	58
R 5-29-69	61	4	57	62	4	58	61	4	57	59	4	55	60	4	56

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8 and 9 Predicted Noise Level	2040 Build Barrier Alt 8 and 9 Noise Reduction	2040 Build Barrier Alt 8 and 9 Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level	2040 Build Alt 13B Predicted Noise Level	2040 Build Barrier Alt 13B Noise Reduction	2040 Build Barrier Alt 13B Predicted Noise Level	2040 Build Alt 13C Predicted Noise Level	2040 Build Barrier Alt 13C Noise Reduction	2040 Build Barrier Alt 13C Predicted Noise Level
R 5-29-70	60	4	56	61	4	57	60	4	56	58	4	54	59	4	55
R 5-29-71	59	4	55	60	4	56	60	4	56	58	4	54	58	4	54
R 5-29-72	59	4	55	60	4	56	59	4	56	57	4	54	58	4	54
R 5-29-73	58	3	55	59	3	56	62	3	57	60	3	55	57	3	54
R 5-29-74	61	5	56	62	5	57	62	5	55	60	5	53	60	5	55
R 5-29-75	61	7	54	62	7	55	61	7	56	59	7	54	60	7	53
R 5-29-76	60	5	55	61	5	56	60	5	55	58	5	53	59	5	54
R 5-29-77	59	5	54	60	5	55	64	5	57	62	5	55	58	5	53
R 5-29-78	63	7	56	64	7	57	69	7	60	67	7	58	62	7	55
R 5-29-79	68	9	59	69	9	60	71	9	61	69	9	59	67	9	58
R 5-29-80	70	10	60	71	10	61	73	10	63	71	10	61	69	10	59
R 5-29-81	72	10	62	73	10	63	74	10	64	72	10	62	71	10	61
R 5-29-82	73	10	63	74	10	64	74	10	65	72	10	63	72	10	62
R 5-29-83	73	9	64	74	9	65	72	9	63	70	9	61	72	9	63
R 5-29-84	71	9	62	72	9	63	72	9	63	70	9	61	70	9	61
R 5-29-85	71	9	62	72	9	63	73	9	64	71	9	62	70	9	61
R 5-29-86	72	9	63	73	9	64	72	9	64	70	9	62	71	9	62
R 5-29-87	71	8	63	72	8	64	74	8	65	72	8	63	70	8	62
R 5-29-88	73	9	64	74	9	65	73	9	65	71	9	63	72	9	63
R 5-29-89	72	8	64	73	8	65	73	8	64	71	8	62	71	8	63
R 5-29-90	72	9	63	73	9	64	72	9	63	70	9	61	71	9	62
R 5-29-91	71	9	62	72	9	63	70	9	63	68	9	61	70	9	61
R 5-29-92	69	7	62	70	7	63	68	7	62	66	7	60	68	7	61

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8 and 9 Predicted Noise Level	2040 Build Barrier Alt 8 and 9 Noise Reduction	2040 Build Barrier Alt 8 and 9 Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level	2040 Build Alt 13B Predicted Noise Level	2040 Build Barrier Alt 13B Noise Reduction	2040 Build Barrier Alt 13B Predicted Noise Level	2040 Build Alt 13C Predicted Noise Level	2040 Build Barrier Alt 13C Noise Reduction	2040 Build Barrier Alt 13C Predicted Noise Level
R 5-29-93	67	6	61	68	6	62	60	6	54	58	6	52	66	6	60
R 5-29-94	59	6	53	60	6	54	59	6	55	57	6	53	58	6	52
R 5-29-95	58	4	54	59	4	55	58	4	55	56	4	53	57	4	53
R 5-29-96	57	3	54	58	3	55	62	3	57	60	3	55	56	3	53
R 5-29-97	61	5	56	62	5	57	61	5	57	59	5	55	60	5	55
R 5-29-98	60	4	56	61	4	57	60	4	57	58	4	55	59	4	55
R 5-29-99	59	3	56	60	3	57	57	3	55	55	3	53	58	3	55
R 5-29-100	56	2	54	57	2	55	57	2	56	55	2	54	55	2	53
R 5-29-101	56	1	55	57	1	56	58	1	56	56	1	54	55	1	54
R 5-29-102	57	2	55	58	2	56	60	2	59	58	2	57	56	2	54
R 5-29-103	59	1	58	60	1	59	61	1	60	59	1	58	58	1	57
R 5-29-104	60	1	59	61	1	60	60	1	58	58	1	56	59	1	58
R 5-29-105	59	2	57	60	2	58	61	2	60	59	2	58	58	2	56
R 5-29-106	60	1	59	61	1	60	60	1	59	58	1	57	59	1	58
R 5-29-107	59	1	58	60	1	59	70	1	64	68	1	62	58	1	57
R 5-29-108	69	6	63	70	6	64	66	6	62	64	6	60	68	6	62
R 5-29-109	65	4	61	66	4	62	59	4	58	57	4	56	64	4	60
R 5-29-110	58	1	57	59	1	58	58	1	58	56	1	56	57	1	56
R 5-29-111	57	0	57	58	0	58	59	0	58	57	0	56	56	0	56
R 5-29-112	58	1	57	59	1	58	60	1	59	58	1	57	57	1	56
R 5-29-113	59	1	58	60	1	59	61	1	60	59	1	58	58	1	57
R 5-29-114	60	1	59	61	1	60	61	1	60	59	1	58	59	1	58
R 5-29-115	60	1	59	61	1	60	68	1	64	66	1	62	59	1	58

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8 and 9 Predicted Noise Level	2040 Build Barrier Alt 8 and 9 Noise Reduction	2040 Build Barrier Alt 8 and 9 Predicted Noise Level	2040 Build Alt 10 Predicted Noise Level	2040 Build Barrier Alt 10 Noise Reduction	2040 Build Barrier Alt 10 Predicted Noise Level	2040 Build Alt 13B Predicted Noise Level	2040 Build Barrier Alt 13B Noise Reduction	2040 Build Barrier Alt 13B Predicted Noise Level	2040 Build Alt 13C Predicted Noise Level	2040 Build Barrier Alt 13C Noise Reduction	2040 Build Barrier Alt 13C Predicted Noise Level
R 5-29-116	67	4	63	68	4	64	67	4	66	65	4	64	66	4	62
R 5-29-117	66	1	65	67	1	66	67	1	65	65	1	63	65	1	64
R 5-29-118	66	2	64	67	2	65	67	2	65	65	2	63	65	2	63
R 5-29-119	66	2	64	67	2	65	65	2	64	63	2	62	65	2	63
R 5-29-120	64	1	63	65	1	64	63	1	62	61	1	60	63	1	62
R 5-29-121	62	1	61	63	1	62	62	1	62	60	1	60	61	1	60
R 5-29-122	61	0	61	62	0	62	63	0	63	61	0	61	60	0	60
R 5-29-123	62	0	62	63	0	63	64	0	63	62	0	61	61	0	61

LEGEND

Bold	Critical Sensitive Receptors
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8 and 9	Alt 10	Alt 13B	Alt 13C
Number of Impacted, Benefited Residences	50	52	52	47	47
Number of Non-Impacted, Benefited Residences	38	36	36	41	41
Total Number of Benefited Locations	88	88	88	88	88
SF per Benefited Residence	1165	1165	1165	1165	1165

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

4.6.11 BARRIER SYSTEM 270-7

A. NSA 5-30

Alternatives 5, 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of one replacement barrier that provides abatement to the area just south of Tuckerman Lane within NSA 5-30. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-181**. The barrier location and benefit locations are shown on Map No 60 for Alternative 5 and on Map No. 72 for Alternative 8, 9, 10, 13B, and 13C.

A replacement noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 5-30.

Table 4-186: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-30

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R136-07	60	3	58	60	2	59
R136-12	68	8	60	70	8	63
R136-14	72	10	62	74	10	64
R136-18	74	11	63	74	10	64
R136-21	71	7	65	70	6	64
R136-22	72	5	66	70	5	65
R136-23	56	0	56	56	0	56
R136-27	58	1	57	60	2	58
R136-33	66	2	64	65	1	63
R136-35	63	1	61	62	1	62
R201-01	66	2	64	67	1	66
R201-04	70	7	63	72	5	67
R 201-06	72	9	63	75	7	68

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	16	16
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	16	16
SF per Benefited Residence	2,425	2,453

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.						
2. A receptor may represent more than 1 equivalent residence.						
3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).						
4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.						

B. NSA 5-31

Alternatives 5, 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of one existing screen wall that provides abatement to the area just west of Old Georgetown Road within NSA 5-31. The screen wall is a constant 8 foot tall wall designed to simply block line of sight to most vehicles along I-495.

The 2040 predicted insertion losses, noise levels and benefits for the screen wall are shown in **Table 4-182**. The wall location is shown on Map No 60 for Alternative 5 and on Map No. 72 for Alternative 8, 9, 10, 13B, and 13C.

The existing screen wall is effective. There is NO additional cost to protect this NSA.

Table 4-187: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-31

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R134-01	60	1	59	60	1	59
R134-04	60	1	59	61	1	60
R134-06	61	2	59	63	3	60
R134-10	68	7	61	71	8	63
R134-12	67	6	61	69	6	63
R134-13	65	4	60	67	5	62
R134-14	64	4	60	66	4	62
R134-32	63	3	60	66	4	61
R134-35	62	2	59	64	4	60
R134-36	58	1	57	59	2	57
R134-41	59	1	58	60	1	59
R134-43	65	3	62	67	5	63
R134-52	62	2	60	63	2	61
R134-54	59	1	58	60	2	58
R134-61	59	1	58	59	1	59

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R134-72	62	2	60	63	3	60
R134-77	59	1	58	60	1	59
R134-80	60	1	59	61	2	59

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	5	17
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	5	17
SF per Benefited Residence	3,859	1,153

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

4.6.12 BARRIER SYSTEM 270-8

A. NSA 5-33 OLD GEORGETOWN ROAD TO THE BETHESDA TROLLEY TRAIL

Alternatives 5, 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of one barrier that provides abatement to the area between Old Georgetown Road to the Bethesda Trolley Trail within NSA 5-33. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked. The barrier designed for Alternative 5 has a SF per benefit value of 843 while the barrier developed for Alternatives 8, 9, 10, 13B, and 13C has a SF per benefit of 891. Both values are under the criterion of 2,700 SF per benefit and are considered cost effective.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-183**. The barrier location and benefit locations are shown on Map No 61 for Alternative 5 and on Map No. 73 for Alternative 8, 9, 10, 13B, and 13C.

This portion of the noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 5-33.

Table 4-188: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits NSA 5-33

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R128-01	68	1	66	68	2	66
R128-02	67	2	65	67	2	65
R128-03	65	2	63	65	2	63
R128-04	63	0	63	63	0	63
R128-06	57	0	57	58	0	58
R128-07	70	6	64	70	6	64
R128-09	69	8	62	69	7	62
R128-10	69	8	61	69	8	61
R128-12	64	5	59	64	5	59
R128-13	63	1	63	63	1	62
R128-14	57	1	56	57	1	56
R128-15	59	2	57	59	2	57
R128-16	65	6	59	65	6	60
R128-20	61	0	60	60	0	60
R128-22	61	1	60	61	0	60
R128-25	61	4	57	61	4	57
R128-29	60	1	59	60	1	59
R129-01	68	8	60	69	8	61
R129-05	71	10	61	71	9	62
R129-08	71	9	62	71	9	63
R129-09	70	9	61	71	9	62
R129-14	69	9	61	70	9	61
R129-15	66	7	60	67	7	60
R129-16	63	5	58	64	5	59
R129-19	65	6	59	66	7	59
R129-24	64	5	58	64	5	59
R129-25	67	8	60	68	8	60
R129-43	61	3	58	61	3	58
R129-51	63	5	58	63	4	58
R129-56	61	3	57	61	3	58
R129-63	60	3	57	60	3	57
R129-70	60	3	57	60	3	57
R129-73	57	1	56	57	1	56
R129-85	57	1	56	57	1	56
R129-93	58	2	57	59	2	57
R130-01	65	6	59	66	6	59
R130-04	67	7	60	67	7	60

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R130-07	63	6	57	63	6	58
R130-08	64	6	58	64	6	58
R130-11	62	5	57	62	5	58
R130-14	66	7	59	66	7	59
R130-15	71	10	61	72	10	62
R130-16	69	10	59	69	10	59
R130-19	64	6	58	65	6	58
R130-22	62	5	58	63	5	58
R130-23	62	6	57	63	6	57
R130-27	60	3	57	60	3	57
R130-38	61	4	57	61	4	57
R130-46	66	6	59	66	6	60
R130-58	58	2	56	58	2	56
R130-61	58	2	56	58	2	56
R130-63	57	1	56	58	1	56
R130-69	58	2	56	59	2	56
R130-72	58	2	56	58	2	56
R130-75	57	2	56	58	2	56
R130-82	57	1	56	57	1	56
R131-01	72	13	59	72	13	59
R131-02	67	7	59	67	8	60
R131-06	70	11	59	71	11	60
R131-07	62	3	59	62	3	59
R131-08	65	6	59	65	6	59
R131-12	66	7	58	66	7	59
R131-13	60	2	58	60	2	58
R131-19	58	2	57	59	2	57
R131-23	60	3	57	60	3	57
R131-24	57	0	56	57	0	56
R131-32	56	0	56	56	0	56
R131-36	57	1	56	57	1	56
R131-41	56	1	56	57	1	56
R132-01	62	1	61	62	0	61

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	54	58

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
Number of Non-Impacted, Benefited Residences			39		30	
Total Number of Benefited Locations			93		88	
SF per Benefited Residence			843		891	

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

B. NSA 5-33: ENGLISHMAN DRIVE

Alternatives 5, 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of one barrier that provides abatement to the area along Englishman Drive within NSA 5-33. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-184**. The barrier location and benefit locations are shown on Map No 61 for Alternative 5 and on Map No. 73 for Alternative 8, 9, 10, 13B, and 13C.

This portion of the noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 5-33.

Table 4-189: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-33

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R124-01	61	4	57	61	4	58
R124-02	60	2	57	60	2	58
R124-04	61	3	58	61	3	58
R124-05	59	2	57	56	0	56
R124-07	60	3	57	60	2	58
R125-001	66	8	58	66	8	59
R125-007	68	10	58	68	9	59
R125-013	67	9	58	68	8	59
R125-016	67	8	59	67	7	60
R125-025	66	7	58	66	7	60
R125-026	66	7	59	67	7	59
R125-045	56	1	55	56	1	55
R125-053	58	2	56	59	2	56
R125-054	59	3	56	59	3	56

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R125-074	60	3	57	61	3	57
R125-077	63	5	57	63	5	58
R125-095	68	10	58	68	10	58
R125-098	65	8	57	66	8	58
R125-101	64	6	57	64	6	58
R125-102	68	10	58	69	10	58
R125-110	68	10	58	69	11	59
R125-113	68	9	59	69	10	59
R125-120	64	7	57	64	6	58
R125-153	61	4	58	61	3	58
R125-159	60	2	58	60	2	58
R125-168	60	1	59	60	1	59

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	3	7
Number of Non-Impacted, Benefited Residences	20	24
Total Number of Benefited Locations	23	31
SF per Benefited Residence	1,531	1,136

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

C. NSA 5-33: GROSVENOR PLACE

Alternatives 5, 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of one barrier that provides abatement to area along Grosvenor Place within NSA 5-33. The majority of the impacted residences are not predicted to receive at least a 7-db(A) noise reduction and line of sight is not effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-185**. The barrier location and benefit locations are shown on Map No 62 for Alternative 5 and on Map No. 74 for Alternative 8, 9, 10, 13B, and 13C.

This portion of the noise barrier ***is not considered feasible*** for NSA 5-33. A separate barrier option was considered only analyzing receptors R123A which was however considered reasonable and feasible and is shown below in **Table 4-186**.

Table 4-190: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-33

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R122-01	59	1	58	59	1	58
R122-02	62	0	62	63	0	63
R122-02-2	66	0	65	66	0	66
R122-02-3	67	0	67	68	0	68
R122-02-4	68	0	68	69	0	69
R122-02-5	69	0	69	70	0	70
R122-02-6	70	0	69	71	0	70
R122-02-7	70	1	70	71	1	71
R122-02-8	71	1	70	72	1	71
R122-02-10	71	1	70	72	1	71
R122-02-12	71	1	70	72	1	71
R122-02-14	71	1	70	72	1	71
R122-02-16	71	1	70	72	1	71
R122-02-18	71	0	71	72	0	72
R122-02-20	71	0	71	72	0	72
R122-03-4	67	1	66	55	0	55
R122-03-5	68	1	67	55	0	55
R122-03-6	69	1	68	69	1	68
R122-03-7	69	1	68	70	1	69
R122-03-8	70	1	69	70	1	69
R122-03-10	71	2	69	71	1	70
R122-03-12	71	1	70	72	1	71
R122-03-14	71	1	70	72	1	71
R122-03-16	71	1	70	72	1	71
R122-03-18	71	1	70	72	1	71
R122-03-20	71	0	70	72	0	71
R122-05	60	1	59	60	1	59
R122-05-2	63	1	62	63	1	62
R122-05-3	65	1	64	65	1	63
R122-05-4	66	1	65	66	1	65
R122-05-5	67	1	66	67	1	66
R122-05-6	68	1	67	68	1	67
R122-05-7	68	1	67	69	1	67
R122-05-8	69	2	67	69	2	68
R122-05-10	70	2	68	70	2	68
R122-05-12	71	2	69	71	1	70
R122-05-14	71	2	69	71	1	70
R122-05-16	71	1	69	71	1	70

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R122-05-18	71	1	70	71	1	71
R122-05-20	71	1	70	71	1	71
R122-06-5	66	1	65	55	0	55
R122-06-6	67	1	66	68	1	66
R122-06-7	68	2	67	68	2	67
R122-06-8	69	2	67	69	2	67
R122-06-10	70	2	67	70	2	68
R122-06-12	70	2	68	71	2	69
R122-06-14	71	2	69	71	2	70
R122-06-16	71	2	69	71	1	70
R122-06-18	71	1	69	71	1	70
R122-06-20	71	1	70	71	1	71
R122-07	55	0	55	58	1	57
R122-07-2	55	0	55	61	2	59
R122-07-3	55	0	55	62	2	61
R122-07-4	55	0	55	64	2	62
R122-07-5	55	0	55	65	2	64
R122-10	58	0	58	59	0	59
R122-10-2	61	0	61	62	0	62
R122-10-3	62	0	62	63	0	63
R122-10-4	62	0	62	64	0	64
R122-10-5	62	0	62	64	0	64
R122-14	59	0	59	60	0	57
R123-01	57	0	57	58	0	58
R123-02	58	1	57	58	1	60
R123-02-2	60	1	59	61	1	62
R123-02-3	62	1	61	63	1	63
R123-02-4	63	1	62	64	1	63
R123-02-5	65	2	63	65	1	58
R123-04	59	1	58	59	1	61
R123-04-2	62	1	60	62	1	62
R123-04-3	63	2	62	64	2	63
R123-04-4	64	2	63	65	2	64
R123-04-5	65	2	63	66	2	65
R123-04-6	66	2	64	67	2	65
R123-04-7	67	3	65	68	3	66
R123-04-8	68	3	65	68	3	66
R123-04-10	69	3	66	69	3	67
R123-04-12	69	3	66	70	3	58

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R123-05	59	1	58	59	1	60
R123-05-2	61	1	60	61	1	62
R123-05-3	63	1	61	63	1	63
R123-05-4	64	2	62	64	2	64
R123-05-5	65	2	63	65	2	64
R123-05-6	66	2	64	66	2	65
R123-05-7	67	3	64	67	2	65
R123-05-8	68	3	65	68	3	66
R123-05-10	68	3	65	69	3	66
R123-05-12	69	3	66	70	3	58
R123-07	58	0	58	58	0	59
R123-07-2	60	1	59	60	1	60
R123-07-3	62	1	60	62	1	61
R123-07-4	63	2	61	63	2	62
R123-07-5	64	2	62	64	2	56
R123-12	55	0	55	56	0	57
R123-12-2	56	0	56	57	0	58
R123-12-3	57	0	57	58	0	58
R123-12-4	57	0	57	58	0	58
R123-12-5	57	0	57	58	0	56
RR123-15	55	0	55	56	0	57
R123-15-2	56	0	56	57	0	58
R123-15-3	57	0	57	58	0	58
R123-15-4	57	0	57	58	0	58
R123-15-5	57	0	57	59	0	57
R123-19	57	0	56	57	0	59
R123-19-2	58	0	58	59	0	60
R123-19-3	60	0	59	60	0	61
R123-19-4	60	0	60	61	0	62
R123-19-5	62	0	61	62	0	57
R123A-01	69	11	57	70	12	58
R123A-04	65	7	58	66	8	58
R123A-06	65	7	58	65	7	58
R123A-21	76	19	57	77	18	58
R123A-24	71	12	59	71	11	59
R123A-36	75	18	57	76	18	58
R123A-39	72	13	59	72	13	59
R123A-43	65	3	62	66	4	62

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
	Bold	**Critical Sensitive Receptors**				
		Effective Noise Reduction[3] at Critical Sensitive Receptor				

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	28	32
Number of Non-Impacted, Benefited Residences	9	5
Total Number of Benefited Locations	37	37
SF per Benefited Residence	1,043	1,043

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

When only considering receptors R123A, a barrier is found to ***be considered feasible*** and ***is considered reasonable*** for receptors R123A in NSA 5-33 shown in **Table 4-186**.

Table 4-191: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-33

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R123A-01	69	8	60	70	10	60
R123A-04	65	4	60	66	6	60
R**123A-21**	76	15	61	77	16	60
R123A-24	71	6	65	71	7	64
R123A-36	75	12	63	76	14	62
R123A-39	72	7	65	72	8	64
R123A-43	65	1	64	66	2	64
	Bold	**Critical Sensitive Receptors**				
		Effective Noise Reduction[3] at Critical Sensitive Receptor				

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	28	32
Number of Non-Impacted, Benefited Residences	0	5
Total Number of Benefited Locations	28	37
SF per Benefited Residence	498	464

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.						
2. A receptor may represent more than 1 equivalent residence.						
3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).						

D. NSA 5-33: GROSVENOR LANE TO I-495

Alternatives 5, 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of one barrier that provides abatement to the area between Grosvenor Lane and I-495 within NSA 5-33. Line of sight is effectively blocked, however a 7-db(A) noise reduction cannot be achieved at a majority of the impacted residences due to the flanking noise from Rockville Pike (MD-355) which is located on the opposite side of this community from I-270.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-187** below. The barrier location and benefit locations are shown on Map No 62 for Alternative 5 and on Map No. 74 for Alternative 8, 9, 10, 13B, and 13C.

This portion of the barrier system ***is considered feasible,*** however ***is considered not reasonable*** for this area within NSA 5-33. The barrier alignment evaluated does not account for the existing berm that is currently providing abatement to this area. Further analysis is required to determine whether the design goal can be achieved; this will be completed prior to the FEIS.

Table 4-192: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-33

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R121-01	72	3	70	75	4	71
R121-06	71	9	62	75	12	63
R121-07	71	0	71	72	0	72
R**121-14**	65	4	61	68	7	62
R121-15	71	0	71	72	0	72
R121-20	63	5	58	65	5	60
R121-25	63	2	61	64	2	62
R121-30	64	5	59	65	5	60
R121-38	64	6	58	65	6	59
R121-42	63	5	58	64	5	58
R121-46	62	4	58	63	4	59
R121-53	63	4	58	64	5	59
R121-54	63	0	63	64	0	64
R121-67	59	1	58	60	1	59

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R121-70	63	0	63	64	0	64
R121-78	58	1	57	59	1	57
R121-81	63	5	59	64	5	59
R121-83	58	1	56	58	2	56
R121-89	64	6	59	65	6	59
R121-98	60	2	59	61	1	60

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	3	7
Number of Non-Impacted, Benefited Residences	20	24
Total Number of Benefited Locations	23	31
SF per Benefited Residence	1,531	1,136

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.6.13 BARRIER SYSTEM 270-9

A. NSA 5-34: I-495 TO GROSVENOR LANE

Alternatives 5, 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of one existing barrier to remain that provides abatement to the area between I-495 and Grosvenor Lane within NSA 5-34. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked. Further analysis is required to determine whether a barrier extension to protect this area meets feasibility and reasonableness criteria; this will be completed prior to the FEIS.

The 2040 Existing Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-188**. The barrier location and benefit locations are shown on Map No 62 for Alternative 5 and on Map No. 74 for Alternative 8, 9, 10, 13B, and 13C.

Table 4-193: 2040 Existing Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-34

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R118-01	71	9	62	71	9	62
R118-02	71	10	61	69	8	61
R118-03	69	8	61	68	8	60
R118-04	62	3	59	62	2	60
R118-05	60	2	58	60	2	58
R118-16	63	3	60	62	4	58
R118-17	60	1	59	58	1	57
R118-18	60	0	60	59	1	58
R118-19	63	0	63	60	0	60
R118-27	67	5	62	66	3	63

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	10	10
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	10	10
SF per Benefited Residence	1,647	1,647

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

B. NSA 5-34: GROSVENOR LANE TO THE BETHESDA TROLLEY TRAIL

Alternatives 5, 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of one barrier that provides abatement to the area between Grosvenor Lane to the Bethesda Trolley Trail within NSA 5-34. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-189**. The barrier location and benefit locations are shown on Map No 62 for Alternative 5 and on Map No. 74 for Alternative 8, 9, 10, 13B, and 13C.

This portion of the barrier system ***is considered feasible*** and ***is considered reasonable*** for NSA 5-34.

Table 4-194: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-34

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R117-01	67	5	62	68	6	62
R117-04	71	10	61	71	10	61
R117-05	66	4	62	67	5	62
R117-08	63	4	60	64	4	60
R117-17	68	8	60	69	9	60
R117-19	65	6	59	66	7	59
R117-32	73	8	65	73	8	65
R117-44	57	1	57	58	1	57
R117-50	63	4	58	63	5	58
R117-59	73	7	66	74	8	66
R117-60	57	1	57	58	1	57
R117-67	64	2	61	65	4	61
R117-72	71	6	65	71	6	65
R117-79	62	3	59	63	4	59
R117-83	68	5	63	69	6	63

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	13	13
Number of Non-Impacted, Benefited Residences	20	20
Total Number of Benefited Locations	33	33
SF per Benefited Residence	1690	1690

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

C. NSA 5-34: BETHESDA TROLLEY TRAIL TO OLD GEORGETOWN ROAD

Alternatives 5, 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of one existing barrier that provides abatement to the area between the Bethesda Trolley Trail to Old Georgetown Road within NSA 5-34. The majority of the impacted residences are not predicted to receive at least a 7-db(A) noise reduction as line of sight is not effectively blocked. Several portions of this barrier will need to be reconstructed due to the roadway widening. A replacement barrier was modeled at these locations, however it did not meet the acoustical requirement of the majority of impacted benefitting residences receiving at least a 7 dB(A) noise

reduction. Possible modifications to this barrier will continue to be evaluated during the final design process.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-190**. The barrier location and benefit locations are shown on Map No 62 for Alternative 5 and on Map No. 74 for Alternative 8, 9, 10, 13B, and 13C.

Table 4-195: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-34

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R116-01	66	6	60	66	6	61
R116-07	74	11	63	74	11	63
R116-13	72	10	62	73	11	62
R116-18	62	4	59	63	4	59
R116-26	61	3	58	61	3	58
R116-32	60	3	57	61	3	58
R116-83	71	10	61	72	11	61
R116-89	68	7	62	69	8	62
R**116-95**	73	6	67	74	7	67
R116-97	64	5	60	65	5	60
R116-102	70	3	67	71	3	67
R116-114	68	3	65	69	3	66
R116-120	67	2	65	68	2	65

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits[4]	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	28	28
Number of Non-Impacted, Benefited Residences	30	30
Total Number of Benefited Locations	58	58
SF per Benefited Residence	1,191	1,189

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

3. Benefits are shown for informational purposes. Cost effectiveness reasonableness criteria has not been evaluated for replacement barriers since the barrier has previously met all criteria.

4.6.14 BARRIER SYSTEM 270-10

A. NSA 5-32

Alternatives 5, 8, 9, 10, 13B, and 13C

This barrier system is comprised of several barrier segments that provide abatement to NSA 5-32. For the area adjacent to the Lockhead Martin facility, the majority of the impacted residences, or equivalents, are not predicted to receive at least a 7-db(A) noise reduction. The residential equivalents for the pedestrian path that runs parallel to the highway and basketball court/playground were calculated based on MDOT SHA Highway Noise Abatement Planning and Engineering Guidelines (2020), using a combination of linear frontage and time/usage factors.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-191**. The barrier location and benefit locations are shown on Maps No. 60 and 63 for Alternative 5 and on Maps No. 72 and 75 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered not feasible*** for Alt 5 and ***is considered feasible and not reasonable*** for Alt 8, 9, 10, 13B, 13C for NSA 5-32.

Table 4-196: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-32

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R 111-01	66	4	62	69	5	64
R **112-01**	70	8	62	71	9	63
R 112-02	66	5	61	67	5	62

Bold	Critical Sensitive Receptors
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	2	3
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	2	3
SF per Benefited Residence	19,025	12,584

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.6.15 BARRIER SYSTEM 270-11

A. NSA 5-36: NORTH OF I-495

Alternative 5, 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier to remain, and two new barriers and provides abatement to NSA 5-36. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-192**. The barrier location and benefit locations are shown on Map No 64 for Alternative 5 and on Map No. 76 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 5-36.

Table 4-197: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-36

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R107-01	61	0	61	62	0	62
R107-05	64	3	62	65	3	62
R107-07	73	7	66	74	7	67
R107-08	76	9	67	77	9	68
R107-09	69	8	61	70	9	61
R107-11	61	4	57	62	4	58
R107-13	58	1	57	58	1	57
R108-01	59	1	58	60	2	58
R108-07	64	2	60	65	2	61
R108-08	67	4	62	67	4	62
R108-12	66	5	61	66	5	61
R108-14	66	5	60	67	5	61
R108-15	67	6	59	67	6	60
R108-21	57	8	56	58	7	56
R108-25	60	1	57	60	1	57
R108-29	68	3	59	69	3	60
R**108-30**	67	9	61	67	9	62
R108-34	68	6	60	68	5	60
R108-37	70	8	60	70	8	61
R108-38	73	10	61	73	9	62
R108-44	74	12	63	75	12	63

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
Benefits			**Alt 5**		**Alt 8, 9, 10, 13B, 13C**	
Number of Impacted, Benefited Residences			35		35	
Number of Non-Impacted, Benefited Residences			0		0	
Total Number of Benefited Locations			35		35	
SF per Benefited Residence			1,274		1,274	

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

B. NSA 5-36: AT DEMOCRACY BOULEVARD INTERCHANGE

Alternatives 5, 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA 5-36. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-193**. The barrier location and benefit locations are shown on Map No 64 for Alternative 5 and on Map No. 76 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 5-36.

Table 4-198: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-36

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R**109-01**	72	7	65	73	7	66
R109-02	68	5	63	69	5	63
R 109-03	66	2	63	67	2	64
R109-04	55	0	55	55	0	55
R109-05	63	5	58	64	5	59
R109-06	68	4	65	69	4	65
R109-07	67	8	59	68	8	59
R109-08	65	7	58	65	7	58
R109-09	67	10	57	68	10	58
R109-10	55	0	55	55	0	55
R109-11	55	0	55	55	0	55
R109-12	55	0	55	55	0	55

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R109-13	55	0	55	55	0	55
R109-14	62	6	56	62	6	56
R109-15	63	7	57	64	7	57
R109-16	55	0	55	55	0	55
R109-17	55	0	55	55	0	55
R109-18	55	0	55	55	0	55
R109-19	63	6	57	64	6	58
R109-20	55	0	55	55	0	55
R109-21	55	0	55	55	0	55
R109-22	63	5	57	63	6	58
R109-23	64	7	57	65	7	58
R109-24	55	0	55	55	0	55
R109-25	55	0	55	55	0	55
R109-26	65	7	58	66	8	58
R109-27	55	0	55	55	0	55
R109-28	55	0	55	55	0	55
R109-29	66	9	57	67	9	58

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	8	11
Number of Non-Impacted, Benefited Residences	19	16
Total Number of Benefited Locations	27	27
SF per Benefited Residence	929	942

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.6.16 BARRIER SYSTEM 270-12

A. NSA 5-37: SOUTH OF DEMOCRACY BOULEVARD

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of extending one existing barrier that would remain and provides abatement to the area south of Democracy Boulevard within NSA 5-37. For the extension, the majority of the impacted residences are not predicted to receive at least a 7-db(A) noise reduction; therefore, the barrier extension is not reasonable.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-194**. The barrier location and benefit locations are shown on Map No 64 for Alternative 5 and on Map No. 76 for Alternative 8, 9, 10, 13B, and 13C.

A noise barrier extension ***is considered feasible*** but ***is not considered reasonable*** for this portion of the barrier system.

Table 4-199: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-37

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R102-01	66	5	62	66	5	62
R102-02	67	4	63	67	4	64
R102-03	67	7	60	67	7	60
R102-04	67	7	60	68	7	61
R102-05	63	5	58	63	5	59
R102-06	70	10	60	71	10	61
R102-07	71	12	59	71	12	59
R102-08	69	11	59	70	11	59
R102-09	69	9	60	70	9	61
R102-10	63	2	62	63	2	62
R102-11	64	2	62	65	2	62
R102-12	62	2	60	62	2	60
R102-13	62	3	59	62	3	60
R102-14	59	2	57	60	2	57
R102-15	60	2	58	60	2	58
R102-16	57	1	56	58	1	57
R102-17	58	1	57	58	1	57
R102-18	58	1	57	59	1	57
R102-20	60	3	58	61	3	58

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences[4]	1	1
Number of Non-Impacted, Benefited Residences[4]	0	0
Total Number of Benefited Locations[3]	1	1
SF per Benefited Residence[3]	2,864	2,864

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4. Benefits only for extension of existing wall.

B. NSA 5-37: BETHESDA COUNRTY CLUB

Alternative 5, 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of one barrier and provides abatement to the Bethesda Country Club within NSA 5-37. The majority of the impacted residences are not predicted to receive at least a 7-db(A) noise reduction as line of sight is not effectively blocked. The linear parallel distance of golf course frontage, including the tennis courts, to the I-270 spurs are the basis for residential equivalency per MDOT SHA Highway Noise Abatement Planning and Engineering Guidelines (2020). These land uses have been determined to amount to 24 equivalent residences.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-195**. The barrier location and benefit locations are shown on Map No 64 for Alternative 5 and on Map No. 76 for Alternative 8, 9, 10, 13B, and 13C.

This portion of the noise barrier ***is considered feasible*** but ***is not considered reasonable*** for NSA 5-37.

Table 4-200: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-37

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R103-1	65	0	65	66	0	66
R103-2	69	5	65	70	5	65
R103-3	71	7	65	72	7	65
R103-4	69	5	64	69	5	64
R103-5	69	7	62	70	7	63

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	20	20
Number of Non-Impacted, Benefited Residences	0	0
Total Number of Benefited Locations	20	20
SF per Benefited Residence	2,849	3,352

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.						
2. A receptor may represent more than 1 equivalent residence.						
3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).						

C. NSA 5-37: NORTH OF BRADLEY BOULEVARD

Alternative 5, 8, 9, 10, 13B, and 13C

This portion of the barrier system is comprised of one barrier and provides abatement to the area north of Bradley Boulevard within NSA 5-37. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-196**. The barrier location and benefit locations are shown on Map No 64 for Alternative 5 and on Map No. 76 for Alternative 8, 9, 10, 13B, and 13C.

This portion of the noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA 5-37.

4.7 I-95 (North of Capital Beltway)

4.7.1 BARRIER SYSTEM 95-1

A. I95-N

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one existing barrier and one new barrier that would provide abatement to NSA I95-N. The majority of the impacted residences do not receive at least a 7-db(A) noise reduction.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-197**. The barrier location and benefit locations are shown on Map No. 77 for Alternative 5, 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is not considered reasonable*** due to not meeting insertion loss design goals of 7 dB at 50% of critically sensitive receivers for NSA I95-N.

Table 4-201: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA 5-37

Receptor Number[1,2]	2040 Build Alt 5 Predicted Noise Level	2040 Build Barrier Alt 5 Noise Reduction	2040 Build Barrier Alt 5 Predicted Noise Level	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R104-02	57	0	57	57	0	57
R104-03	61	0	60	61	0	61
R104-04	73	8	65	74	8	66
R104-05	73	8	64	73	8	65
R104-06	73	8	65	73	7	66
R104-07	72	8	64	72	8	64
R104-08	70	7	63	70	7	63
R104-09	70	5	64	70	5	65
R104-10	69	6	63	69	6	63
R104-11	68	5	63	68	5	64
R104-12	67	5	62	68	5	63
R104-13	65	5	60	65	5	60
R104-14	64	4	60	65	4	61
R104-15	62	4	58	62	4	58
R104-16	62	4	58	63	4	59
R104-17	62	3	58	62	4	59
R104-18	62	3	58	62	3	59
R104-19	60	3	57	60	3	58

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5	Alt 8, 9, 10, 13B, 13C
Number of Impacted, Benefited Residences	10	10
Number of Non-Impacted, Benefited Residences	1	1
Total Number of Benefited Locations	11	11
SF per Benefited Residence	961	961

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

Table 4-202: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA I95-N

Receptor Number[1,2]	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 5, 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R-I95-N-7	68	6	62
R-I95-N-8	66	7	59
R-I95-N-9	65	6	59
R-I95-N-11	67	6	61
R-I95-N-12	64	5	59
R-I95-N-13	61	3	58
R-I95-N-14	65	4	61
R-I95-N-15	69	8	61
R-I95-N-16	66	5	61
R-I95-N-17	66	5	61
R-I95-N-18	58	2	56
R-I95-N-19	62	4	58
R-I95-N-20	58	2	56
R-I95-N-23	58	2	56
R-I95-N-24	59	2	57
R-I95-N-25	58	1	57
R-I95-N-26	59	1	58
R-I95-N-27	69	7	62

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5, 8, 9, 10, 13B, and 13C
Number of Impacted, Benefited Residences	27
Number of Non-Impacted, Benefited Residences	56
Total Number of Benefited Locations	83
SF per Benefited Residence	988

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.7.2 BARRIER SYSTEM 95-2

A. I95-S

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA I95-S. The majority of the impacted residences do not receive at least a 7-db(A) noise reduction.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-198**. The barrier location and benefit locations are shown on Map No. 77 for Alternatives 5, 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered not reasonable*** due to not meeting insertion loss design goals of 7 dB(A) at 50% of critically sensitive receivers for NSA I95-S.

Table 4-203: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA I95-S

Receptor Number[1,2]	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 5, 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R-I95-S-1	59	0	59
R-I95-S-2	60	4	56
R-I95-S-3	56	0	56
R-I95-S-4	55	0	55
R-I95-S-5	70	4	66
R-I95-S-6	65	4	61
R-I95-S-7	56	3	53
R-I95-S-8	55	0	55
R-I95-S-9	58	0	58
R-I95-S-10	55	0	55
R-I95-S-11	59	4	55
R-I95-S-12	59	3	56

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5, 8, 9, 10, 13B, and 13C
Number of Impacted, Benefited Residences	0
Number of Non-Impacted, Benefited Residences	0
Total Number of Benefited Locations	0
SF per Benefited Residence	N/A

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.8 I-295 (Baltimore-Washington Parkway)

4.8.1 BARRIER SYSTEM 295-1

A. BW-N

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA BW-N. The barrier does meet the acoustical consideration of 5 dBA for 70 percent of the impacted residences but does not meet the design goal of achieving a minimum 7 dB(A) noise reduction for at least three or 50 percent of the

impacted residences. The residential equivalents for the outdoor use areas were calculated based on MDOT SHA Highway Noise Abatement Planning and Engineering Guidelines (2020).

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-199.** The barrier location and benefit locations are shown on Map No 78 for Alternative 5, 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** but and ***is considered not reasonable*** due to not meeting insertion loss design goals for NSA BW-N.

Table 4-204: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA BW-N

Receptor Number[1,2]	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 5, 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R-BW-N-1	56	0	56
R-BW-N-2	57	0	57
R-BW-N-3	60	0	60
R-BW-N-4	55	0	55
R-BW-N-5	55	0	55
R-BW-N-6	70	5	65
R-BW-N-7	60	0	60
R-BW-N-8	58	1	57
R-BW-N-9	68	5	63
R-BW-N-10	70	7	63
R-BW-N-11	65	3	62
R-BW-N-12	64	3	61
R-BW-N-13	56	1	55
R-BW-N-14	63	1	62
R-BW-N-15	63	0	63
R-BW-N-16	56	1	55
R-BW-N-17	60	0	60

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5, 8, 9, 10, 13B, and 13C
Number of Impacted, Benefited Residences	8
Number of Non-Impacted, Benefited Residences	10
Total Number of Benefited Locations	18
SF per Benefited Residence	988

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.8.2 BARRIER SYSTEM 295-2

A. BW-S

Alternative 5 and Alternative 8, 9, 10, 13B, and 13C

This barrier system is comprised of one barrier and provides abatement to NSA BW-S. The majority of the impacted residences are predicted to receive at least a 7-db(A) noise reduction and line of sight is effectively blocked.

The 2040 Build Barrier predicted insertion losses, noise levels and benefits are shown in **Table 4-200**. The barrier location and benefit locations are shown on Map No 78 for Alternative 5, 8, 9, 10, 13B, and 13C.

A noise barrier ***is considered feasible*** and ***is considered reasonable*** for NSA BW-S.

Table 4-205: 2040 Build Barrier Predicted Insertion Loss, Noise Levels and Benefits, NSA BW-S

Receptor Number[1,2]	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 5, 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R-BW-S-1	66	7	59
R-BW-S-2	62	3	59
R-BW-S-3	57	1	56
R-BW-S-4	61	4	57
R-BW-S-5	56	0	56
R-BW-S-6	59	1	58
R-BW-S-7	69	7	62
R-BW-S-8	61	4	57
R-BW-S-9	56	0	56
R-BW-S-10	56	0	56
R-BW-S-11	56	0	56
R-BW-S-12	56	0	56
R-BW-S-13	56	0	56
R-BW-S-14	56	0	56
R-BW-S-15	56	0	56
R-BW-S-16	60	3	57
R-BW-S-17	67	8	59
R-BW-S-18	57	1	56
R-BW-S-19	65	7	58
R-BW-S-20	60	4	56
R-BW-S-21	66	8	58
R-BW-S-22	66	7	59
R-BW-S-23	62	6	56
R-BW-S-24	58	3	55
R-BW-S-25	61	4	57
R-BW-S-26	63	6	57
R-BW-N-27	58	2	56
R-BW-N-28	55	0	55

Receptor Number[1,2]	2040 Build Alt 8, 9, 10, 13B, 13C Predicted Noise Level	2040 Build Barrier Alt 5, 8, 9, 10, 13B, 13C Noise Reduction	2040 Build Barrier Alt 8, 9, 10, 13B, 13C Predicted Noise Level
R-BW-N-29	55	0	55

Bold	**Critical Sensitive Receptors**
	Effective Noise Reduction[3] at Critical Sensitive Receptor

Benefits	Alt 5, 8, 9, 10, 13B, and 13C
Number of Impacted, Benefited Residences	10
Number of Non-Impacted, Benefited Residences	37
Total Number of Benefited Locations	47
SF per Benefited Residence	1,147

1. A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.

2. A receptor may represent more than 1 equivalent residence.

3. Barrier Effectiveness is based on minimum Noise Reduction of 7 to 10 dB(A).

4.9 I-495 (Capital Beltway in Virginia)

The MLS study area overlaps with VDOT's I-495 Express Lanes Northern Extension Study between the Potomac River and VA-193. The Virginia portion of the study area is being evaluated in coordination with VDOT and in compliance with the VDOT Highway Traffic Noise Impact Analysis Guidance Manual. The results of the evaluation will be presented in the FEIS.

5

5 COORDINATION WITH LOCAL OFFICIALS

5.1 Coordination with Local Officials

Local land use and zoning processes can prevent noise sensitive land uses from being located adjacent to state highways and high traffic noise areas. The control of highway noise, to be effective and comprehensive, must be done in partnership between the MDOT SHA and local land use planning officials. The MDOT SHA will furnish the results of all highway traffic noise analyses to local government officials and will encourage local communities and developers to practice noise compatible development. Local coordination will specifically be accomplished through the distribution of highway project environmental documents and noise Study reports.

For undeveloped land (Category G) that is not permitted for development by the date of public knowledge, FHWA regulations require the assessment and reporting of future noise levels. The results must be documented in the noise analysis report. This requires the determination of the distance – measured from the proposed edge of the traveled way – to the NAC for all exterior land use categories. Any noise abatement for such lands shall not be eligible for future Federal-aid participation for Type II projects. These results have been provided in **Table 5-1**. The results have been presented as the typical distances, based on land that is roughly the same elevation as the adjacent roadway that have been identified along I-495 and I-270, site specific distances need to be determined if any undeveloped lands become permitted for development.

Table 5-1: Land Use Activity Category G Areas, Typical NAC Distances

Land Use Activity Category G Area	Distance from Nearest Edge of Shoulder to the MDOT SHA Approach NAC 71 dB(A) [Category E] (feet)	Distance from Nearest Edge of Shoulder to the MDOT SHA Approach NAC 66 dB(A) [Category B & C] (feet)	Notes
I-495	155	180	1
I-270	115	200	1
1. Distances shown are based on typical conditions along each roadway.			

5.2 Construction Noise

Land uses that are sensitive to vehicular noise would also be sensitive to construction noise. Although highway construction is a short-term phenomenon, it can cause significant noise impacts. Additionally, it is possible that some construction may occur at night to avoid severe traffic impacts. The extent and severity of the noise impact would depend upon the phase of construction and the noise characteristics of the construction equipment in use. Construction would have a direct impact on the receptors located close to the construction site and would have an indirect impact on receptors located near roadways where traffic flow characteristics are altered due to re-routing of vehicles from the construction area.

As with any major construction project, areas around the construction site are likely to experience varied periods and degrees of noise impact. This type of project would probably employ the following types of construction equipment that would likely be sources of construction noise:

- Bulldozers and earth movers;
- Graders;
- Front-end Loaders;
- Dumps and other diesel trucks; and
- Compressors

In general, sensitive land use located near construction zones (approximately 100 feet) may experience noise levels between 78 dB(A) and 83 dB(A).

Maintenance of construction equipment will be regular and thorough to minimize noise emissions due to inefficiently tuned engines, poorly lubricated moving parts, poor to ineffective muffling/exhaust systems, etc.

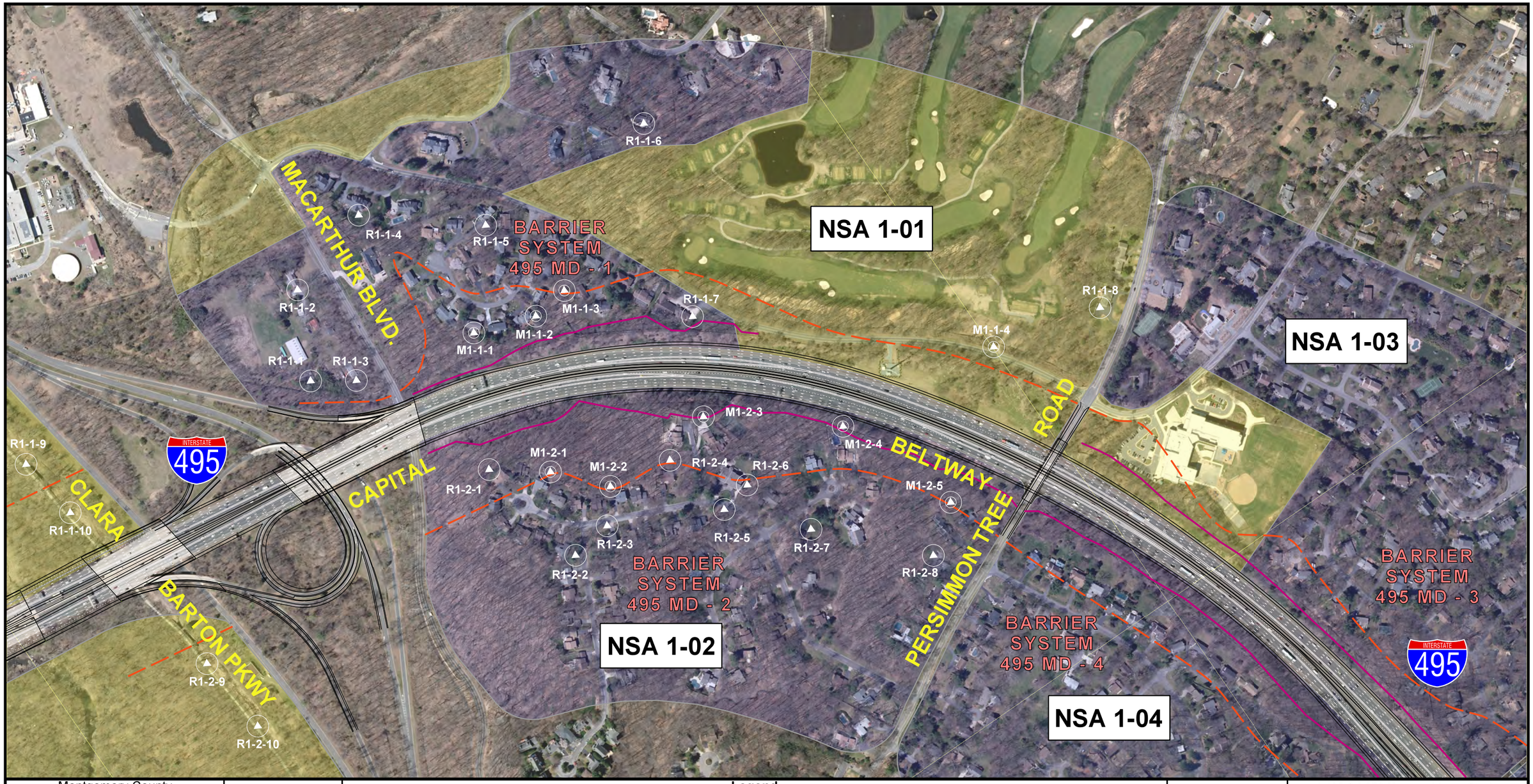
In addition, several mitigation procedures can be followed to assist in minimizing the temporary impacts of construction noise. Adjustments to the equipment, the provision of temporary noise barriers, constructing the permanent noise barriers first where possible, varying the construction activity areas to redistribute noise events, public involvement and financial incentives to contractors are alternatives to decrease temporary noise impacts. These mitigation measures will be considered during the final design to minimize public exposure to short-term noise impacts.

6

6 ALTERNATIVES MAPPING

Refer to the following attachments:

- Noise Tech Report Exhibits_May 2020.pdf



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

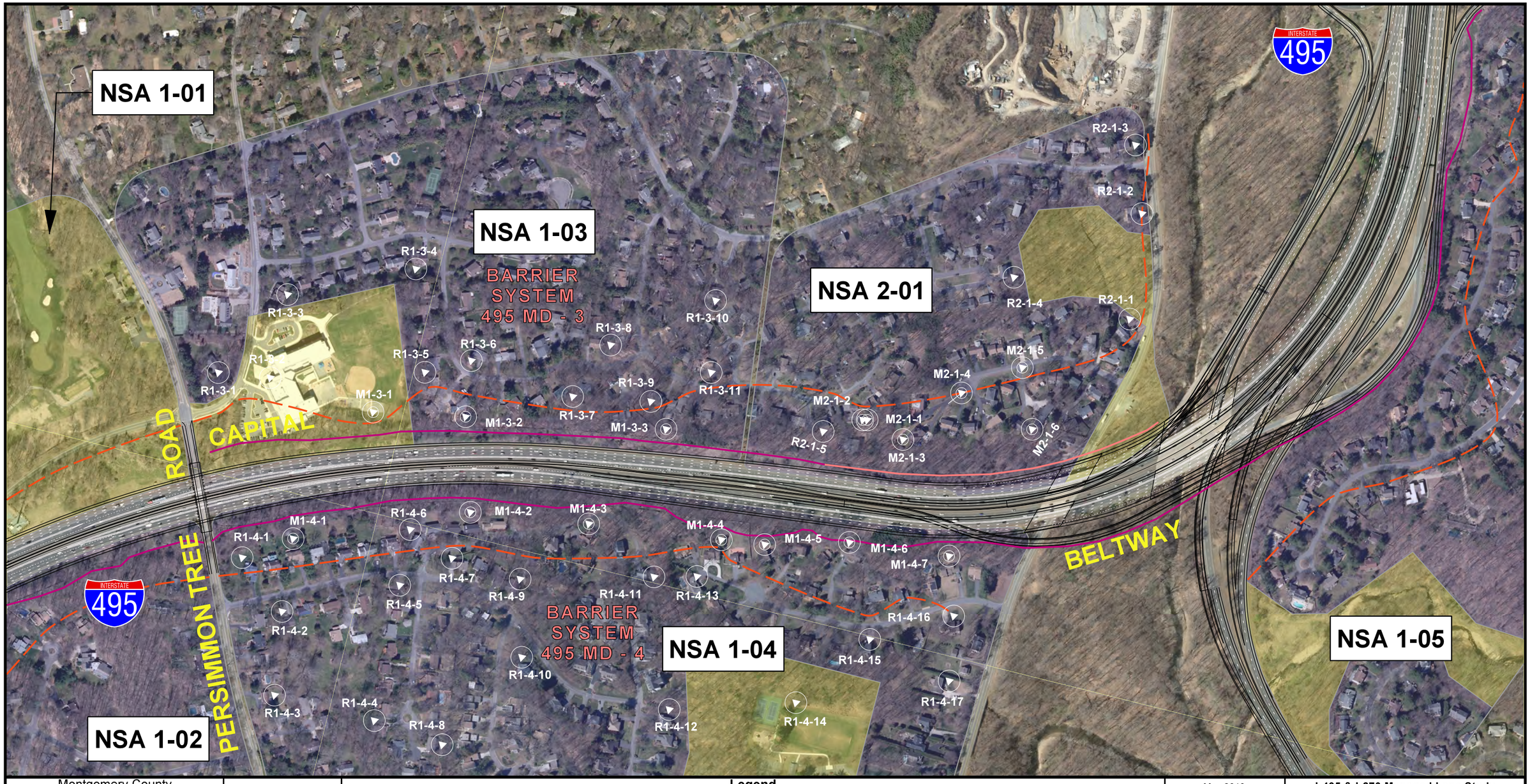
LAND USES AND RECEPTORS NSA 1-1 & 1-2

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 1

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-01_8&2BB_11_12_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

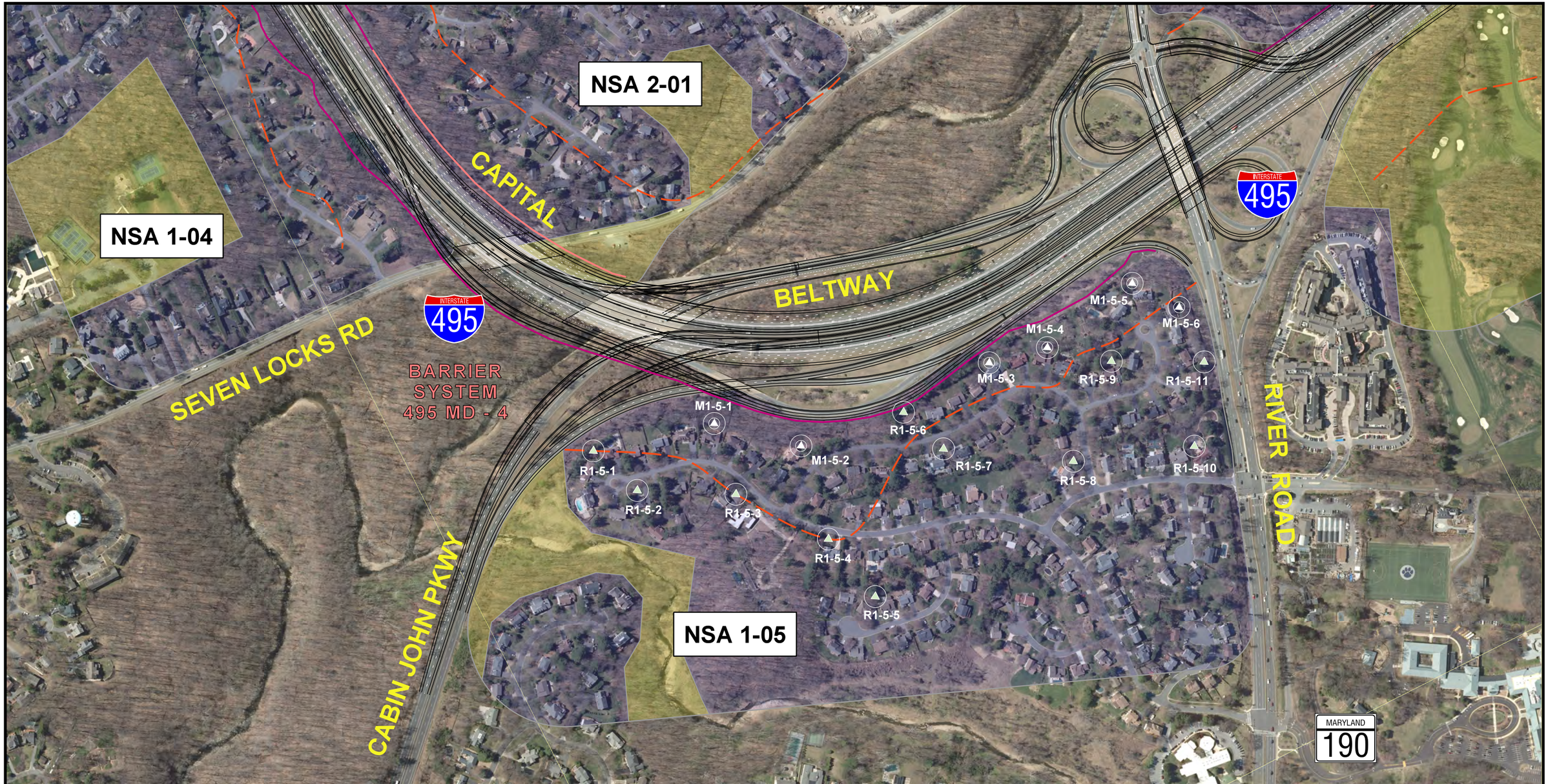
LAND USES AND RECEPTORS
NSA 1-3, 1-4, & 2-1

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 2

pw:\\shawmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-02_8&BB_13_14_21_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

PROPOSED NOISE BARRIER NSA 1-5

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 3

pw:\\shavmpwx.shacadd.ad.mdot.mdstate\SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseT1_TNAR 2019\CADD\pNA-03_8&2BB_15_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

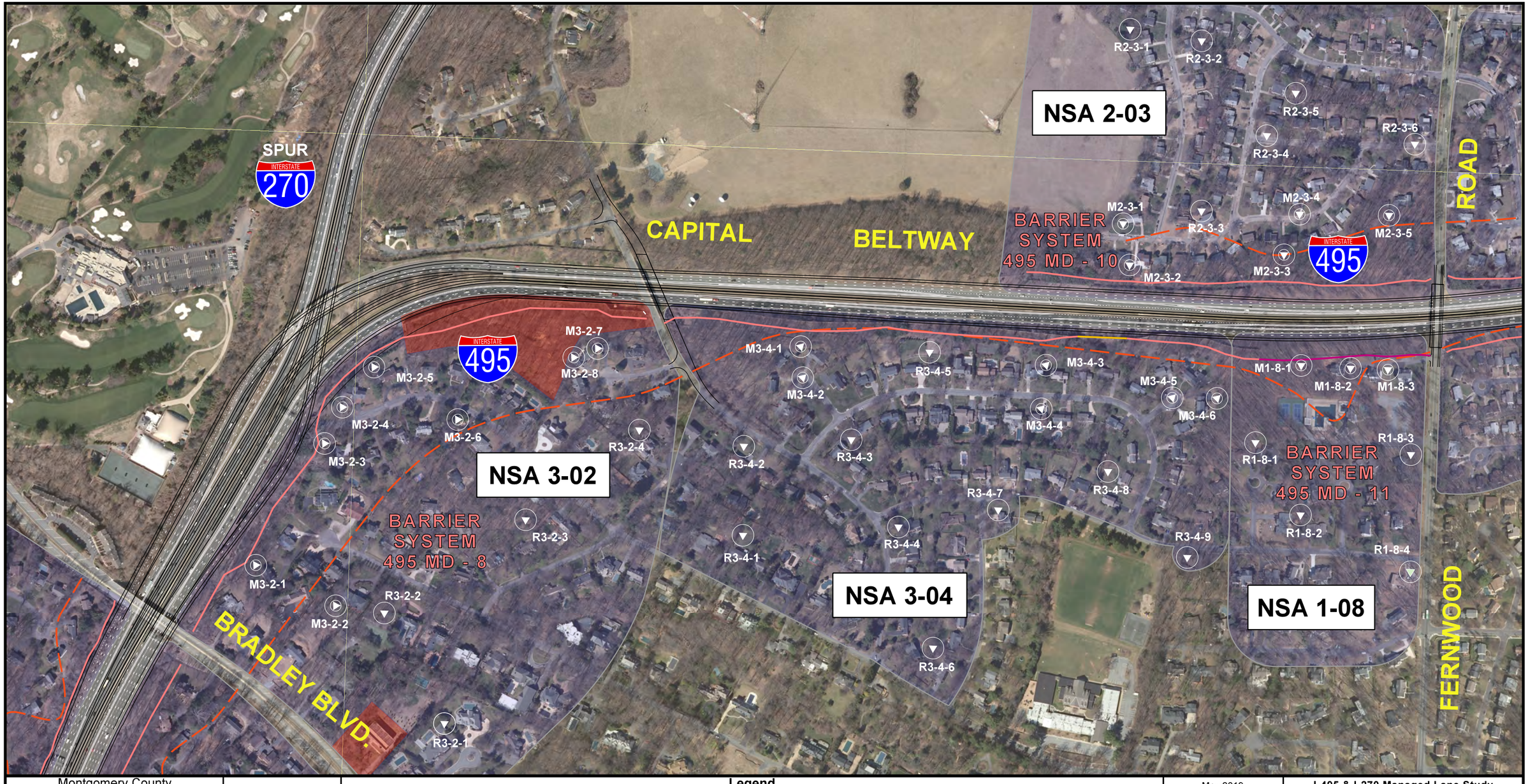
LAND USES AND RECEPTORS NSA 1-6, 1-7, 2-2, 3-1 & 4-1

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 4

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-04_8&2BB_16_17_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

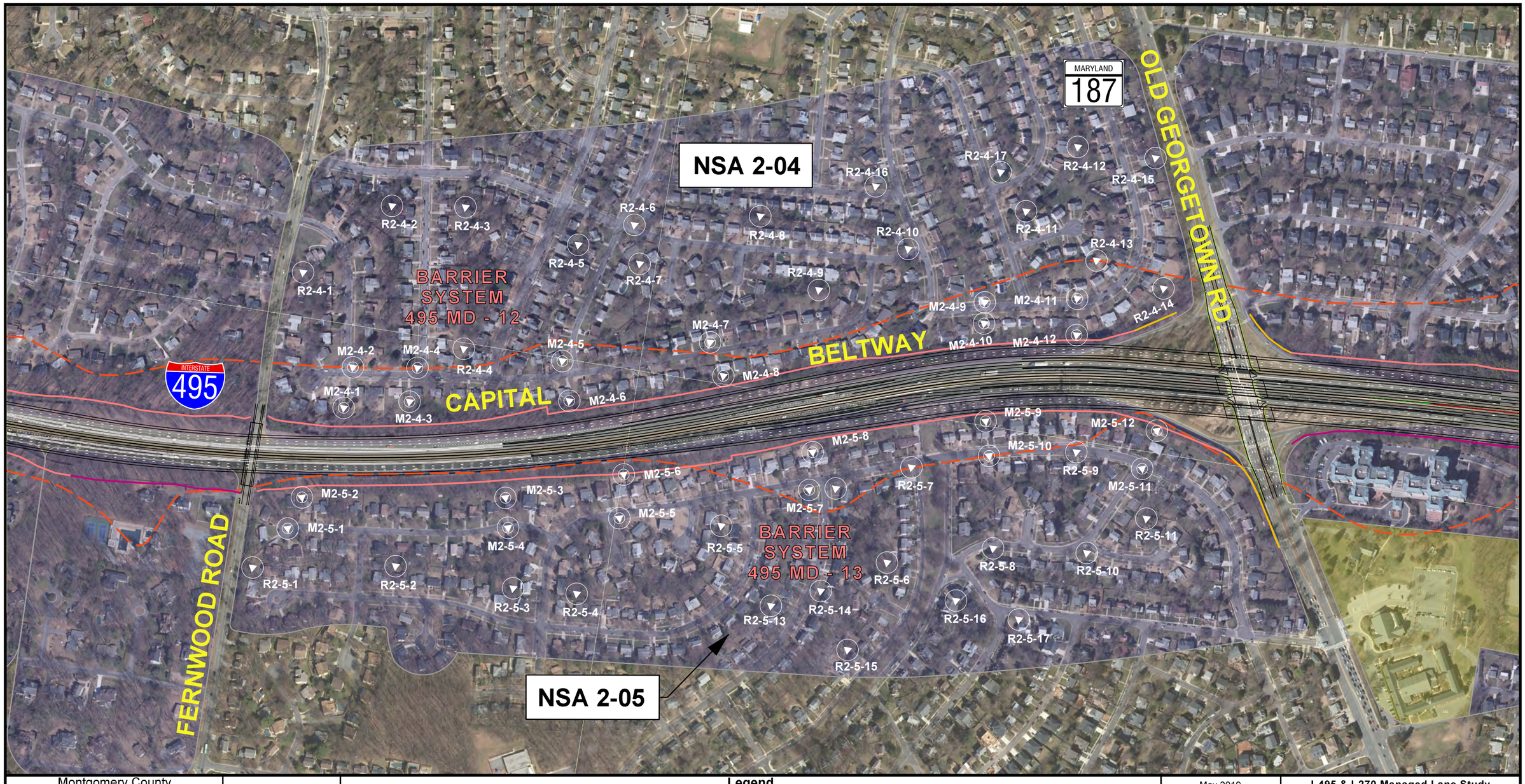
LAND USES AND RECEPTORS NSA 1-8, 2-3, 3-2, 3-3, & 3-4

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 5

pw:\\sharnmpw.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-05_8&2BB_cw1_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA 2-4 & 2-5

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 6

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-06_8&2BB_cw2_CAPBWNSE.dgn
5/14/2020

NSA 2-06

NSA 1-09

NSA 1-11

NSA 1-10

BARRIER SYSTEM 495 MD - 14

BARRIER SYSTEM 495 MD - 15

CAPITAL BELTWAY

OLD GEORGETOWN ROAD

INTERSTATE 270

INTERSTATE 495

MARYLAND 355

MARYLAND 187

M1-9-3
R1-9-6
R2-6-4
R2-6-6
R1-9-5
R2-6-5
R2-6-3
R1-9-2
R1-9-1
R1-9-3
R1-9-4
M2-6-1
M2-6-3
M2-6-5
M1-9-2
M2-6-2
M2-6-4
M2-6-6
M1-9-1
24HR-3
M1-10-7
M1-10-8
R1-10-16
R1-10-12
M1-10-6
R1-10-18
R1-10-17
R1-10-15
M1-10-5
R1-10-13
R1-10-11
R1-10-14
M1-10-4
R1-10-9
R1-10-10
24HR-2
M1-10-1
M1-10-2
R1-10-4
M1-10-3
R1-10-7
R1-10-19
R1-10-20
R1-10-3
R1-10-6
R1-10-8
R1-10-1
R1-10-5
R1-10-2

Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

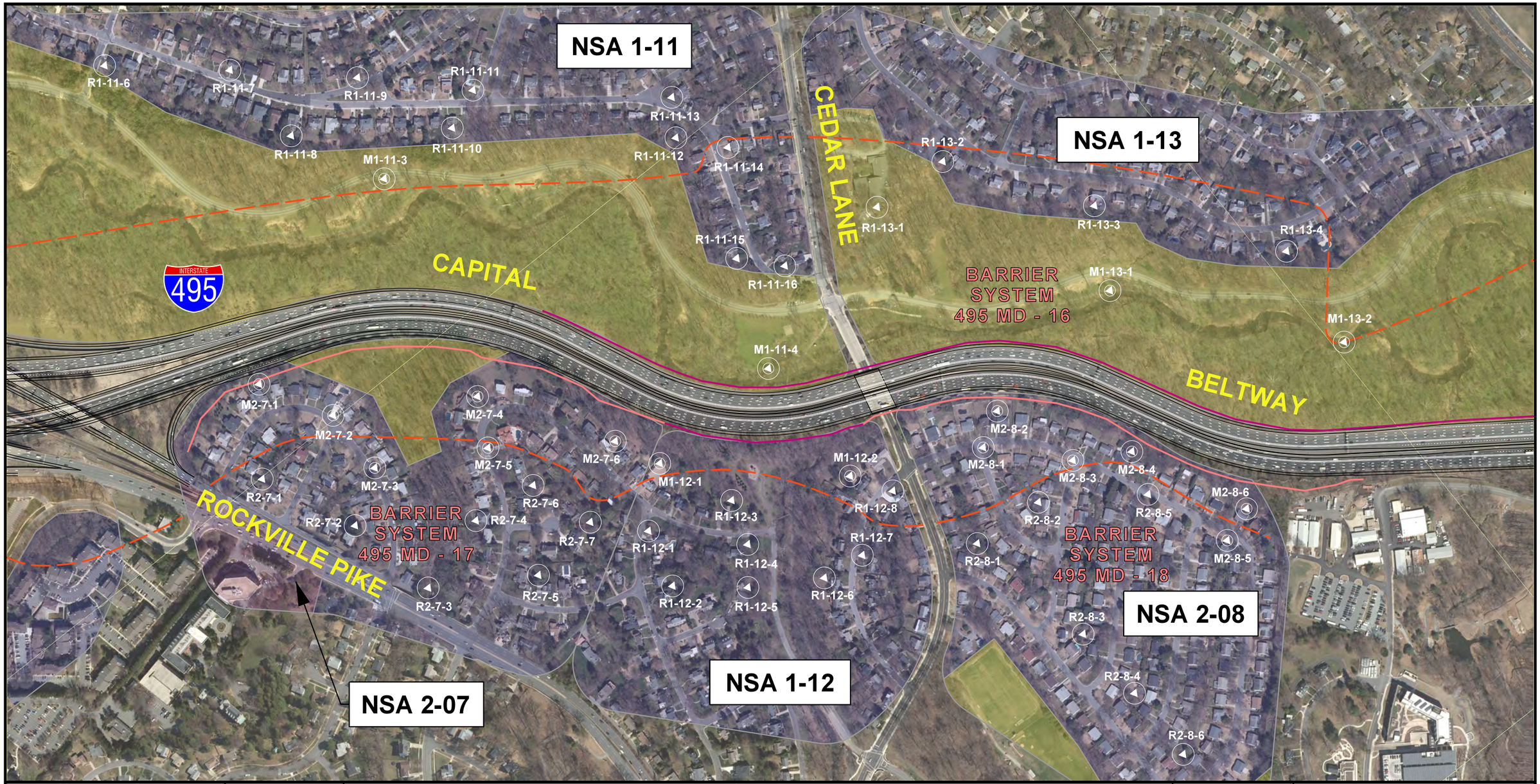
LAND USES AND RECEPTORS NSA 1-9,1-10 & 2-6

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 7

pw:\shawmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12~I495-I270 CR P3~ Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-07_8&2BB_cw3_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

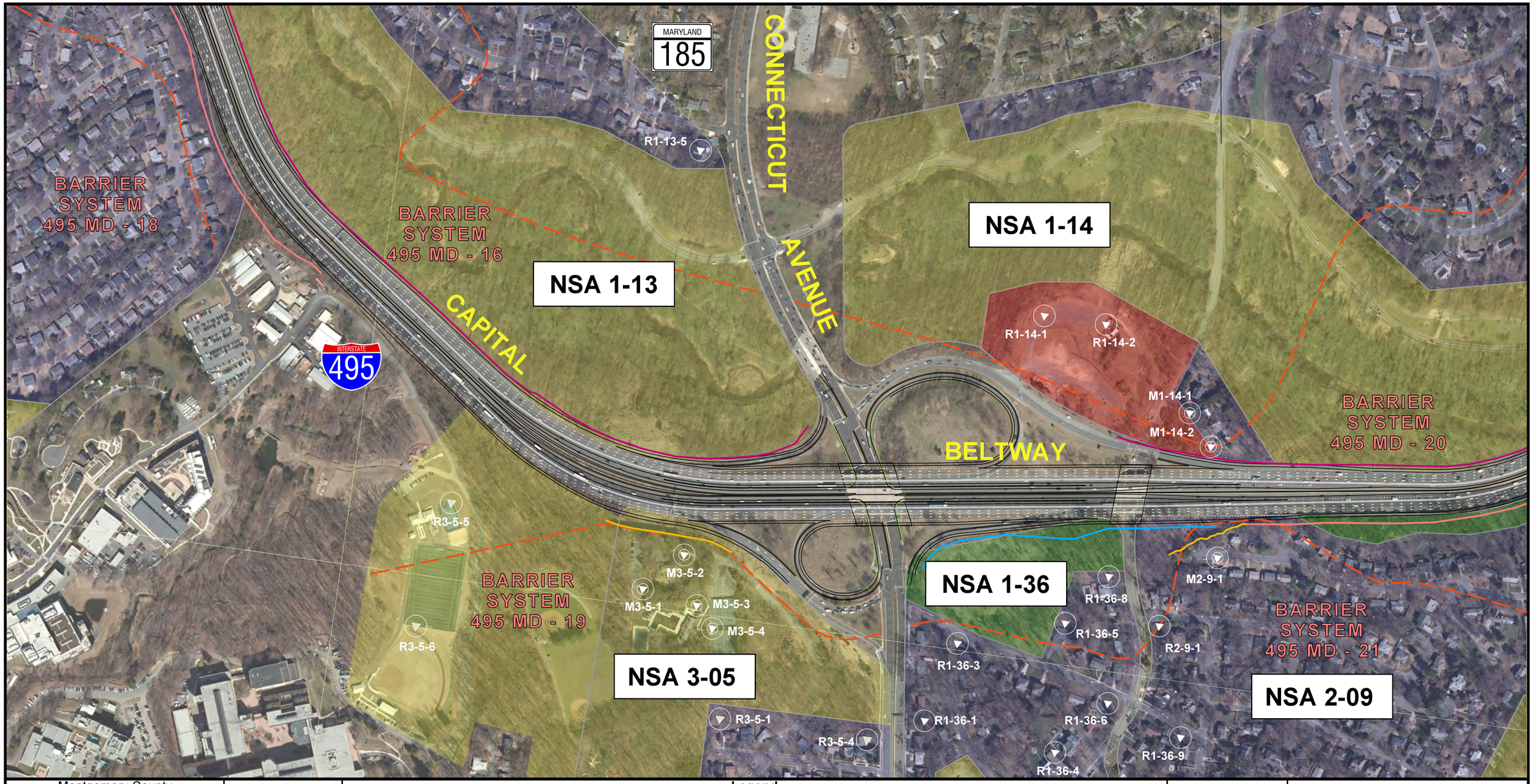
LAND USES AND RECEPTORS
NSA 1-11, 1-12, 1-13, 2-7 & 2-8

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 8

pw:\\shavmpwx.shacadd.ad.mdot.mdstate\SHAPWP3\Documents\12- I-495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-08_8&2BB_cw4_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour

Legend

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

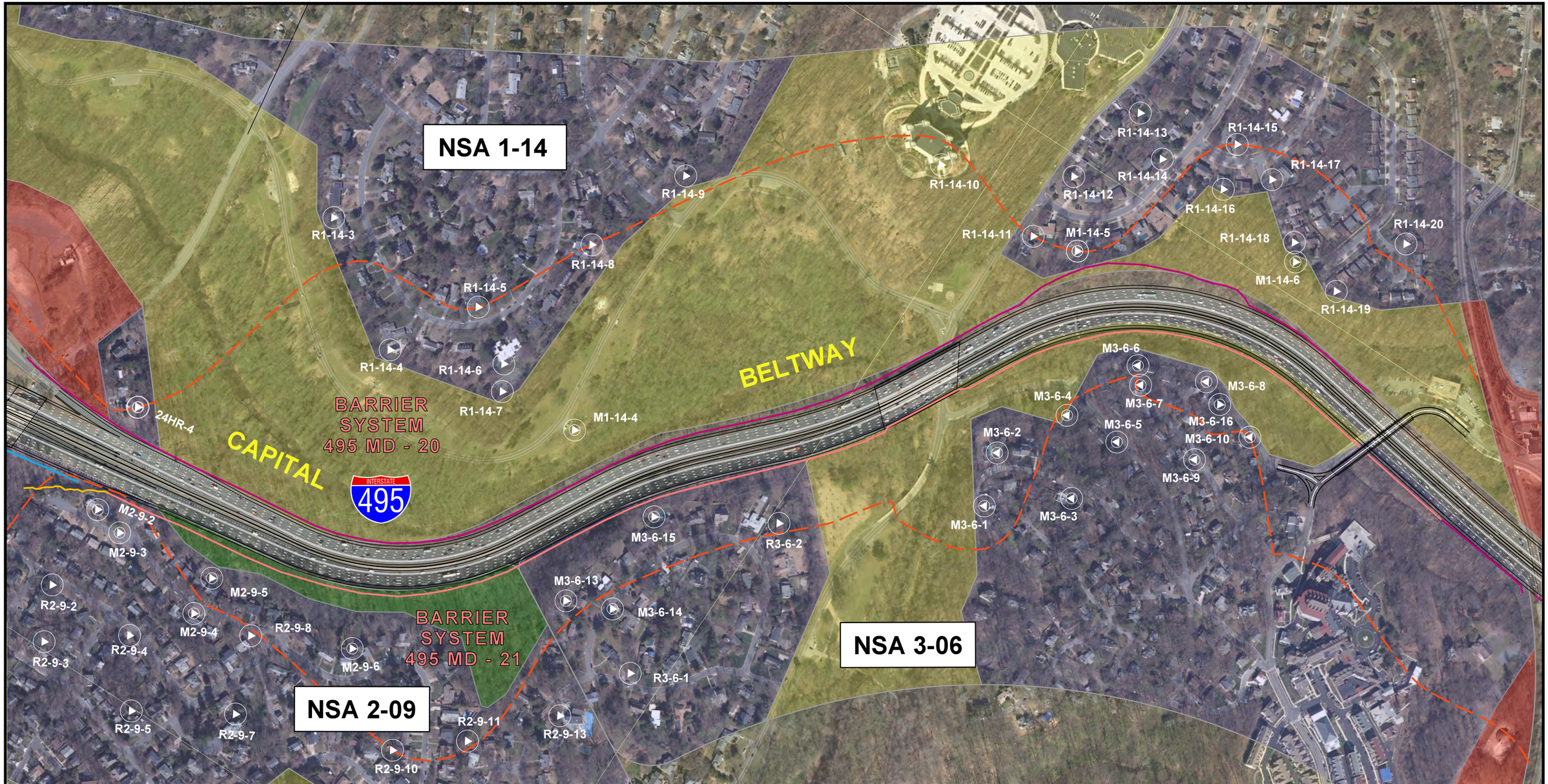
LAND USES AND RECEPTORS
NSA 1-13, 1-14, 2-9 & 3-5

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 9

pw:\\shavmpwx.shacadd.ad.mdot.mdstate\SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-09_8&2BB_cw4a_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

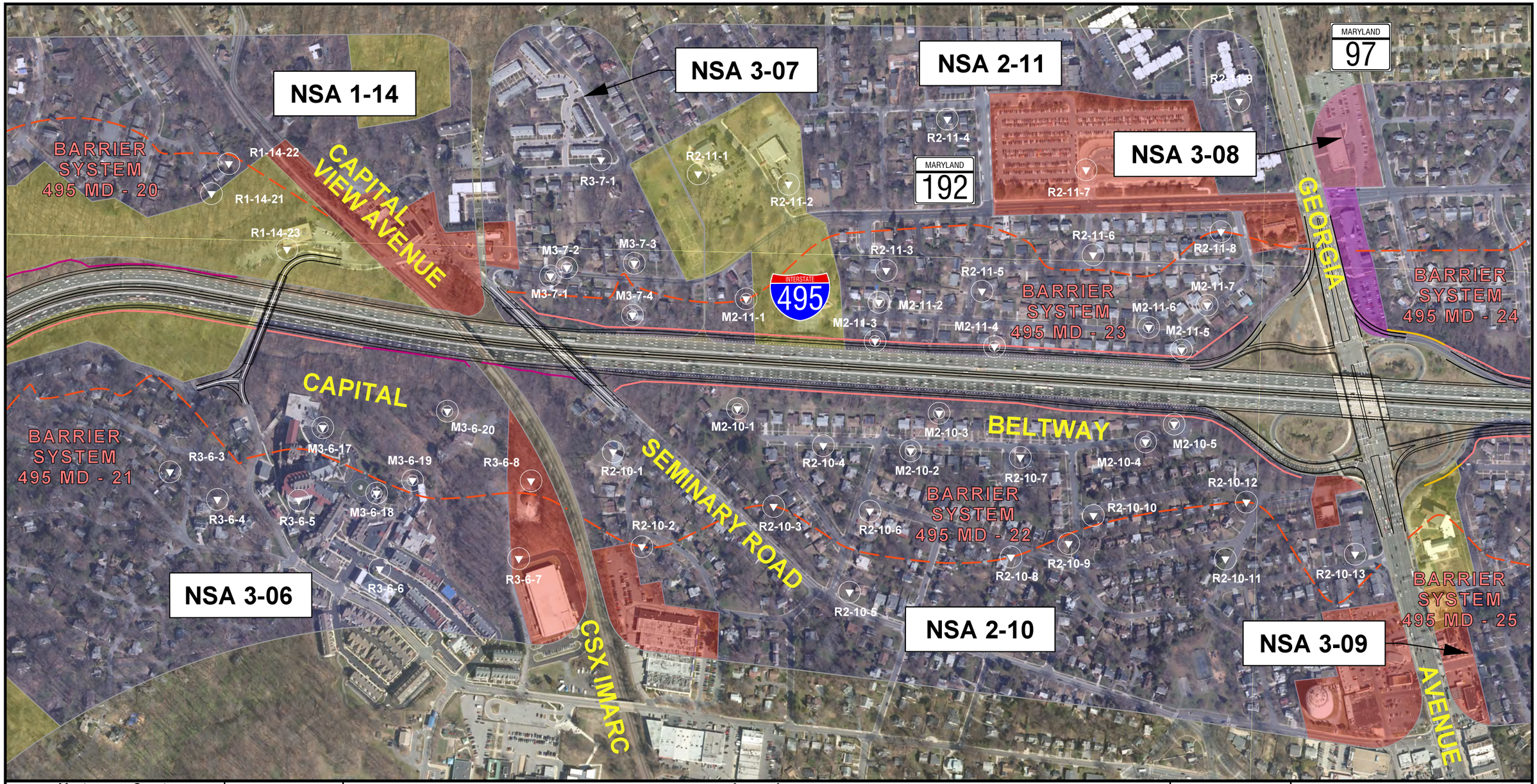
LAND USES AND RECEPTORS NSA 1-14, 2-9 & 3-6

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 10

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-10_8&2BB_cw5_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-14, 2-10, 2-11, 3-6 & 3-7

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 11

pw:\\shavmpwx.shacadd.ad.mdot.mdstate\SHAPWP3\Documents\12- I-495-I-270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-11_8&2BB_cw6_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 2-12, 2-13
3-8, 3-9, 4-2 & 4-3

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 12

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-12_8&BB_cw6a_CAPBWNSE.dgn
5/14/2020

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I-495-I-270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-13_8&2BB_cw7_CAPBWNSE.dgn
5/14/2020

NSA 2-12
BARRIER SYSTEM 495 MD - 26
NSA 4-04
BARRIER SYSTEM 495 MD - 28
NSA 2-15
BARRIER SYSTEM 495 MD - 30
BARRIER SYSTEM 495 MD - 31
NSA 2-14
BARRIER SYSTEM 495 MD - 29
NSA 2-13
BARRIER SYSTEM 495 MD - 27
NSA 2-16
CAPITAL BELTWAY
ROAD
W. UNIVERSITY BLVD.
COLESVILLE ROAD
INTERSTATE 95
INTERSTATE 495
MARYLAND 193
R2-12-9
R2-12-13
R2-12-12
M2-12-7
R2-12-11
M2-12-4
M2-12-6
R2-12-10
M2-12-5
M2-12-3
R4-4-3
M4-4-4
R4-4-4
M4-4-2
R4-4-2
M4-4-3
R4-4-5
R4-4-1
M2-14-8
R2-14-3
M2-14-4
M2-14-7
M2-14-2
M2-14-5
R2-14-9
M2-14-9
M2-14-10
R2-14-11
R2-14-6
M2-14-6
R2-14-12
R2-14-7
M2-14-1
R2-14-5
R2-14-4
R2-14-13
R2-14-1
M2-14-3
R2-14-8
R2-14-2
M2-13-3
M2-13-7
M2-13-9
M2-13-11
M2-13-4
M2-13-5
M2-13-12
M2-13-6
M2-13-8
M2-13-10
R2-13-3
R2-13-2
R2-13-4
R2-13-5
R2-13-6

Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Existing Barrier to Remain
Feasible and Reasonable
Not Feasible and Reasonable
Existing Barrier to be Replaced
66 dBA Noise Contour

Legend

Land Use Activity Category B
Noise Sensitive Area (EXTERIOR)
Land Use Activity Category C
Noise Sensitive Area (EXTERIOR)
Land Use Activity Category D
Noise Sensitive Area (INTERIOR)
M1-1 Noise Measurement Receptor Site

Land Use Activity Category E
Noise Sensitive Area (EXTERIOR)
Land Use Activity Category F
Non-Noise Sensitive Area
Land Use Activity Category G
Non-Noise Sensitive Area
R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration
Office of Planning and Preliminary Engineering
Environmental Planning Division
Noise Abatement Design & Analysis Team

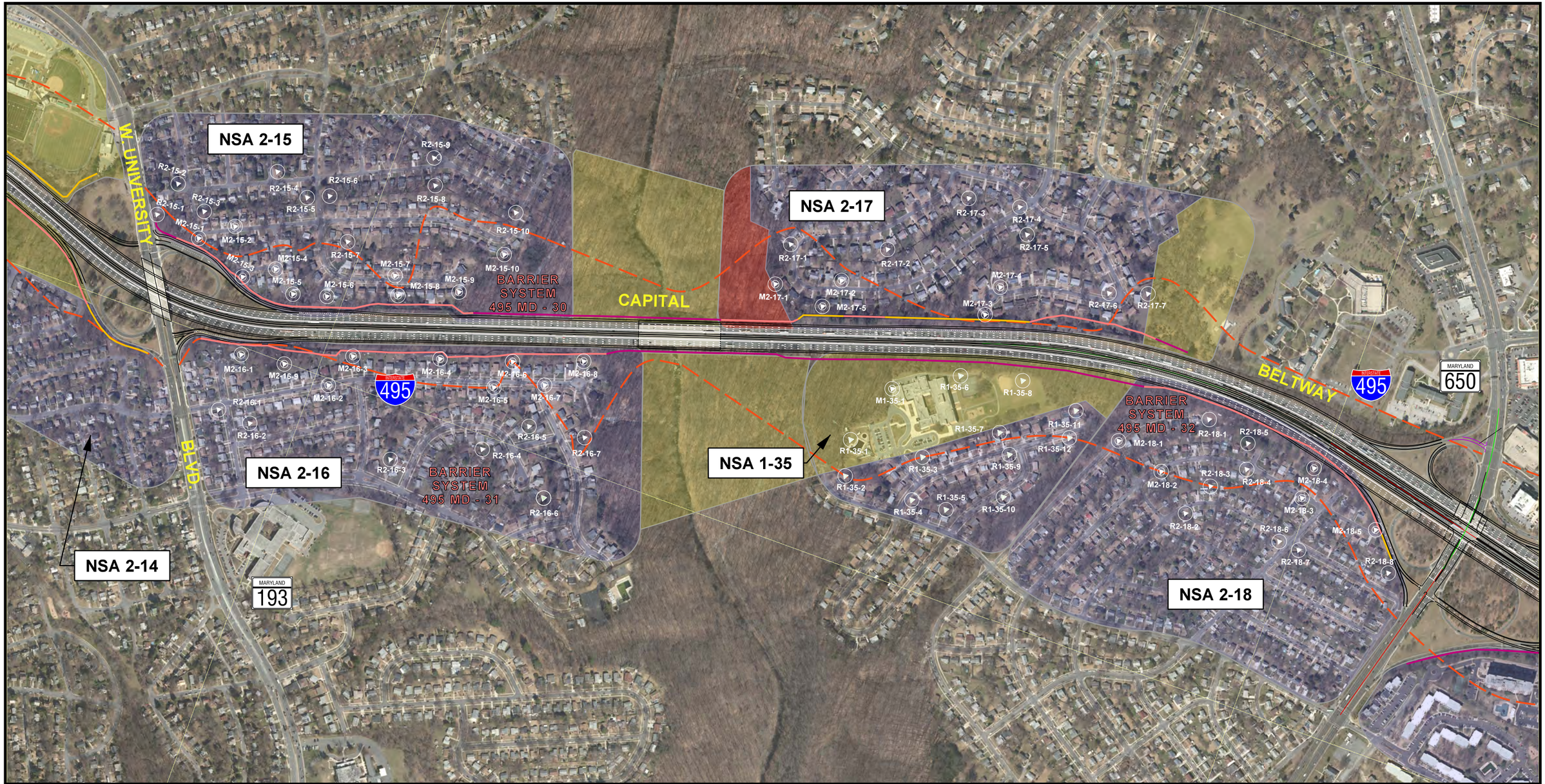
I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 2-12, 2-13, 2-14 & 4-4

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 13



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour

Legend

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

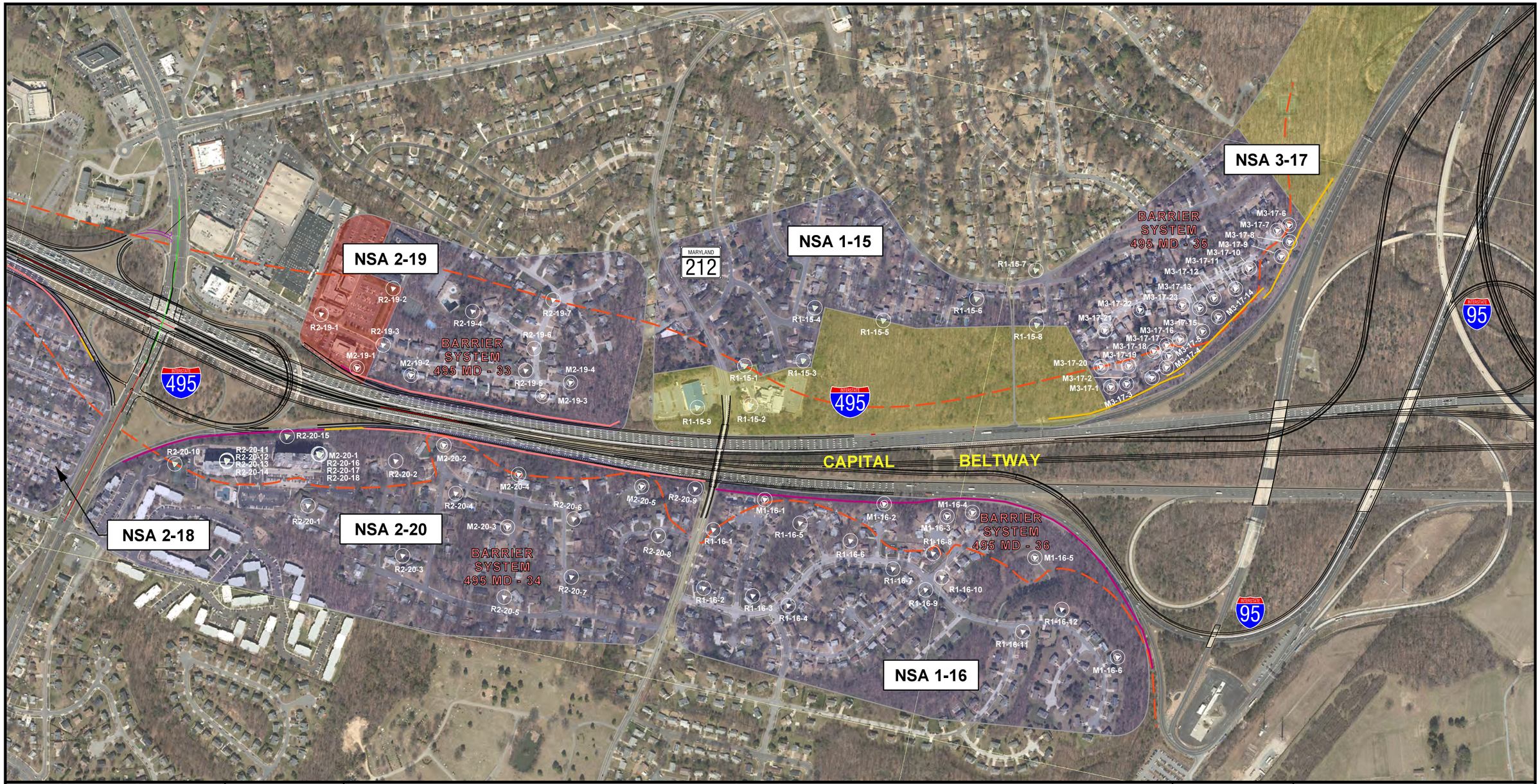
LAND USES AND RECEPTORS
NSA 1-35, 2-15, 2-16, 2-17 & 2-18

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 14

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-14_8&2BB_cvr9_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

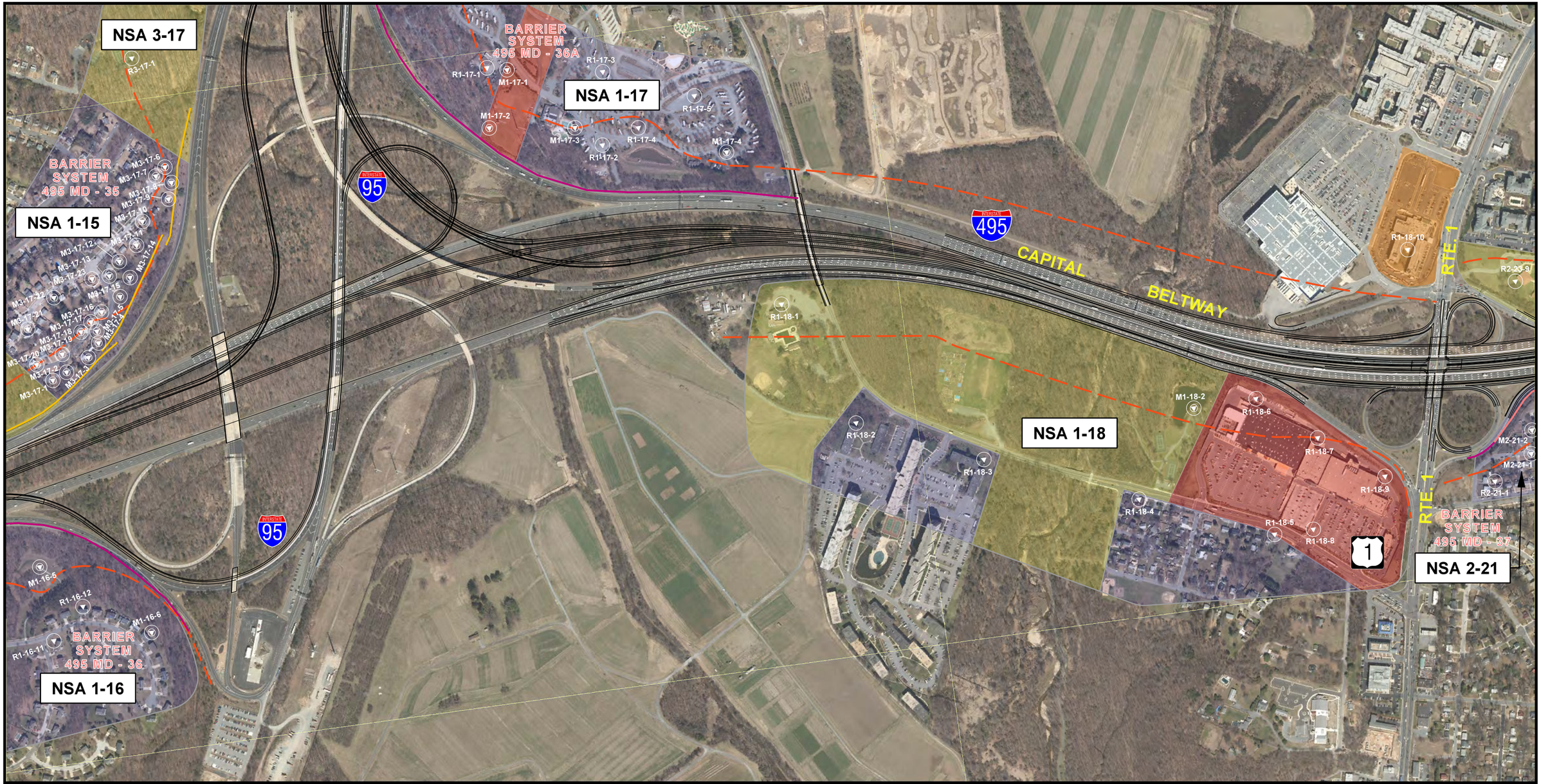
LAND USES AND RECEPTORS
NSA 1-15, 1-16, 2-19, 2-20 & 3-17

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 15

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-15_8&2BB_115_116_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

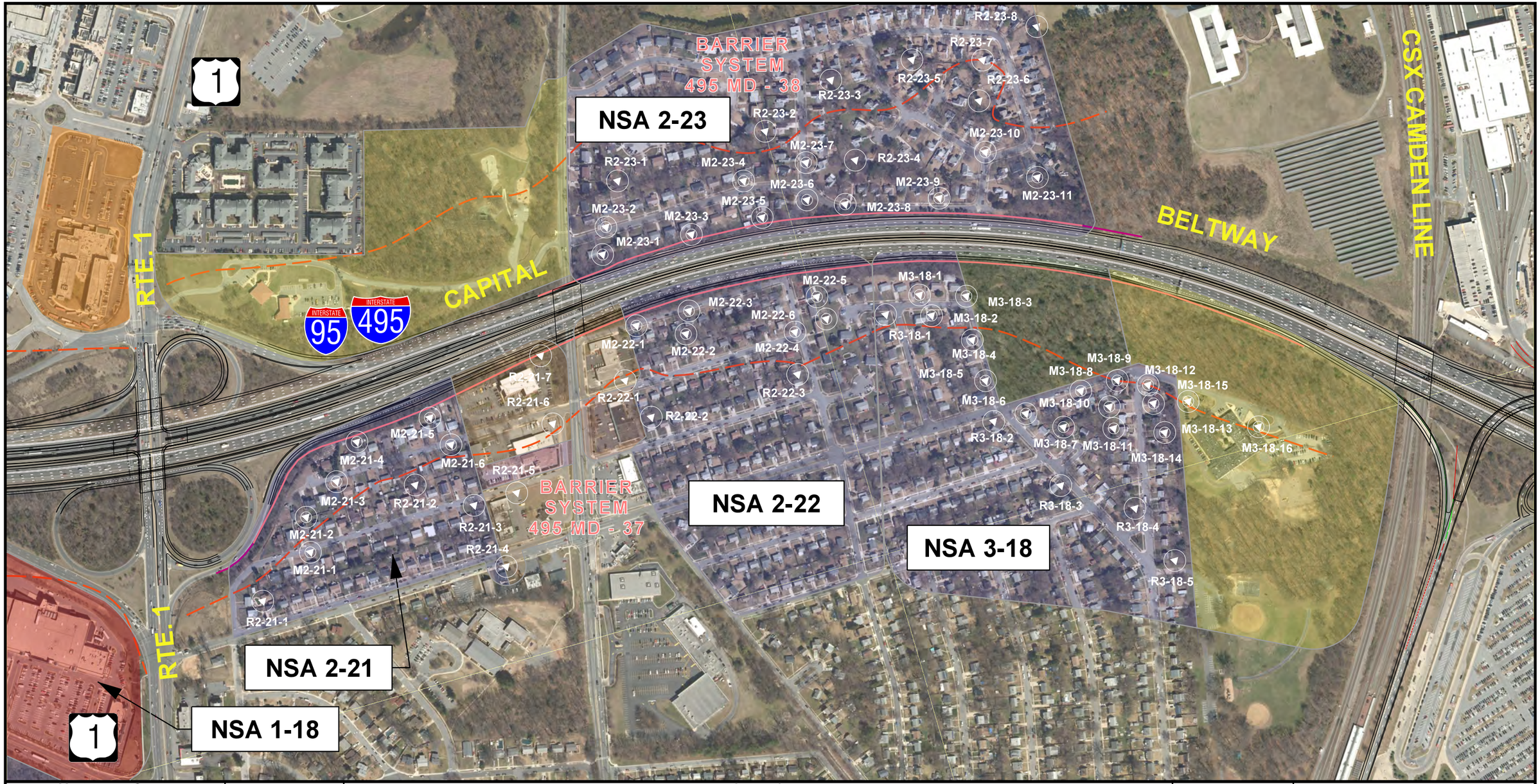
LAND USES AND RECEPTORS NSA 1-17 & 1-18

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 15A

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-15A_&&2BB_115_116_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 2-21, 2-22
2-23 & 3-18

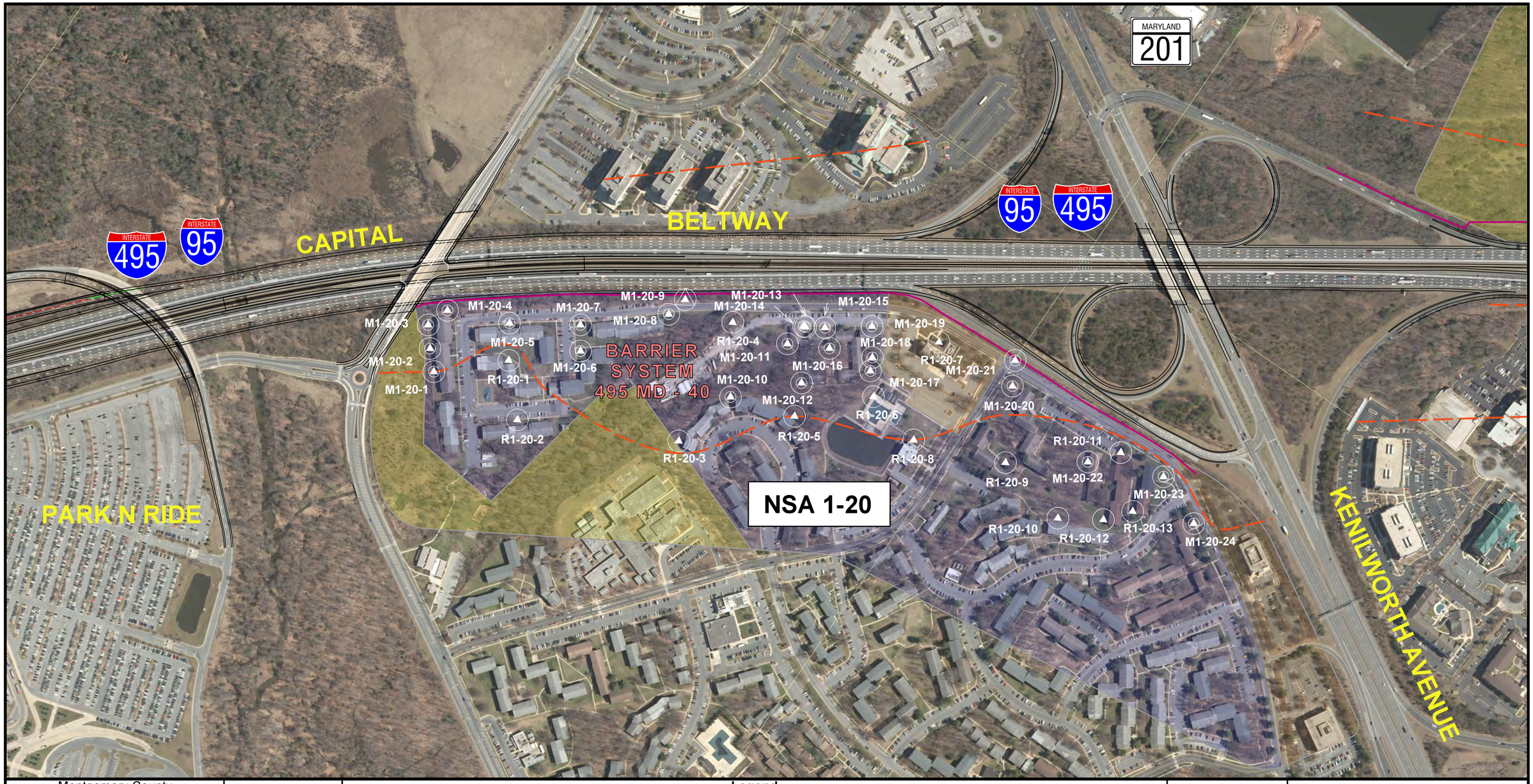
ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 16

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 N
5/14/2020

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12-I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-17_8&BB_120_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

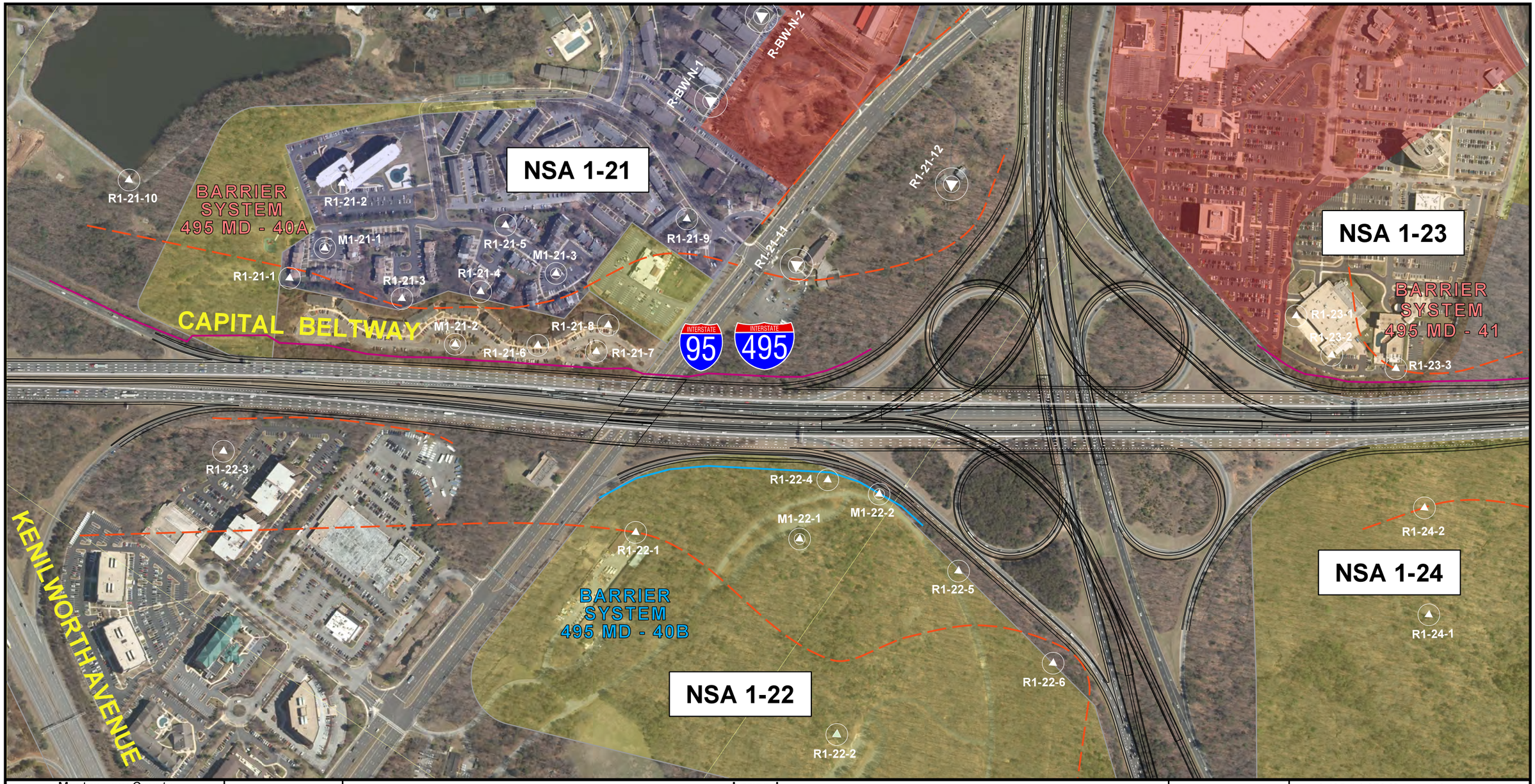
Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-20

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

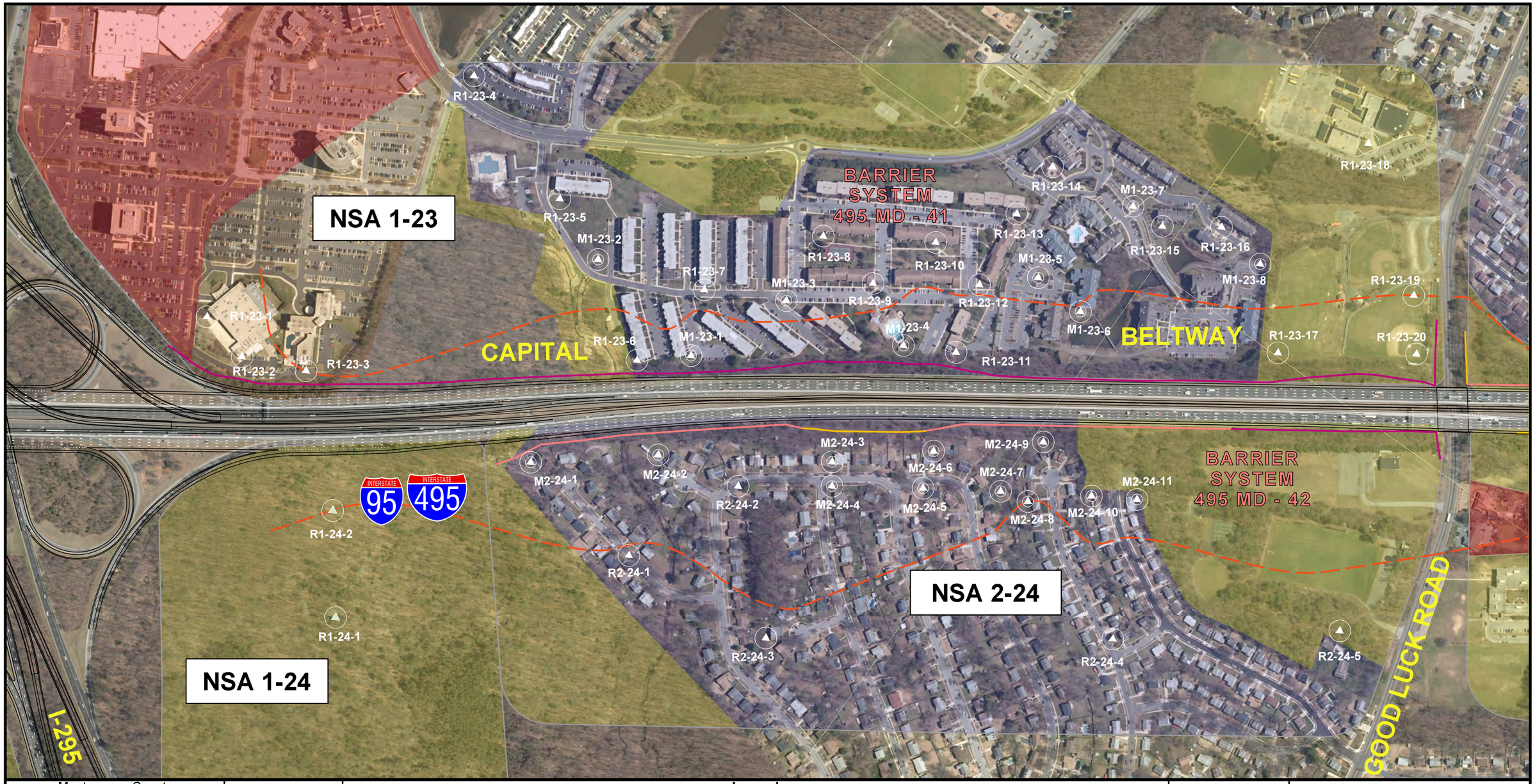
LAND USES AND RECEPTORS NSA 1-21 & 1-22

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 17A

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseT1_TNAR 2019\CADD\pNA-17A_8&2BB_120_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Existing Barrier to Remain
Feasible and Reasonable
Not Feasible and Reasonable
Existing Barrier to be Replaced
66 dBA Noise Contour

Legend

Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
Land Use Activity Category D Noise Sensitive Area (INTERIOR)
M1-1 Noise Measurement Receptor Site

Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
Land Use Activity Category F Non-Noise Sensitive Area
Land Use Activity Category G Non-Noise Sensitive Area
R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

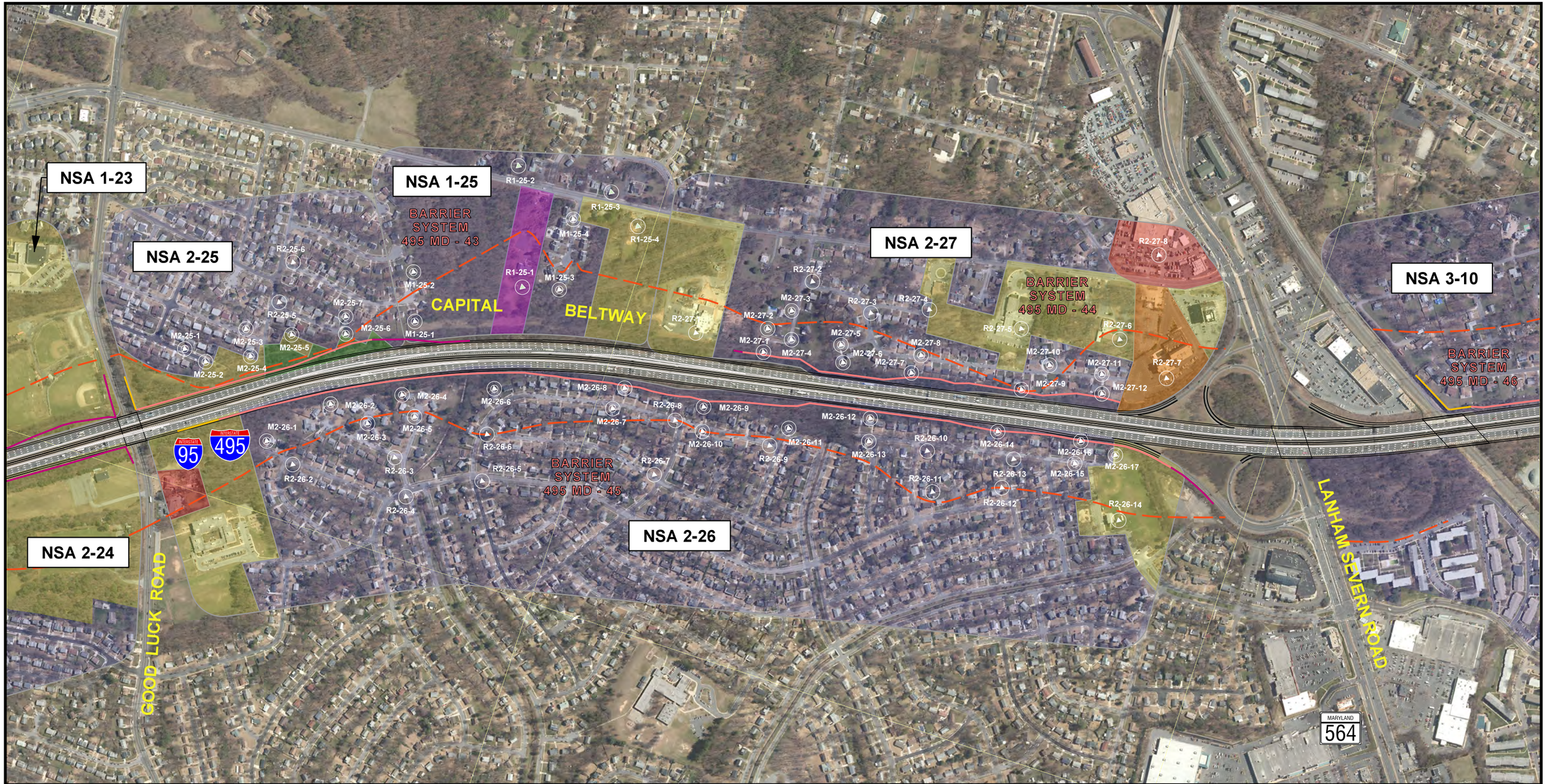
LAND USES AND RECEPTORS NSA 1-23, 1-24 & 2-24

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 18

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseT1_TNAR 2019\CADD\pNA-18_&2BB_123_124_224_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-25, 2-25, 2-26 & 2-27

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 19

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-19_8&2BB_125_225_226_227_CAPBWNSE.dgn
5/14/2020

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:\SHAPWP3\Documents\12~I495-I270 CR P3~ Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-20_8&2BB_310_CAPBWNSE.dgn
5/14/2020

NSA 2-28
NSA 3-10
NSA 1-33
NSA 2-29
NSA 3-11
NSA 2-30

BARRIER SYSTEM 495 MD - 47
BARRIER SYSTEM 495 MD - 48
BARRIER SYSTEM 495 MD - 49
BARRIER SYSTEM 495 MD - 50
BARRIER SYSTEM 495 MD - 46

M2-28-1, M2-28-2, M2-28-3, M2-28-4
R2-28-1, R2-28-2, R2-28-3, R2-28-4, R2-28-5
M2-29-1, M2-29-2, M2-29-3, M2-29-4
R2-29-1, R2-29-2, R2-29-3, R2-29-4, R2-29-5
M3-11-1, M3-11-2, M3-11-3, M3-11-4, M3-11-5, M3-11-6, M3-11-7, M3-11-8
R3-11-1
R1-33-1, R1-33-2, R1-33-3, R1-33-4
M-1-33-01, M-1-33-02, M-1-33-03, M-1-33-04, M-1-33-05, M-1-33-06
R3-10-1, R3-10-2, R3-10-3, R3-10-4
M-3-10-01, M-3-10-02, M-3-10-03, M-3-10-04, M-3-10-05, M-3-10-06, M-3-10-07, M-3-10-08

JOHN HANSON HIGHWAY
MLK BLVD.
MARYLAND 450
MARYLAND 704
50
LANHAM SEVERN ROAD
CAPITAL BELTWAY
INTERSTATE 95
INTERSTATE 495

Montgomery County
Prince George's County

MONTGOMERY
PRINCE GEORGES

Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

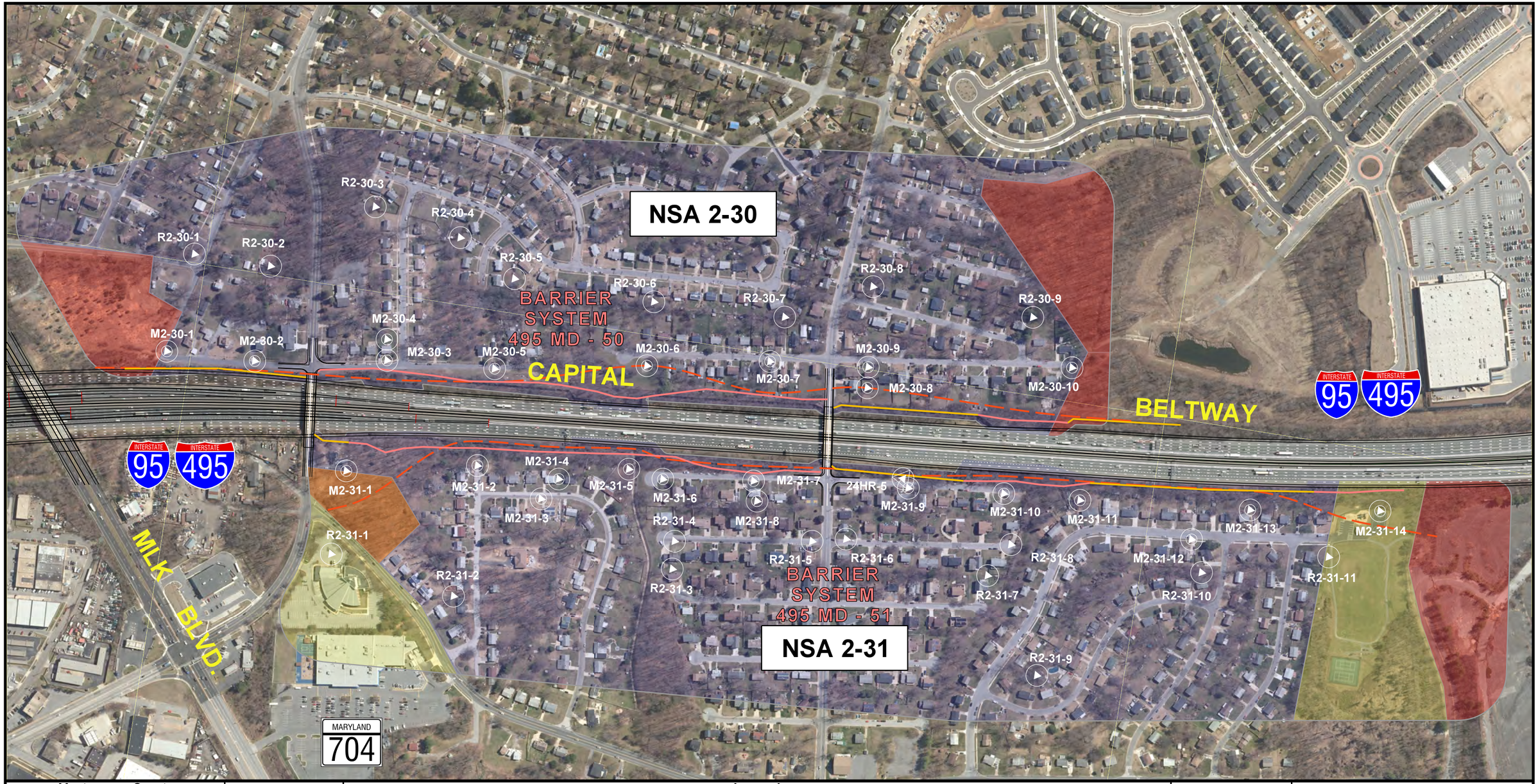
I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-33, 2-28, 2-29, 3-10 & 3-11

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 20



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 2-30 & 2-31

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 21

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-21_8&BB_230_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 3-12

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 22

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-22_8&2BB_312_CAPBWNSE.dgn
5/14/2020

Aerial image does not include new townhome construction. Lots are shown to give approximate location of the townhomes.

NSA 1-26

R1-26-1
R1-26-2
R1-26-3
M1-26-1
R1-26-4
M1-26-2
R1-26-5
R1-26-6
R1-26-7
R1-26-8
R1-26-9
R1-26-10
R1-26-11
M1-26-3
R1-26-12
R1-26-13
R1-26-14
R1-26-15
R1-26-16
R1-26-17
R1-26-18
M1-26-4
24HR-6
R1-26-19 (ELEV 17')
R1-26-20
R1-26-21 (ELEV 17')
R1-26-22
R1-26-23 (ELEV 17')
R1-26-24
R1-26-25

BARRIER SYSTEM 495 MD - 53

CENTRAL AVENUE

CAPITAL BELTWAY

INTERSTATE 95
INTERSTATE 495

Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

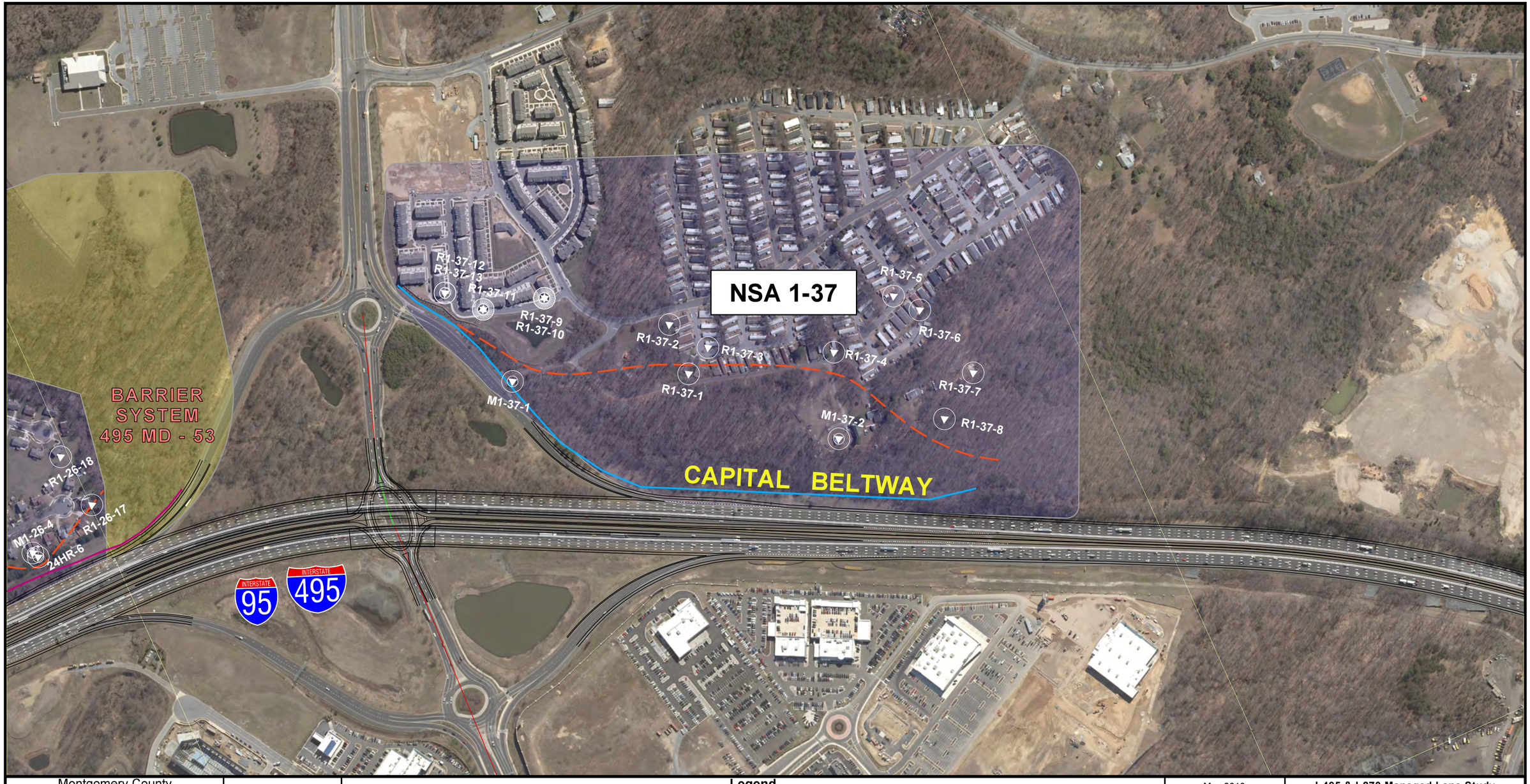
LAND USES AND RECEPTORS
NSA 1-26

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 23

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseTT1_TNAR 2019\CADD\pNA-23_8&2BB_126_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-26

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 23A

pw:\\shawmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I-495-I-270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-23A_&&2BB_126_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-28, 1-29, & 3-13

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 24

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseT1_TNAR 2019\CADD\pNA-24_8&BB_128_129_313_CAPBWNSE.dgn
5/14/2020

CAPITAL BELTWAY

M1-27-1
R1-27-1
M1-27-2
M1-27-3
M1-27-4
R1-27-2
R1-27-3
R1-27-4
R1-27-5
R1-27-6

NSA 1-27

INTERSTATE 95
INTERSTATE 495

Montgomery County
Prince George's County

MONTGOMERY
PRINCE GEORGES

Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

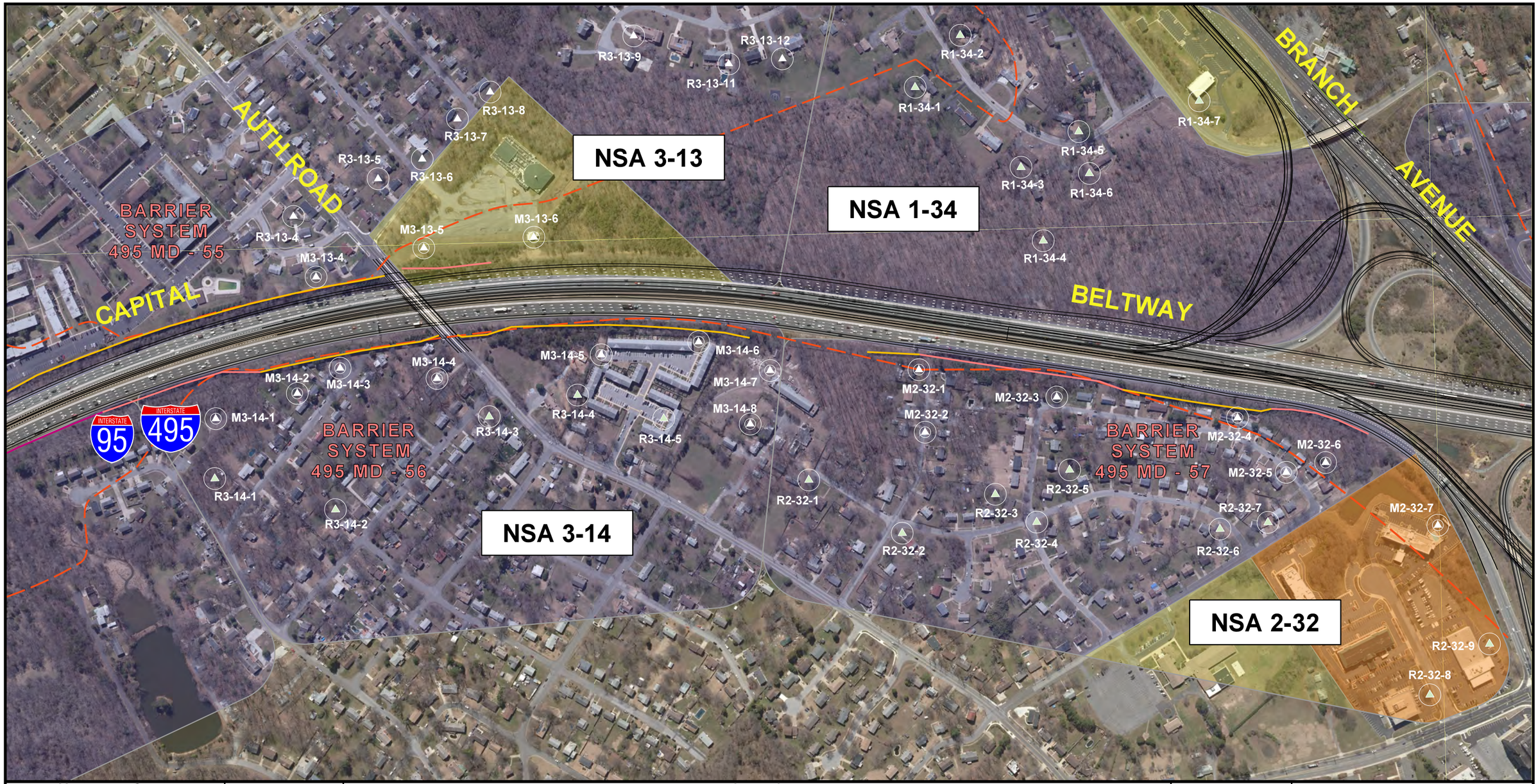
LAND USES AND RECEPTORS
NSA 1-27

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 24A

pw:\\shawmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-24A_&&2BB_128_129_313_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA 1-34, 3-13, 3-14 & 2-32

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12-I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-25_8&2BB_134_232_313_314_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA 3-15 & 3-16

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 25A

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-25A_8&2BB_134_232_313_314_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA 3-16

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 26

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-26_8&2BB_130_131_132_CAPBWNSE.dgn
5/15/2020

pw:\\shawmpwx.shacadd.ad.mdot.mdstate:\SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-27_8&4BB_11_12_CAPBWNSE.dgn
5/15/2020

NSA 1-01

NSA 1-02

NSA 1-03

NSA 1-04

MACARTHUR BLVD.

CLARA BARTON PKWY

CAPITAL BELTWAY

PERSIMMON TREE ROAD

BARRIER SYSTEM 495 MD - 1

BARRIER SYSTEM 495 MD - 2

BARRIER SYSTEM 495 MD - 3

BARRIER SYSTEM 495 MD - 4

INTERSTATE 495

R1-1-1 R1-1-2 R1-1-3 R1-1-4 R1-1-5 R1-1-6 R1-1-7 R1-1-8 R1-1-9 R1-1-10

M1-1-1 M1-1-2 M1-1-3 M1-1-4

R1-2-1 R1-2-2 R1-2-3 R1-2-4 R1-2-5 R1-2-6 R1-2-7 R1-2-8 R1-2-9 R1-2-10

M1-2-1 M1-2-2 M1-2-3 M1-2-4 M1-2-5

Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

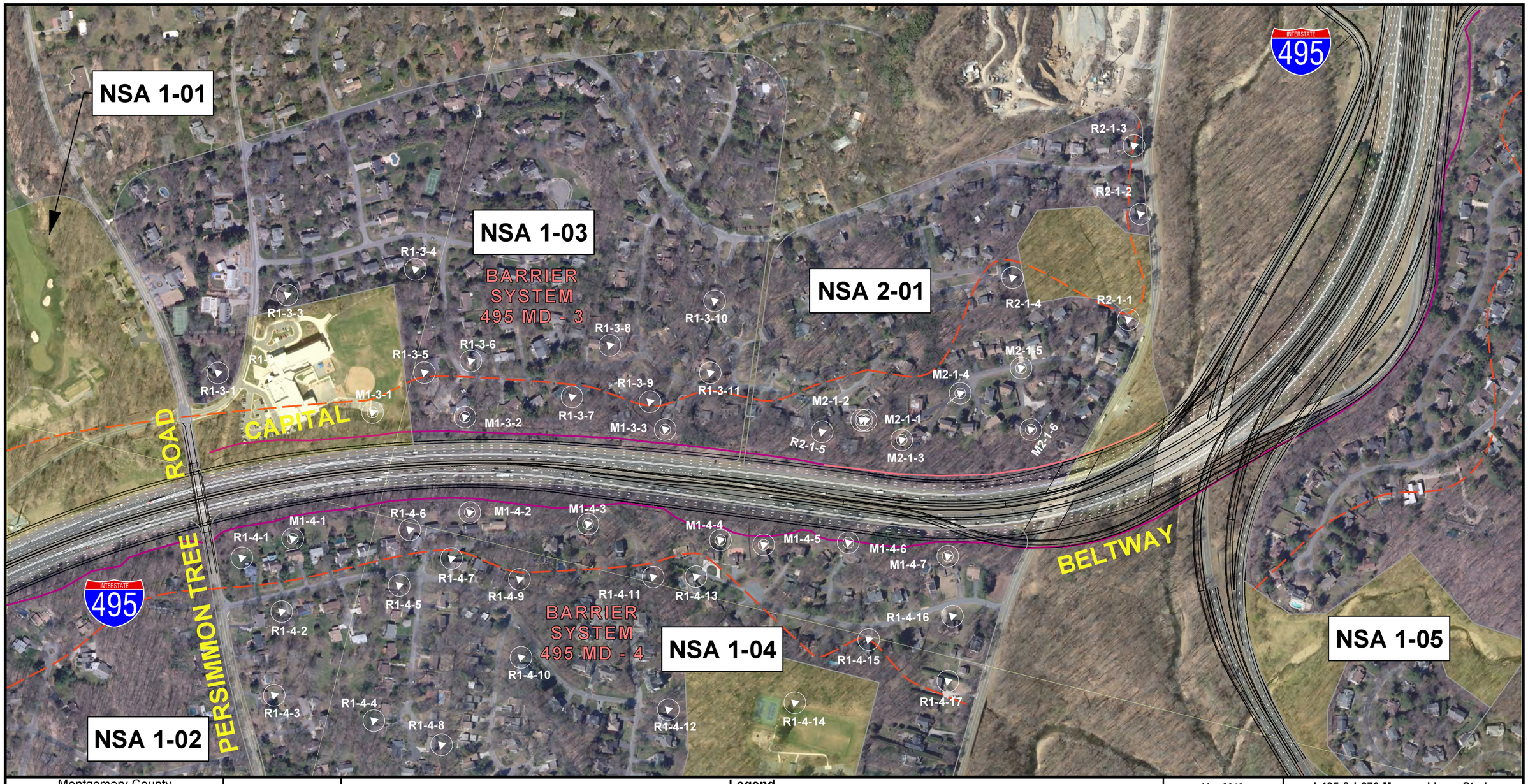
I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA 1-1 & 1-2

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 27



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

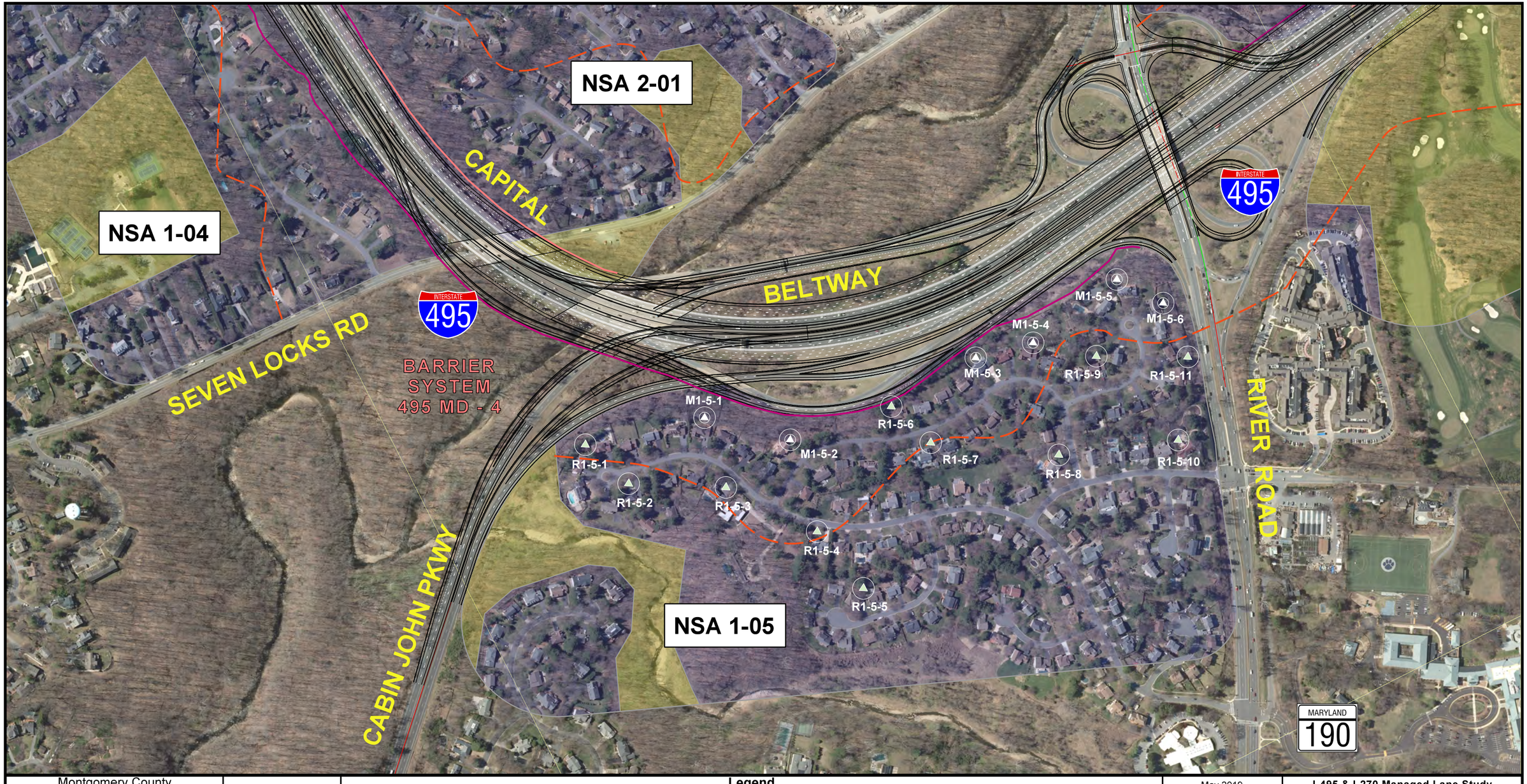
I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA 1-3, 1-4, & 2-1

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-28_8&4BB_13_14_21_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

PROPOSED NOISE BARRIER NSA 1-5

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 29

pw1\shawmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseT1_TNAR 2019\CADD\pNA-29_8&8BB_16_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

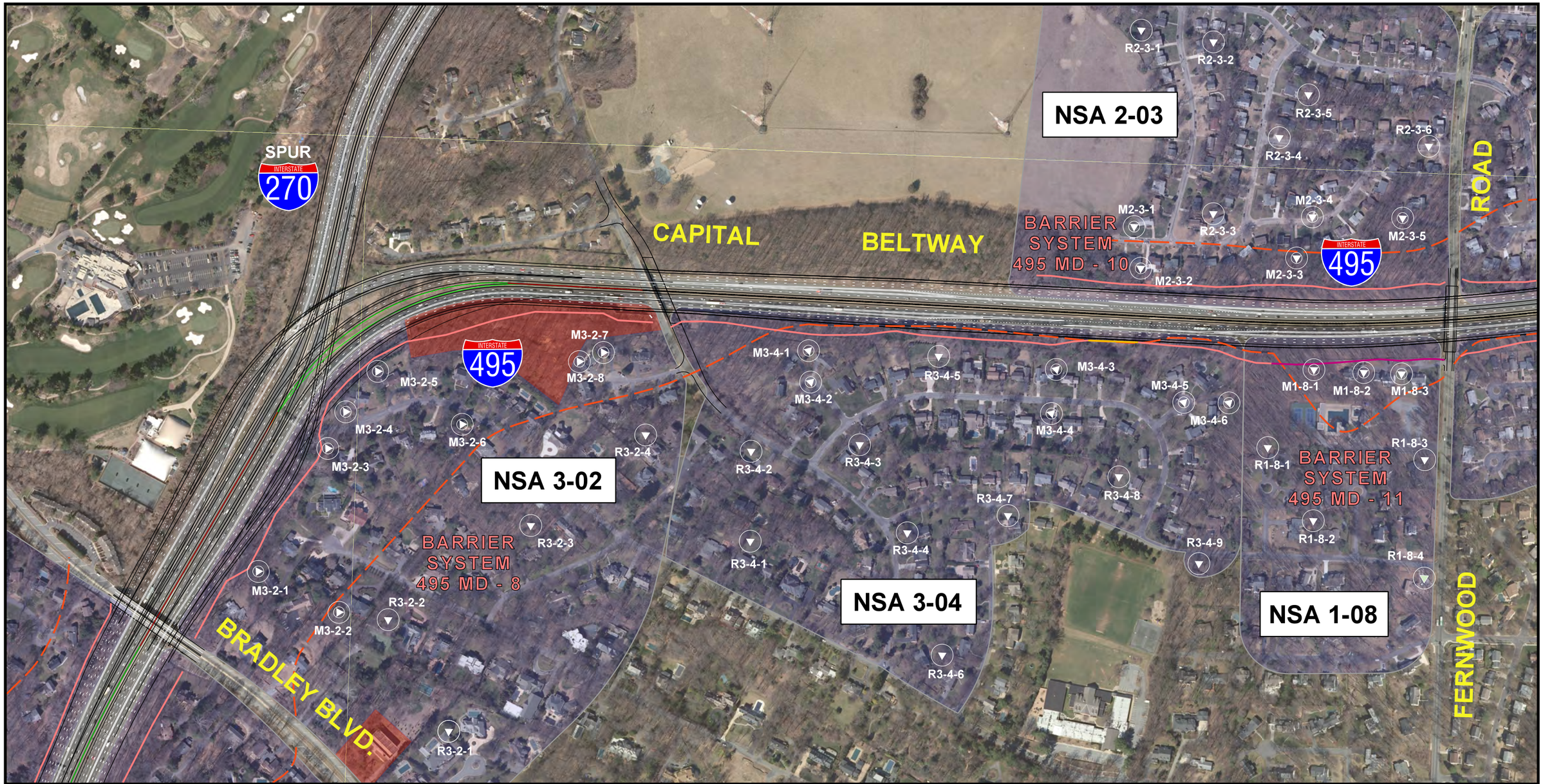
LAND USES AND RECEPTORS NSA 1-6, 1-7, 2-2, 3-1 & 4-1

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 30

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-30_8&4BB_16_17_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Existing Barrier to Remain
Feasible and Reasonable
Not Feasible and Reasonable
Existing Barrier to be Replaced
66 dBA Noise Contour

Legend

Land Use Activity Category B
Noise Sensitive Area (EXTERIOR)
Land Use Activity Category C
Noise Sensitive Area (EXTERIOR)
Land Use Activity Category D
Noise Sensitive Area (INTERIOR)
M1-1 Noise Measurement Receptor Site

Land Use Activity Category E
Noise Sensitive Area (EXTERIOR)
Land Use Activity Category F
Non-Noise Sensitive Area
Land Use Activity Category G
Non-Noise Sensitive Area
R1-1 Modeled Receptor

May 2019

Maryland
Department of Transportation
State Highway Administration

Office of
Planning and Preliminary
Engineering

Environmental Planning
Division

Noise Abatement Design
& Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-8, 2-3, 3-2, 3-3,
& 3-4

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 31

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I-495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-31_8&4BB_cw1_CAPBWNSE.dgn
5/15/2020

pw1:\shawmpwx.shacadd.ad.mdot.mdstate:\SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-32_8&4BB_cw2_CAPBWNSE.dgn
5/15/2020

NSA 2-04

NSA 2-05

MARYLAND 187

OLD GEORGETOWN RD.

FERNWOOD ROAD

INTERSTATE 495

BELTWAY

CAPITAL BELTWAY

BARRIER SYSTEM 495 MD - 12

BARRIER SYSTEM 495 MD - 13

R2-4-1 R2-4-2 R2-4-3 R2-4-4 R2-4-5 R2-4-6 R2-4-7 R2-4-8 R2-4-9 R2-4-10 R2-4-11 R2-4-12 R2-4-13 R2-4-14 R2-4-15 R2-4-16 R2-4-17

M2-4-1 M2-4-2 M2-4-3 M2-4-4 M2-4-5 M2-4-6 M2-4-7 M2-4-8 M2-4-9 M2-4-10 M2-4-11 M2-4-12

R2-5-1 R2-5-2 R2-5-3 R2-5-4 R2-5-5 R2-5-6 R2-5-7 R2-5-8 R2-5-9 R2-5-10 R2-5-11 R2-5-13 R2-5-14 R2-5-15 R2-5-16 R2-5-17

M2-5-1 M2-5-2 M2-5-3 M2-5-4 M2-5-5 M2-5-6 M2-5-7 M2-5-8 M2-5-9 M2-5-10 M2-5-11 M2-5-12

Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 2-4 & 2-5

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 32

pw:\\shawmpwx.shacadd.ad.mdot.mdstate:\SHAPWP3\Documents\12~I495-I270 CR P3~ Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-33_8&4BB_cw3_CAPBWNSE.dgn
5/15/2020

NSA 2-06

NSA 1-09

NSA 1-11

NSA 1-10

BARRIER SYSTEM 495 MD - 14

BARRIER SYSTEM 495 MD - 15

CAPITAL BELTWAY

OLD GEORGETOWN ROAD

INTERSTATE 270

INTERSTATE 495

MARYLAND 355

MARYLAND 187

M1-9-3
R1-9-6
R2-6-4
R2-6-6
R1-9-5
R2-6-5
R2-6-3
R1-9-2
R1-9-1
R1-9-3
R1-9-4
M1-9-2
M2-6-1
M2-6-3
M2-6-5
M2-6-2
M2-6-4
M2-6-6
M1-9-1
24HR-3
M1-10-7
M1-10-8
R1-10-16
M1-10-6
R1-10-12
R1-10-18
R1-10-17
R1-10-15
M1-10-5
R1-10-13
R1-10-11
R1-10-14
M1-10-4
R1-10-9
R1-10-10
24HR-2
M1-10-1
M1-10-2
M1-10-3
R1-10-4
R1-10-7
R1-10-19
R1-10-20
R1-10-3
R1-10-6
R1-10-8
R1-10-1
R1-10-5
R1-10-2

Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA 1-9,1-10 & 2-6

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 33

NSA 1-11

NSA 1-13

CEDAR LANE

CAPITAL BELTWAY

INTERSTATE 495

BARRIER SYSTEM 495 MD - 16

BARRIER SYSTEM 495 MD - 17

BARRIER SYSTEM 495 MD - 18

ROCKVILLE PIKE

NSA 2-07

NSA 1-12

NSA 2-08

R1-11-6 R1-11-7 R1-11-8 R1-11-9 R1-11-10 R1-11-11 R1-11-12 R1-11-13 R1-11-14 R1-11-15 R1-11-16

M1-11-3 M1-11-4

R1-13-1 R1-13-2 R1-13-3 R1-13-4

M1-13-1 M1-13-2

M2-7-1 M2-7-2 M2-7-3 M2-7-4 M2-7-5 M2-7-6

R2-7-1 R2-7-2 R2-7-3 R2-7-4 R2-7-5 R2-7-6 R2-7-7

M1-12-1 M1-12-2

R1-12-1 R1-12-2 R1-12-3 R1-12-4 R1-12-5 R1-12-6 R1-12-7 R1-12-8

M2-8-1 M2-8-2 M2-8-3 M2-8-4 M2-8-5 M2-8-6

R2-8-1 R2-8-2 R2-8-3 R2-8-4 R2-8-6

Montgomery County
Prince George's County

MONTGOMERY
PRINCE GEORGES

Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

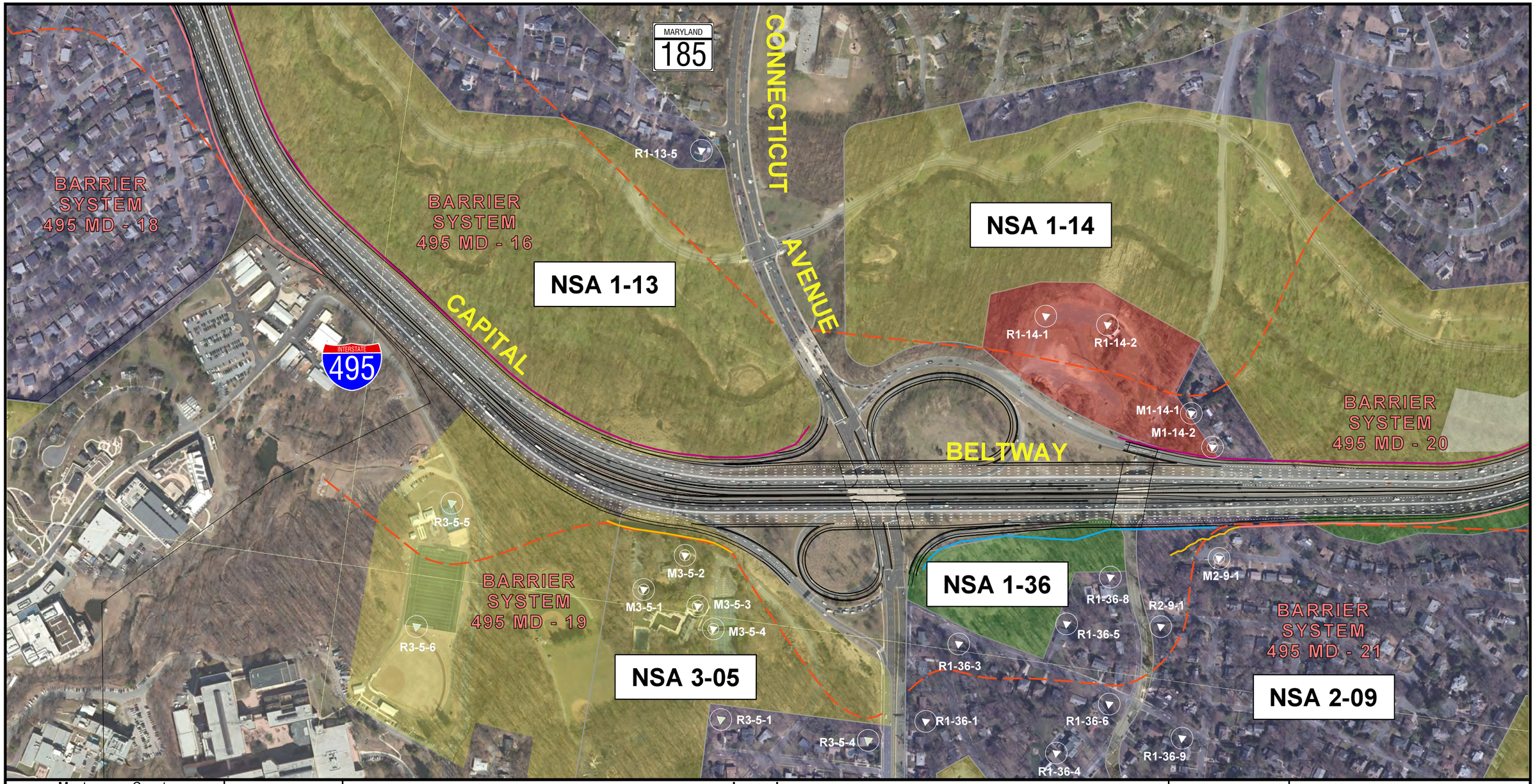
LAND USES AND RECEPTORS NSA 1-11, 1-12, 1-13, 2-7 & 2-8

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 34

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12-I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-34_8&4BB_cw4_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour

Legend

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-13, 1-14, 2-9 & 3-5

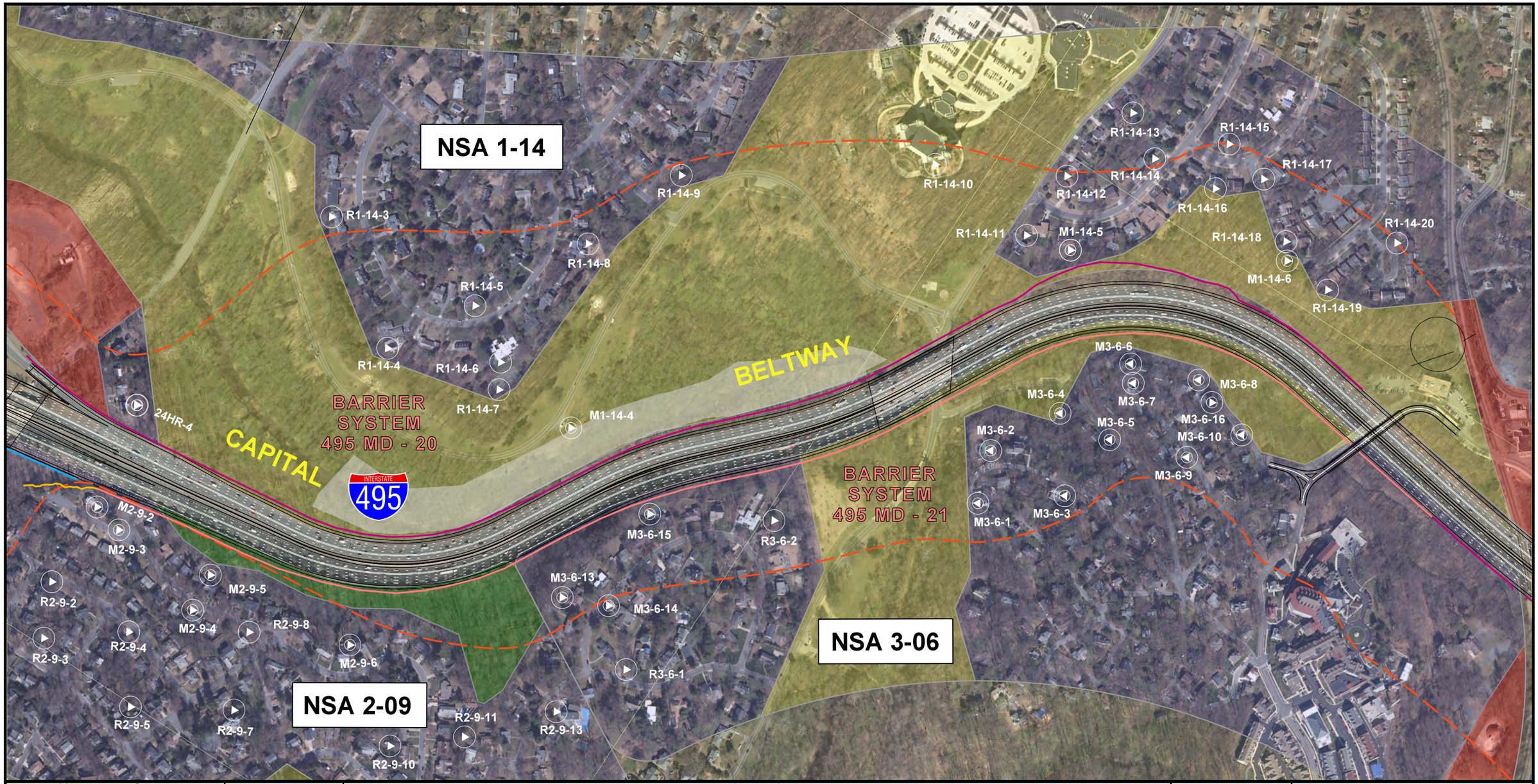
ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 35

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-35_8&4BB_cw4a_CAPBWNSE.dgn
5/14/2020

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:\SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-36_8&4BB_cw5_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

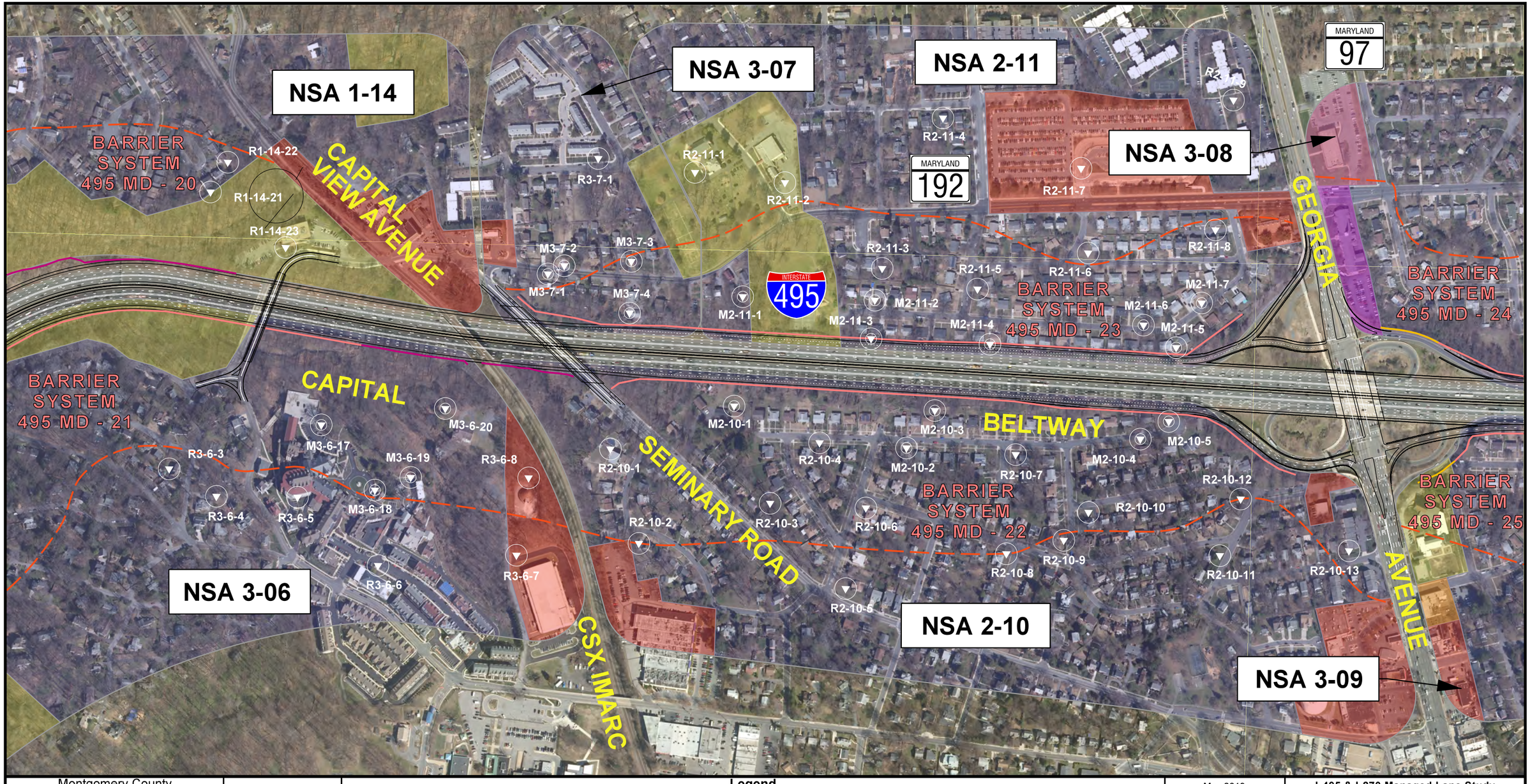
I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-14, 2-9 & 3-6

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 36



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-14, 2-10, 2-11, 3-6 & 3-7

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 37

pw:\\shawmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseT1_TNAR 2019\CADD\pNA-37_8&4BB_cw6_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

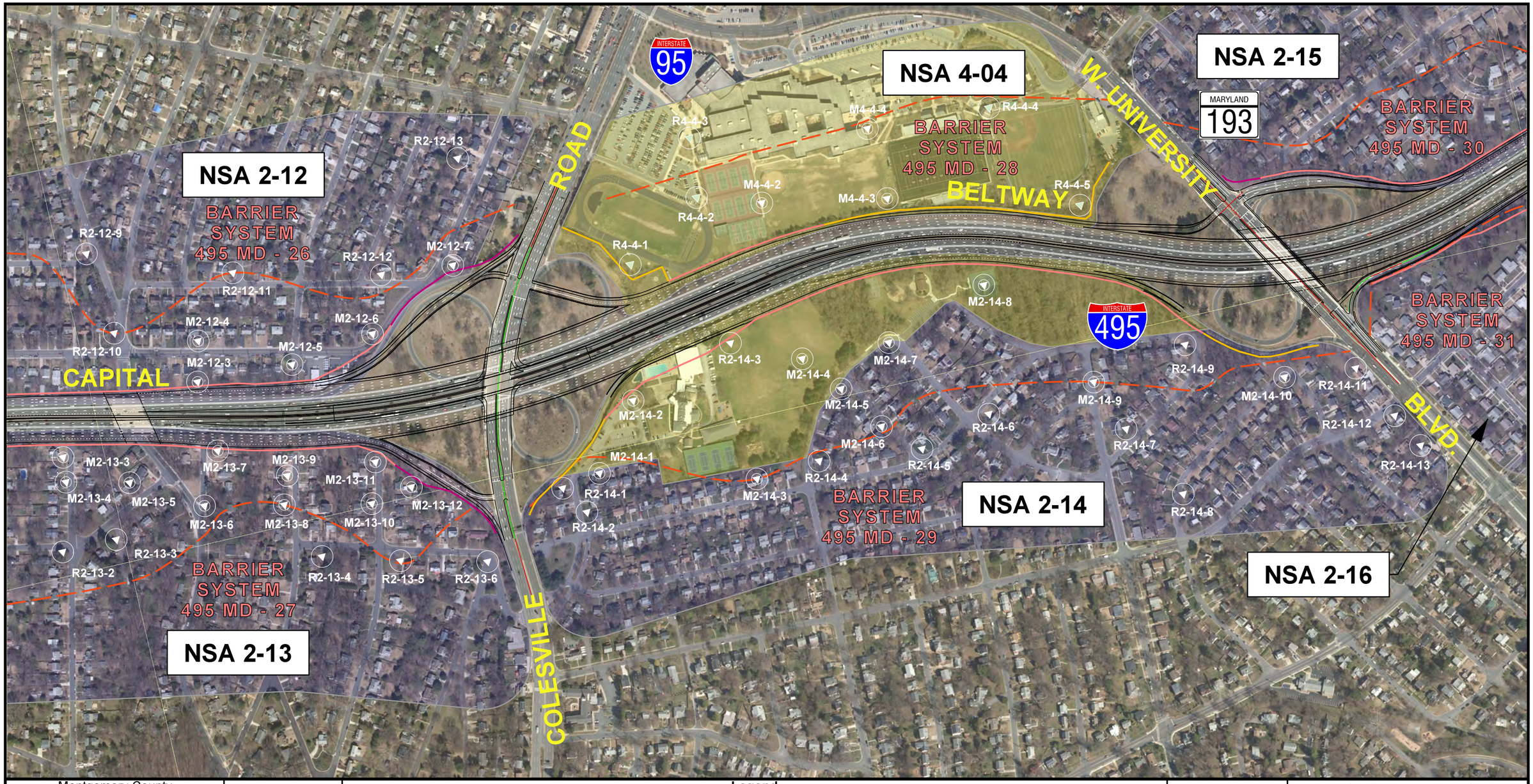
LAND USES AND RECEPTORS
NSA 2-12, 2-13
3-8, 3-9, 4-2 & 4-3

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 38

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12-I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-38_8&4BB_cw6a_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour

Legend

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

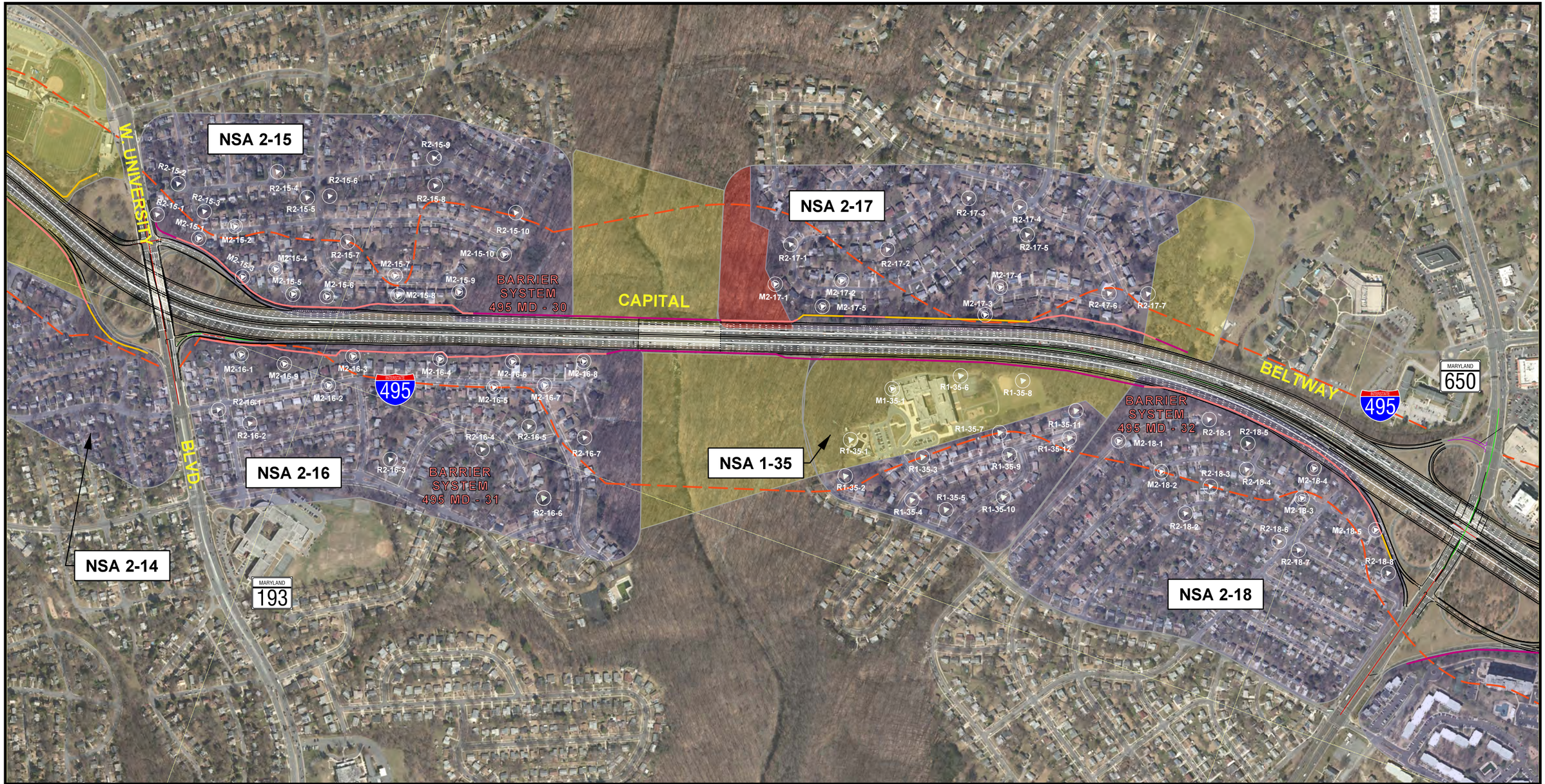
LAND USES AND RECEPTORS
NSA 2-12, 2-13, 2-14 & 4-4

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 39

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I-495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-39_8&4BB_cw7_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour

Legend

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

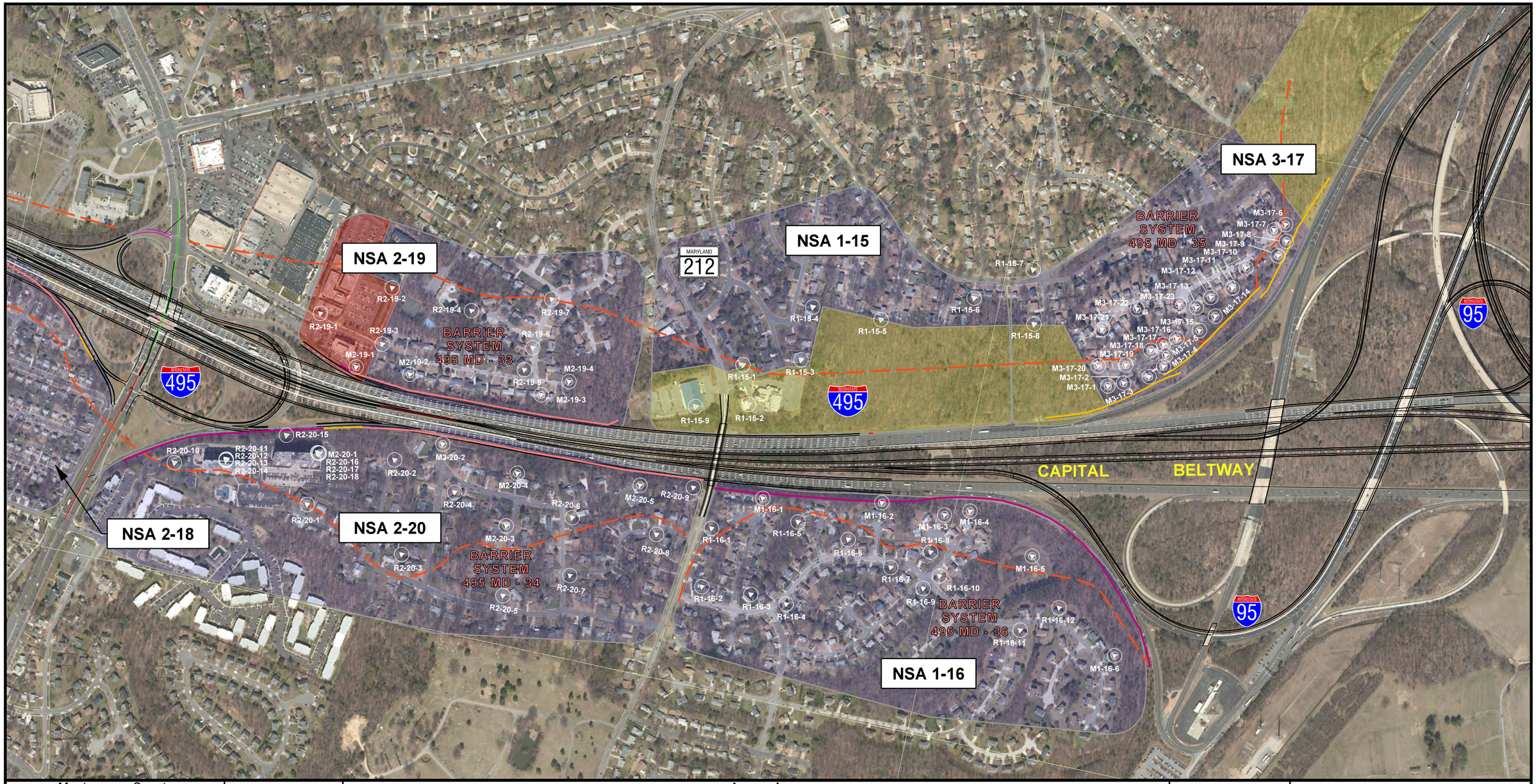
LAND USES AND RECEPTORS
NSA 1-35, 2-15, 2-16, 2-17 & 2-18

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 40

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:\SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-40_8&4BB_cvr9_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour

Legend

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

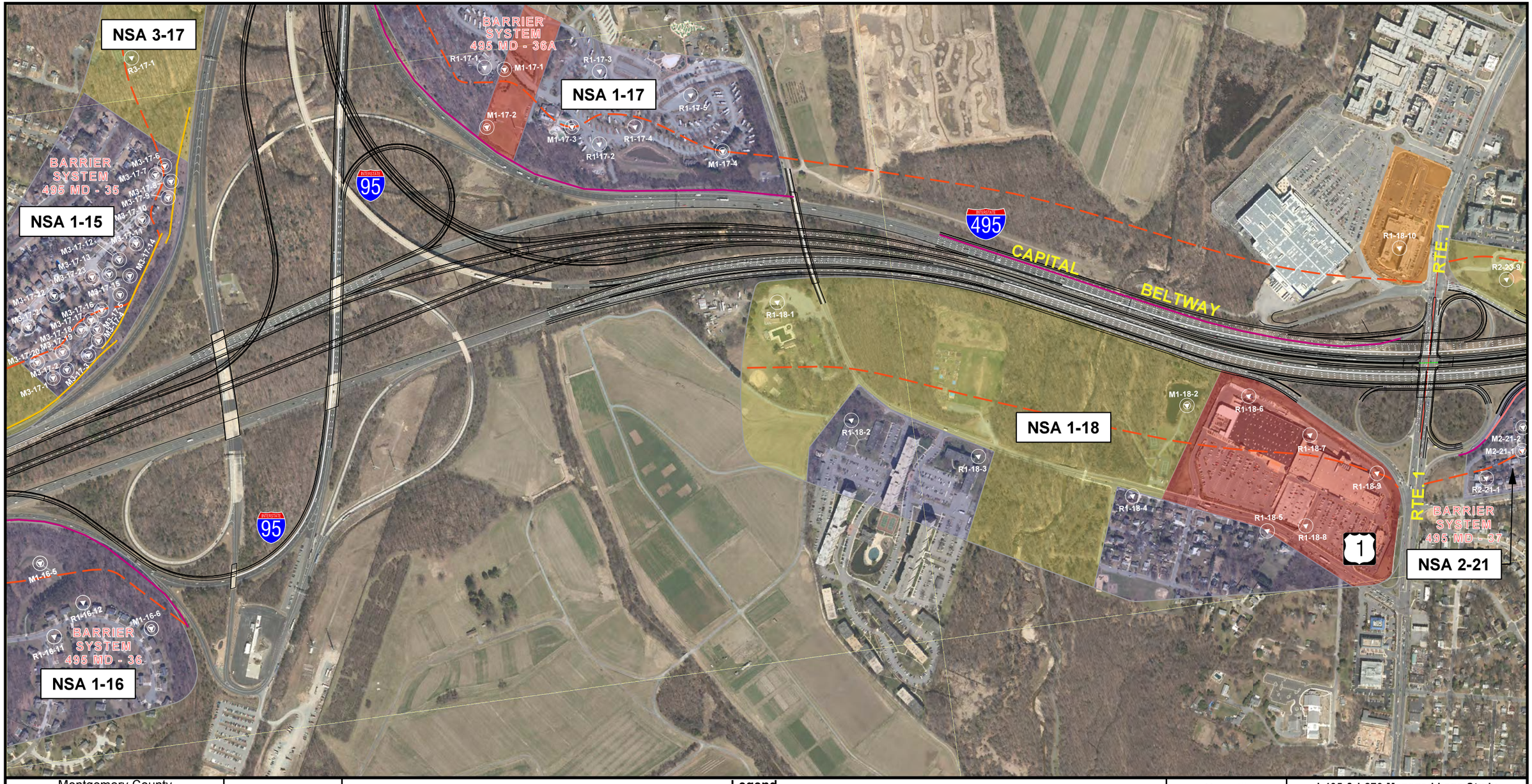
LAND USES AND RECEPTORS
NSA 1-15, 1-16, 2-19, 2-20 & 3-17

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 41

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA41_8&4BB_115_116_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

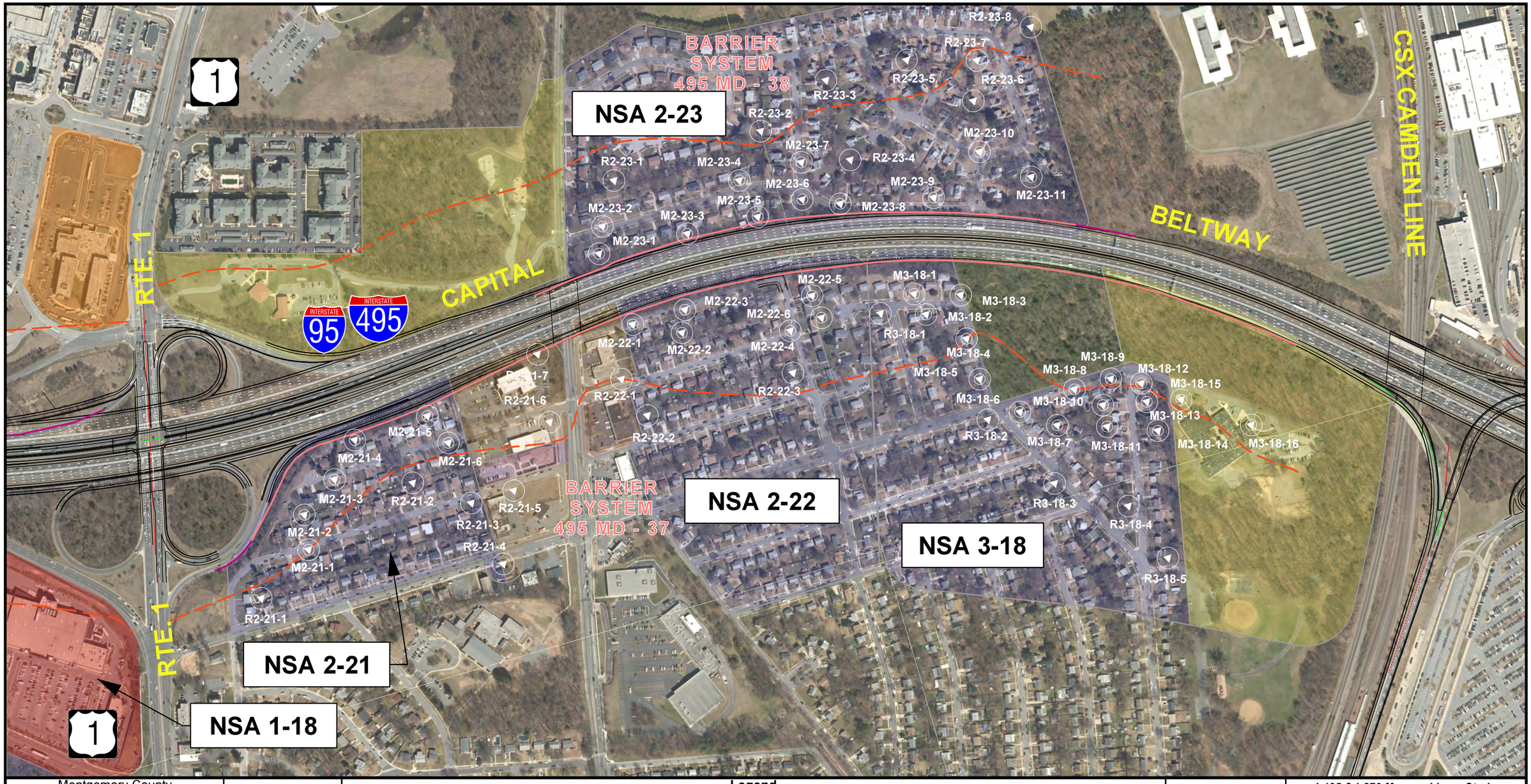
LAND USES AND RECEPTORS NSA 1-17 & 1-18

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 41A

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-41A_&&4BB_115_116_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 2-21, 2-22
2-23 & 3-18

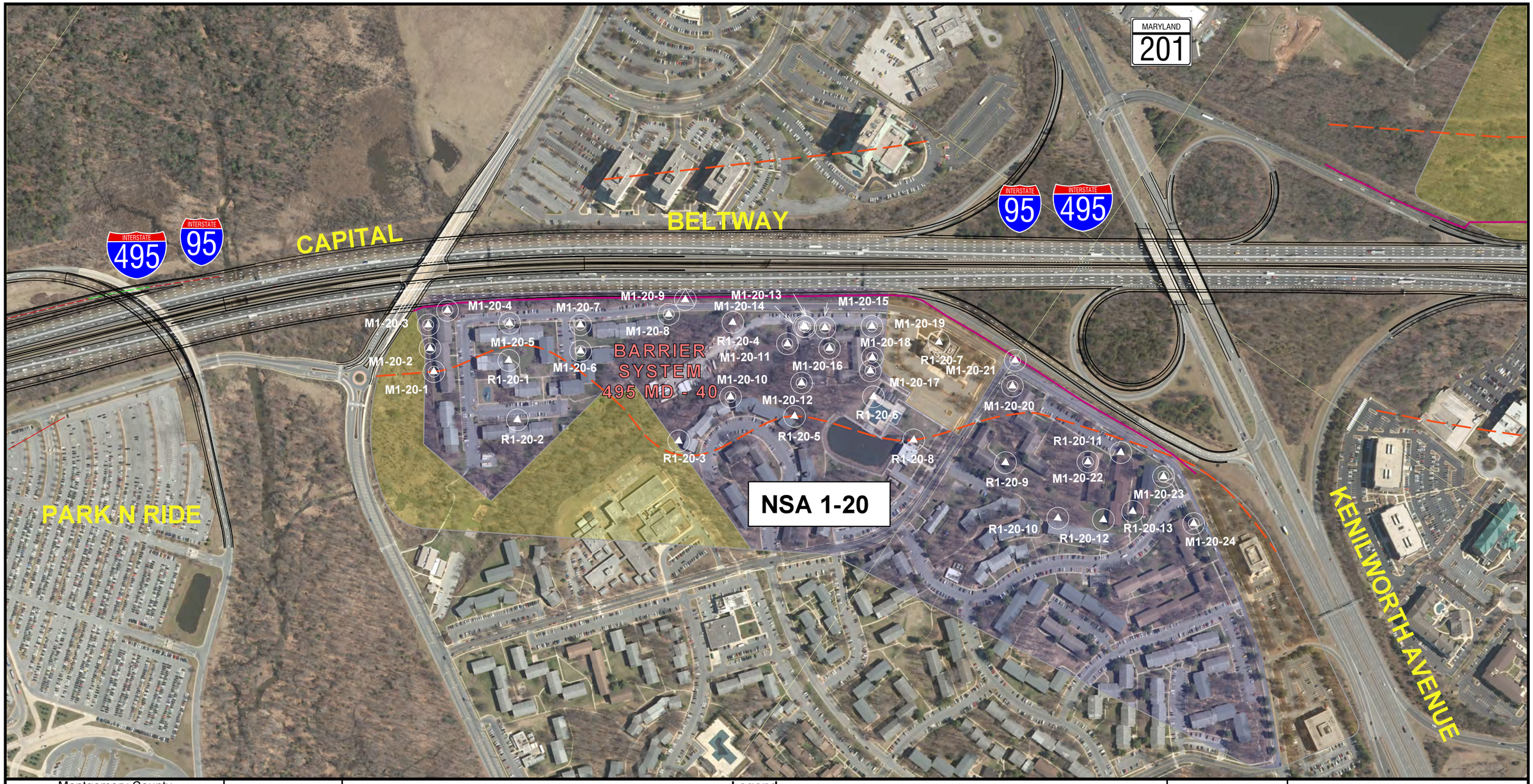
ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 42

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-42_8&4BB_119_221_222_223_CAPBWNSE.dgn
5/15/2020

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12-I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-43_8&4BB_120_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

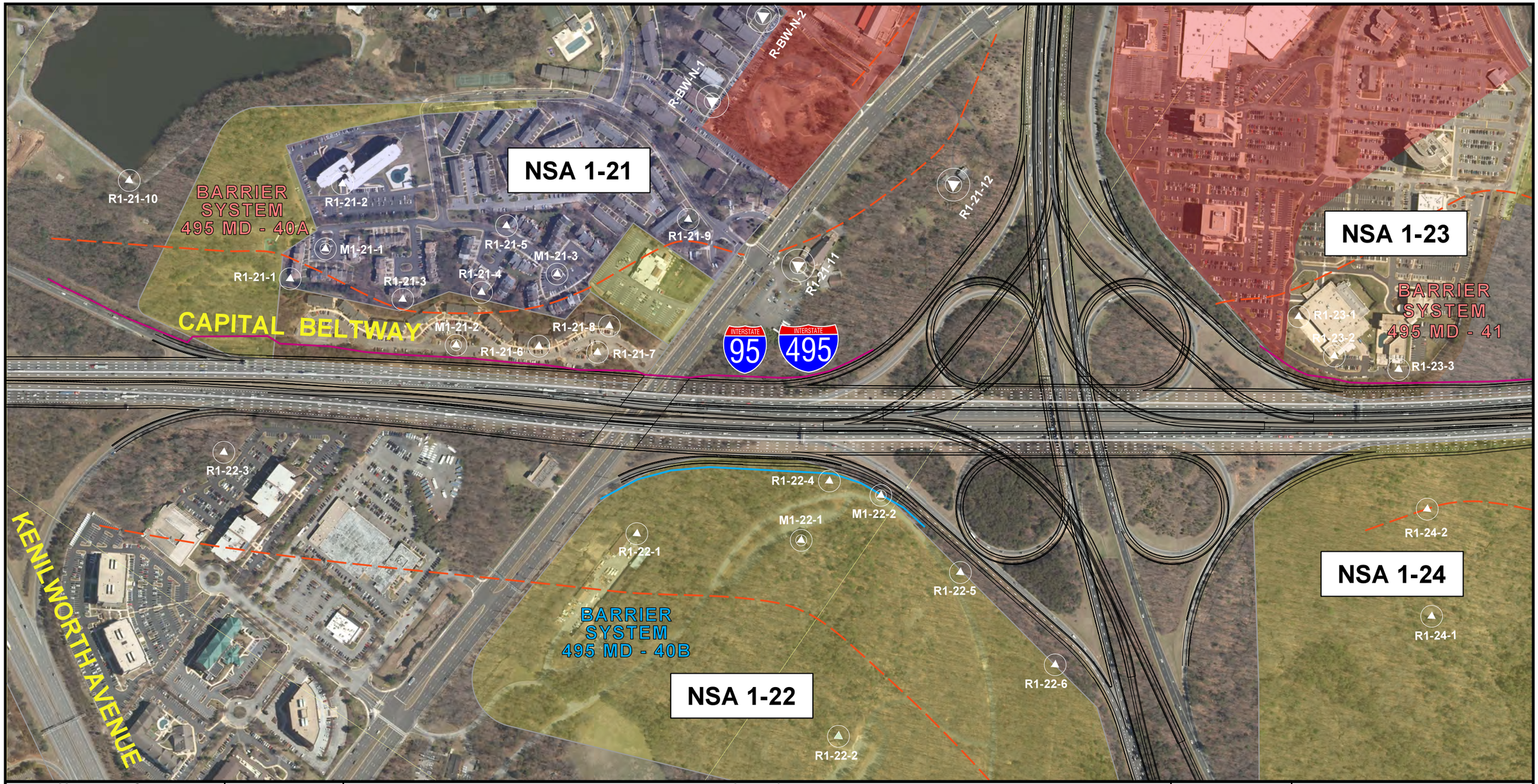
I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-20

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 43



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

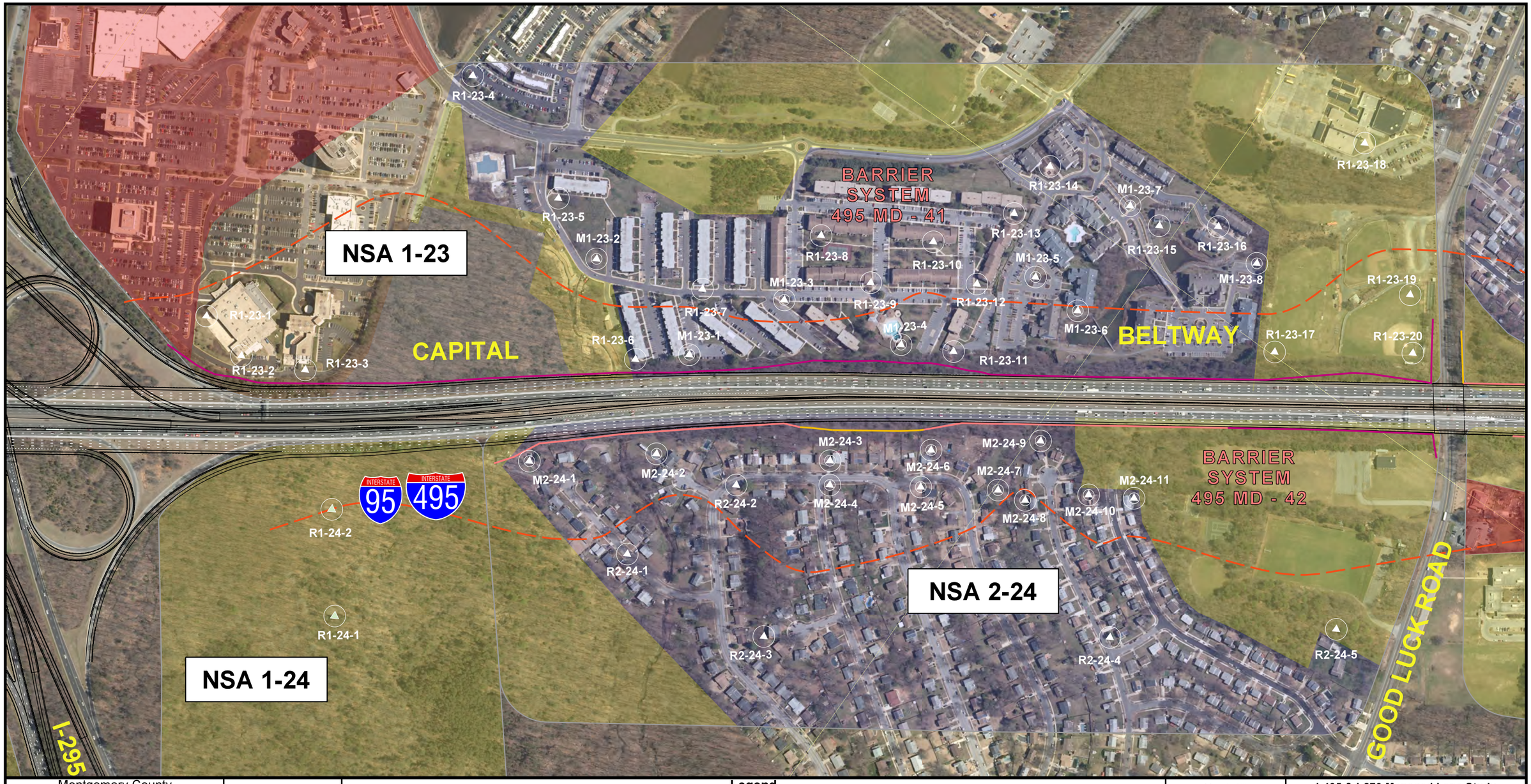
LAND USES AND RECEPTORS
NSA 1-21 & 1-22

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 43A

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseT1_TNAR 2019\CADD\pNA-43A_&&2BB_120_CAPBWNSE.dgn
5/14/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

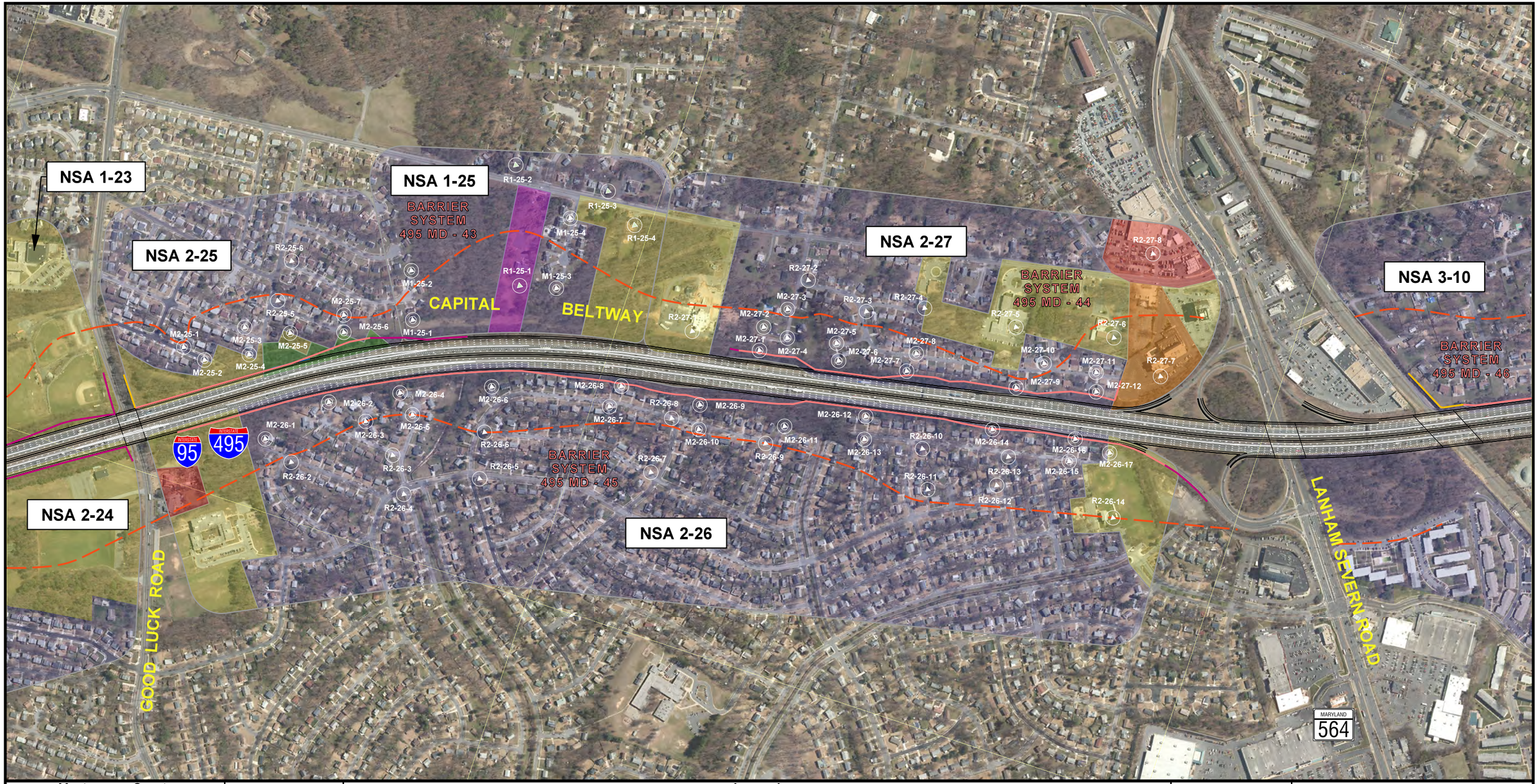
LAND USES AND RECEPTORS NSA 1-23, 1-24 & 2-24

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 44

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseT1_TNAR 2019\CADD\pNA-44_8&4BB_123_124_224_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

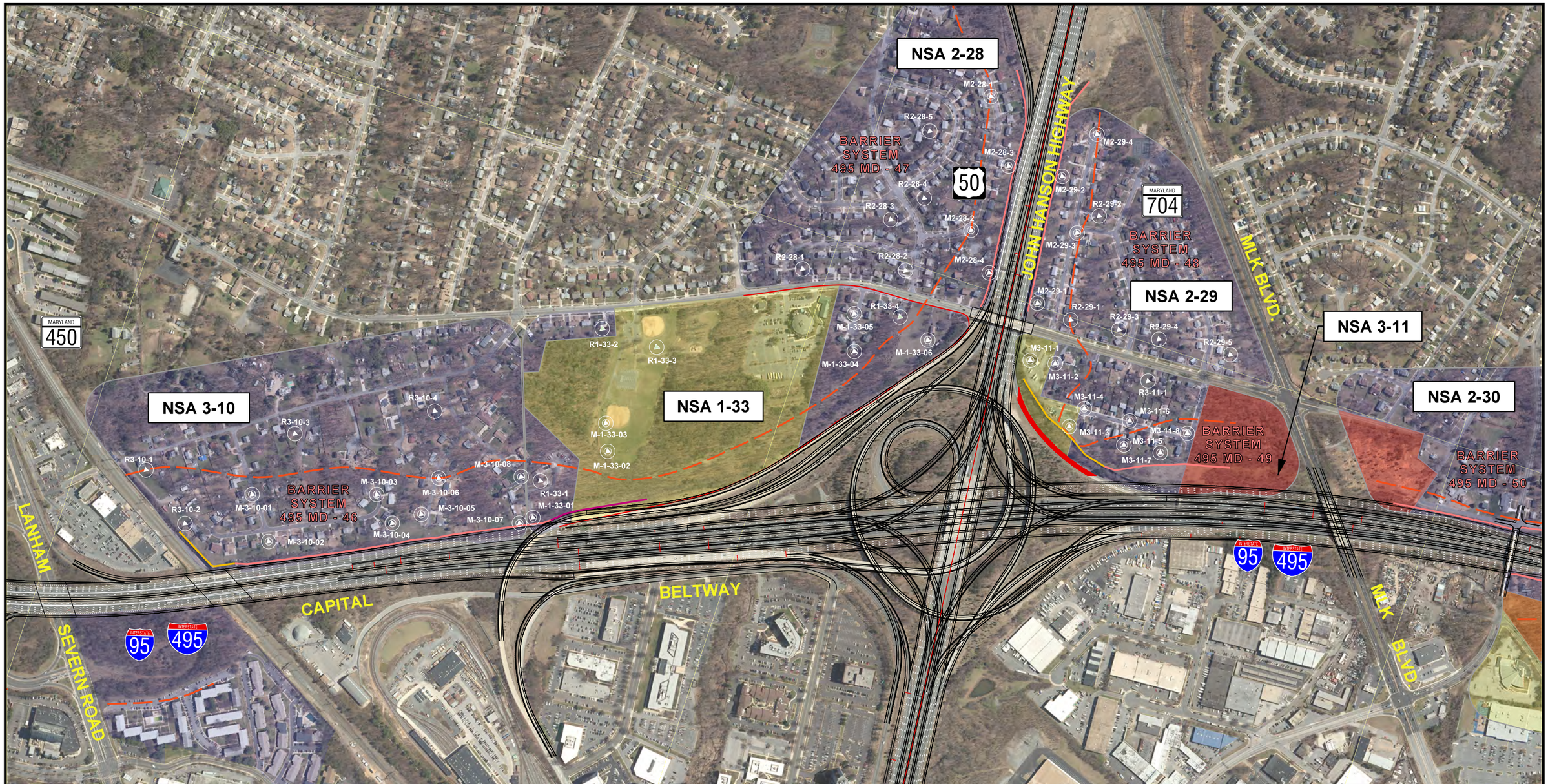
LAND USES AND RECEPTORS NSA 1-25, 2-25, 2-26 & 2-27

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 45

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-45_8&8BB_125_225_226_227_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

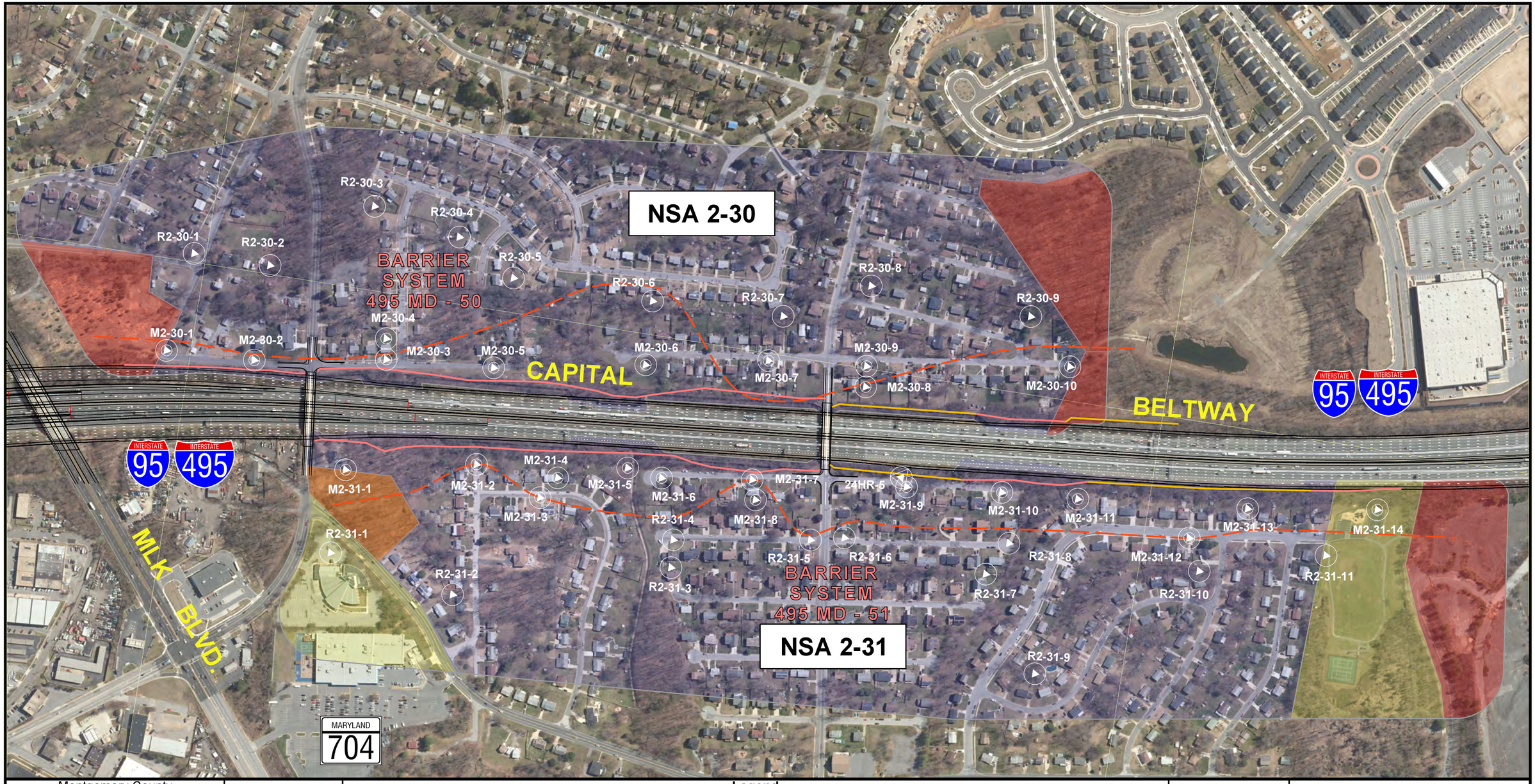
LAND USES AND RECEPTORS
NSA 1-33, 2-28, 2-29, 3-10 & 3-11

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 46

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseT1_TNAR 2019\CADD\pNA-46_8&8BB_310_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 2-30 & 2-31

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 47

pw:\\shavmpwx.shacadd.ad.mdot.mdstate\SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-47_8&4BB_230_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour

Legend

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 3-12

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 48

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I-495-I-270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-48_8&4BB_312_CAPBWNSE.dgn
5/15/2020

Aerial image does not include new townhome construction. Lots are shown to give approximate location of the townhomes.

NSA 1-26

R1-26-1
R1-26-2
R1-26-3
R1-26-4
R1-26-5
R1-26-6
R1-26-7
R1-26-8
R1-26-9
R1-26-10
R1-26-11
R1-26-12
R1-26-13
R1-26-14
R1-26-15
R1-26-16
R1-26-17
R1-26-18
R1-26-19 (ELEV 17')
R1-26-20
R1-26-21 (ELEV 17')
R1-26-22
R1-26-23 (ELEV 17')
R1-26-24
R1-26-25
M1-26-1
M1-26-2
M1-26-3
M1-26-4
24HR-6

BARRIER SYSTEM 495 MD - 53

CENTRAL AVENUE

CAPITAL BELTWAY

INTERSTATE 95
INTERSTATE 495

Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA 1-26

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 49

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12_7 NEPA\12_7_6 NEPA Process and Documentation\12_7_6_9 NoiseIT1_TNAR 2019\CADD\pNA-49_8&48B_126_CAPBWNSE.dgn
5/14/2020

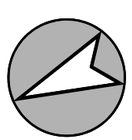
pw:\\shavmpwx.shacadd.ad.mdot.mdstate:\SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-49A_8&4BB_126_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map



0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA 1-26

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 49A



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-28, 1-29, & 3-13

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 50

pw:\\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseT1_T
5/15/2020

CAPITAL BELTWAY

M1-27-1
R1-27-1
M1-27-2
M1-27-3
R1-27-2
R1-27-3
M1-27-4
R1-27-4
R1-27-5
R1-27-6

NSA 1-27

INTERSTATE 95
INTERSTATE 495

Montgomery County
Prince George's County

MONTGOMERY
PRINCE GEORGES

Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

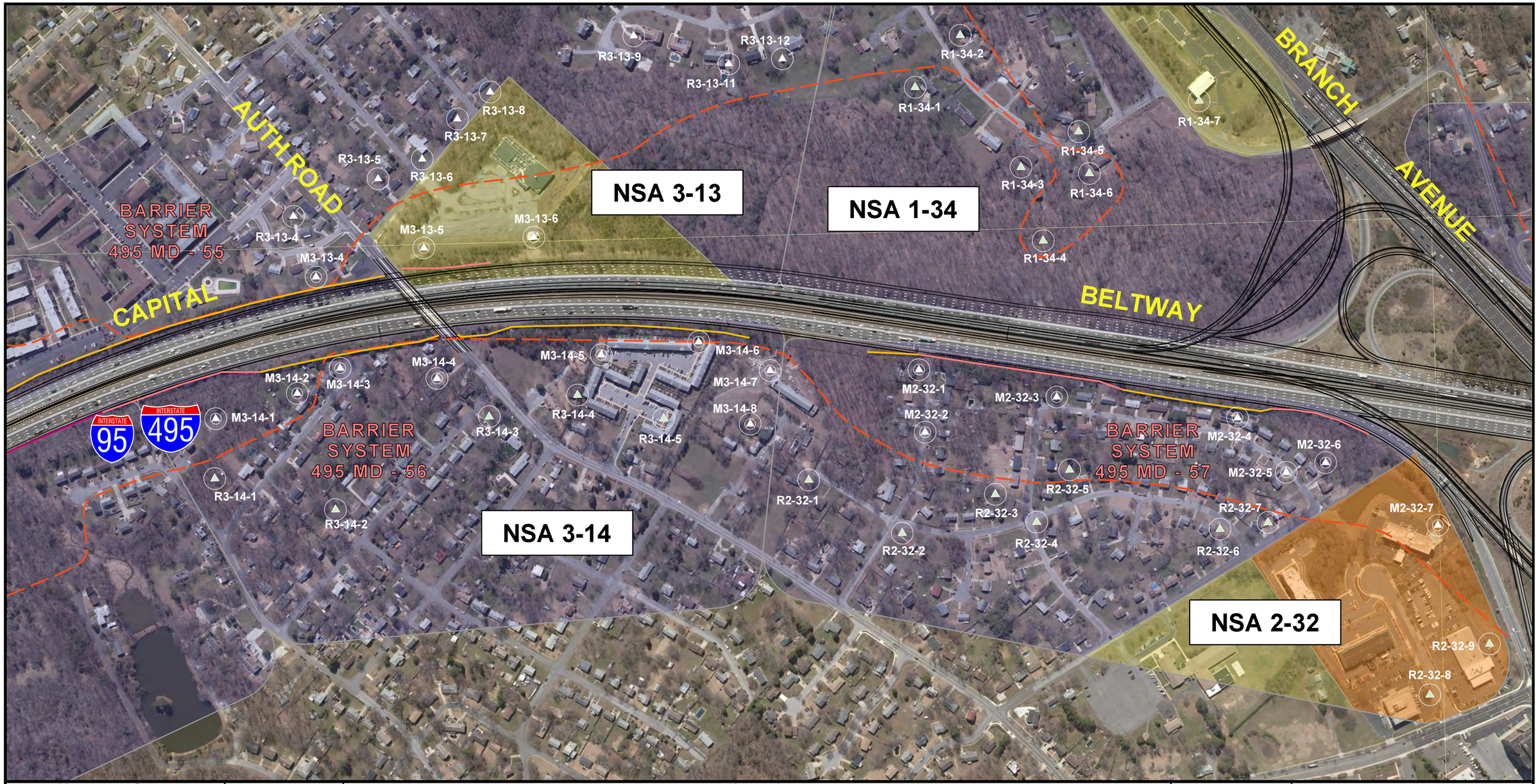
LAND USES AND RECEPTORS
NSA 1-27

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 50A

pw:\\shampwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-50A_8&4BB_12B_12B_313_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSA 1-34, 3-13, 3-14 & 2-32

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 51

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-51_8&4BB_134_232_313_314_CAPBWNSE.dgn
5/15/2020

Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA 3-15 & 3-16

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 51A

pw:\\shavmpww.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 NoiseT1_TNAR 2019\CADD\pNA-51A_8848B_134_232_313_314_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 600
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

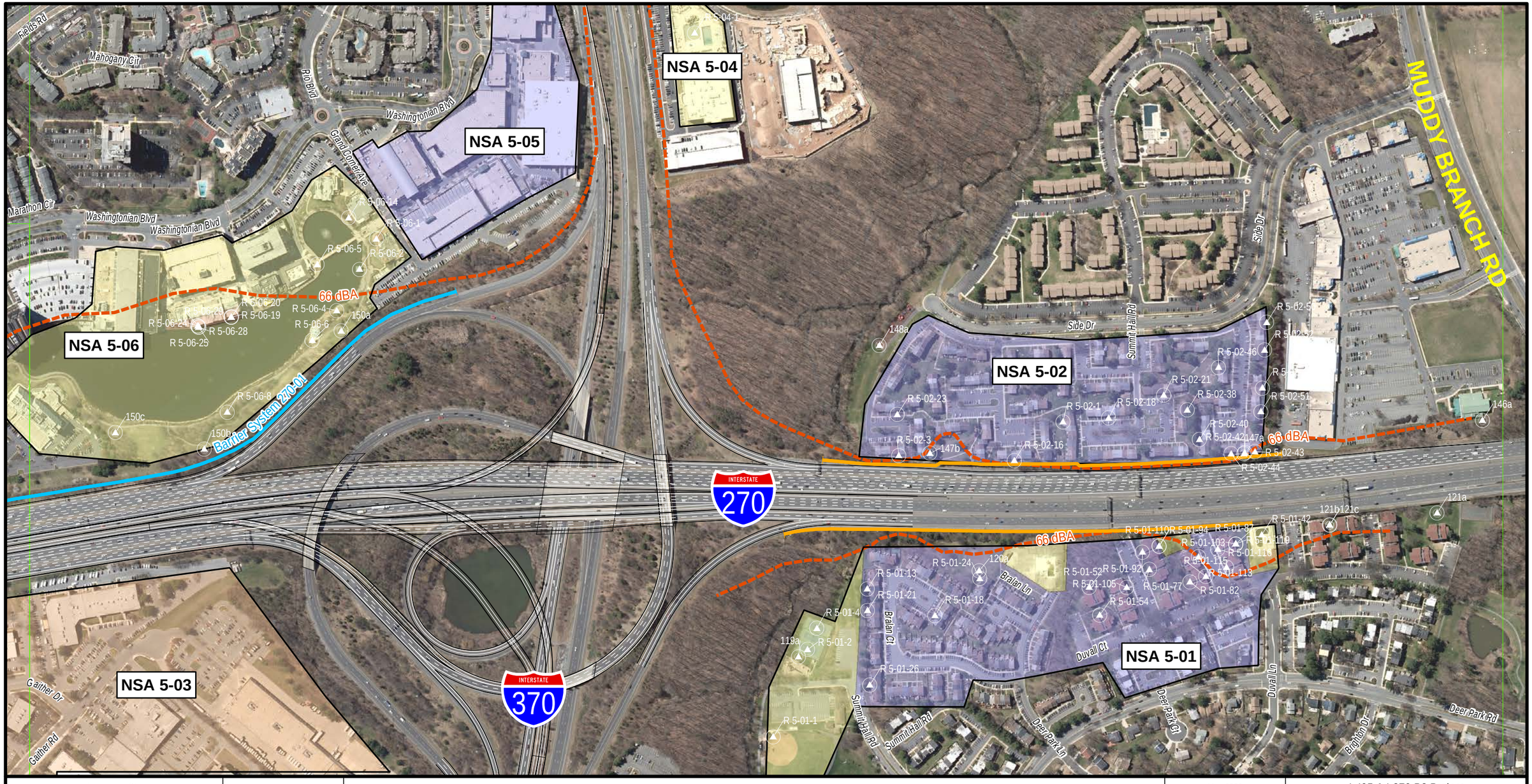
LAND USES AND RECEPTORS
NSA 3-16

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 52

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I-495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-52_8&4BB_130_131_132_CAPBWNSE.dgn
5/15/2020



Montgomery County
Prince George's County



Vicinity Map

0 390
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site

- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

May 2020

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 P3 Project

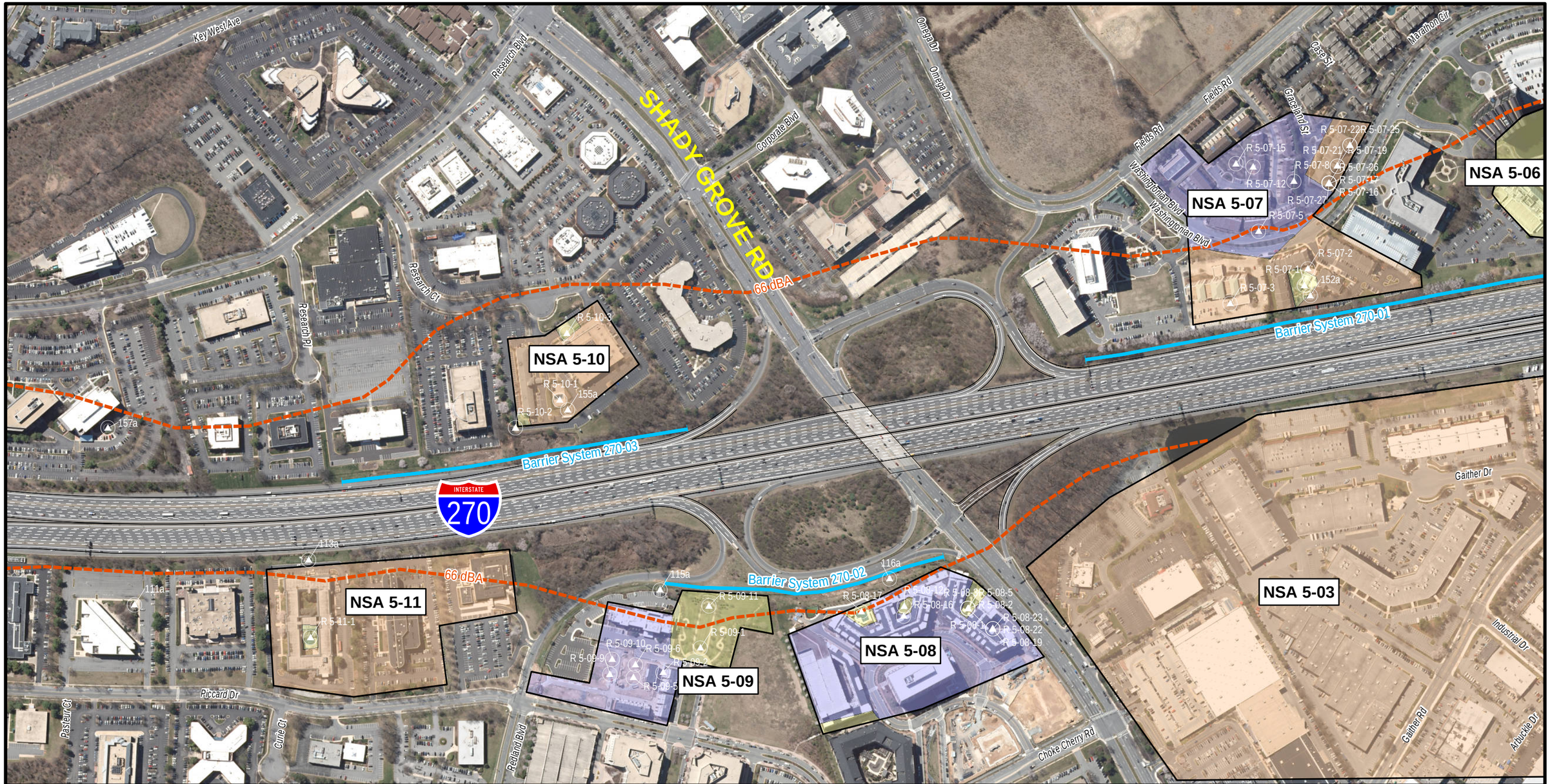
LAND USES AND RECEPTORS NSA 5-01 to 5-06

ALTERNATIVES 5 and 13B BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-53

Document Path: \\fs1\vol1\Projects\309XXX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_Alt&2_Sheet_Layout.mxd
Date Saved: 12/18/2019 1:00:33 PM



Montgomery County
Prince George's County



Vicinity Map

0 390
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

May 2020

Maryland
Department of Transportation
State Highway Administration

Office of
Planning and Preliminary
Engineering

Environmental Planning
Division

Noise Abatement Design
& Analysis Team

I-495 & I-270 P3 Project

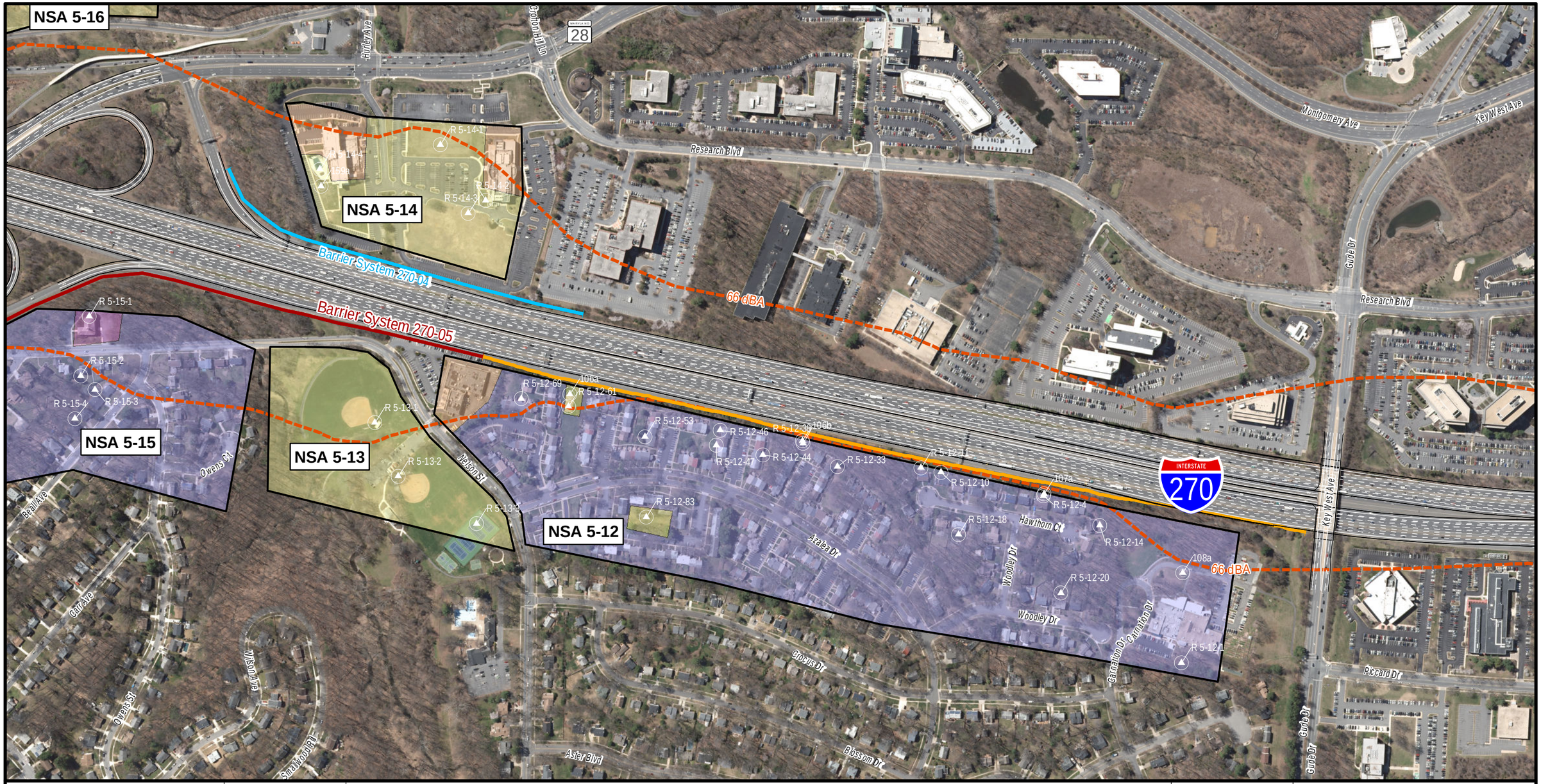
LAND USES AND RECEPTORS
NSA 5-07 to 5-11

ALTERNATIVES 5 and 13B
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-54

Document Path: \\fs1\vol1\Projects\309XXX\309800_MDOT_Statewide_Engineering_Services\001_1495_I270\GIS\309800_001_MDOT_Alt8&2_Sheet_Layout.mxd
Date Saved: 5/11/2020 6:25:24 PM



Montgomery County
Prince George's County



Vicinity Map

0 390
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

August 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 P3 Project

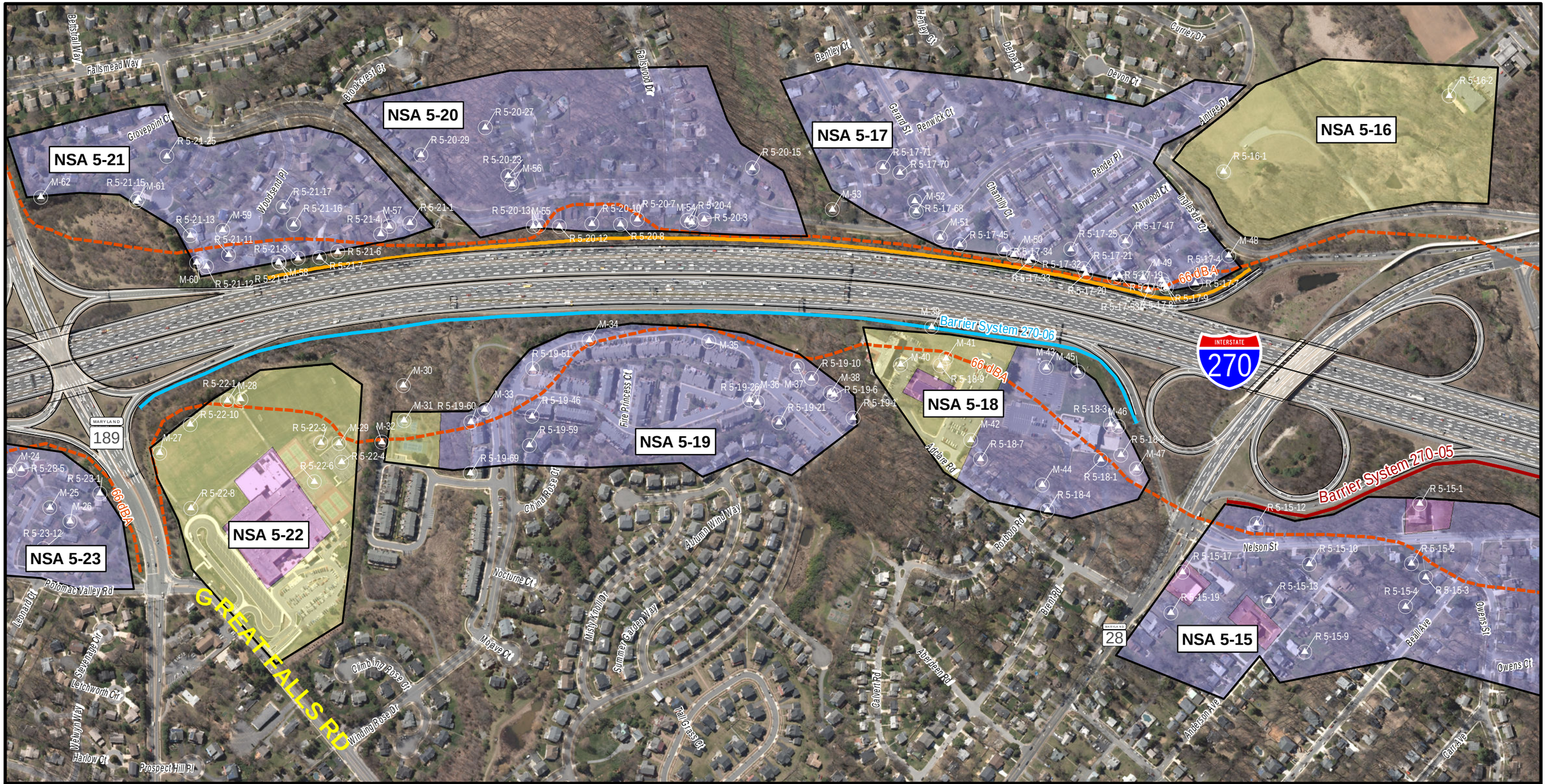
LAND USES AND RECEPTORS NSA 5-12 to 5-14

ALTERNATIVES 5 and 13B BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-55

Document Path: G:\Projects\309XXX\309800_MDOT_Statewide_Engineering_Services\001_1495_I270\GIS\309800_001_MDOT_Alt8&2_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:30:27 PM



Montgomery County
Prince George's County



Vicinity Map

0 390
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

August 2019

Maryland
Department of Transportation
State Highway Administration

Office of
Planning and Preliminary
Engineering

Environmental Planning
Division

Noise Abatement Design
& Analysis Team

I-495 & I-270 P3 Project

LAND USES AND RECEPTORS
NSA 5-15 to 5-22

ALTERNATIVES 5 and 13B
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-56

Document Path: G:\Projects\309XXX\309800_MDOT_Statewide_Engineering_Services\001_1495_I270\GIS\309800_001_MDOT_Alt8&2_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:30:27 PM



Montgomery County
Prince George's County



Vicinity Map

0 390
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

August 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 P3 Project

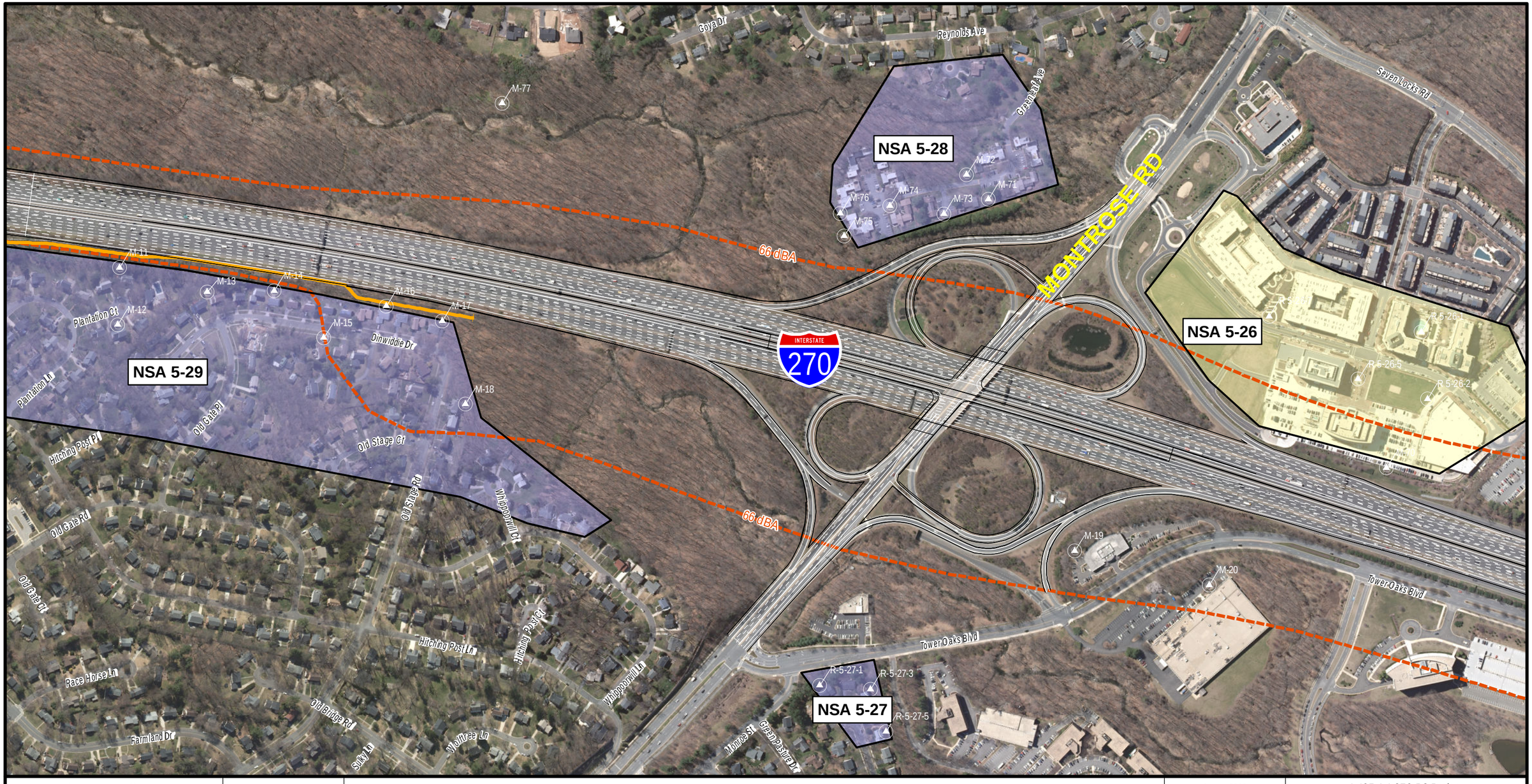
LAND USES AND RECEPTORS NSA 5-23 to 5-26

ALTERNATIVES 5 and 13B BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-57

Document Path: G:\Projects\309XXX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_Alt8&2_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:30:27 PM



Montgomery County
Prince George's County



Vicinity Map

0 390
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

August 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 P3 Project

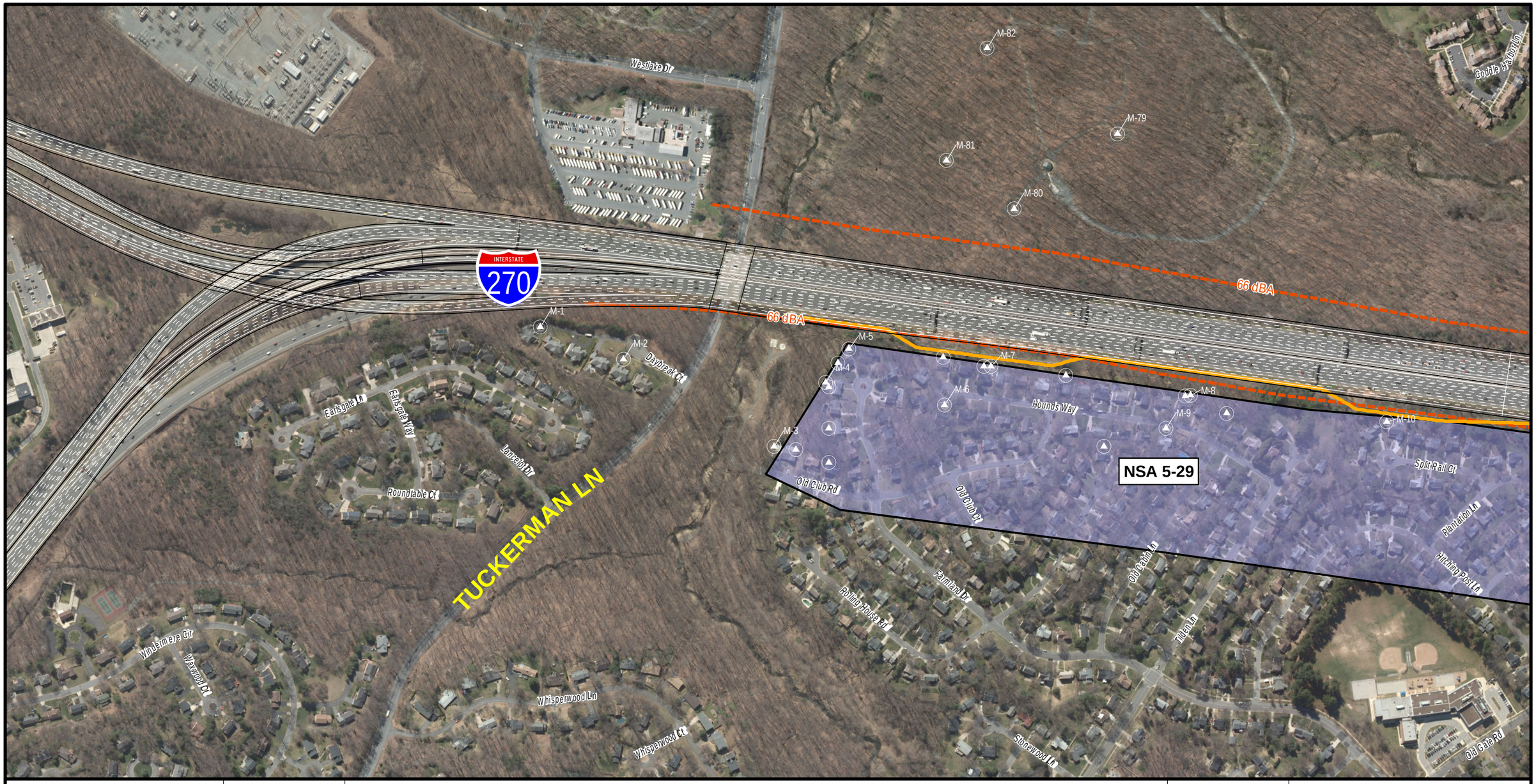
LAND USES AND RECEPTORS
NSA 5-26 to 5-27

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-58

Document Path: G:\Projects\309XXX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_Alt8&2_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:30:27 PM



Montgomery County
Prince George's County



Vicinity Map

0 390
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

August 2019

Maryland
Department of Transportation
State Highway Administration

Office of
Planning and Preliminary
Engineering

Environmental Planning
Division

Noise Abatement Design
& Analysis Team

I-495 & I-270 P3 Project

LAND USES AND RECEPTORS

ALTERNATIVE 5
BUILD NOISE CONDITIONS

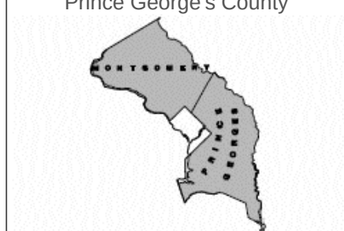
Land Uses and Representative Receptors

Map-59

Document Path: G:\Projects\309XX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_All8&2_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:30:27 PM



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSAs 112-E, 113-E, 114-E,133-B, 134-B, 135-B, 136-B & 201-B;
Non-Sensitive Areas F-101 & F206;
Undeveloped Areas G-102 & G-106

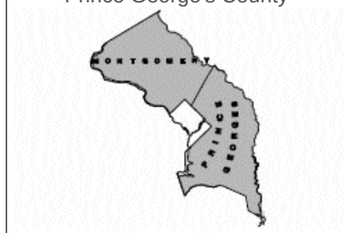
ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors


NSA 5-33
NSA 5-34
TUCKERMAN LANE
VALERIAN LANE
INTERSTATE 270
OLD GEORGETOWN ROAD MD. ROUTE 187
ROCK SPRING DRIVE
GROSVENOR LANE
Bethesda Trolley
BARRIER SYSTEM 270 - 8
BARRIER SYSTEM 270 - 9
BARRIER SYSTEM 270 - 9
131-B
130-B
129-B
128-B
127-D
126-C
125-B
124-B
G-105
G-104
132-C
116-B
115-B
117-B
118-B
Montgomery County
Prince George's County
Vicinity Map
0
400
Scale in Feet
Existing Barrier to Remain
Feasible and Reasonable
Not Feasible and Reasonable
Existing Barrier to be Replaced
Legend
Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
Land Use Activity Category D Noise Sensitive Area (INTERIOR)
Noise Measurement Receptor Site
M1-1
Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
Land Use Activity Category F Non-Noise Sensitive Area
Land Use Activity Category G Non-Noise Sensitive Area
Modeled Receptor
R1-1
May 2019
Maryland Department of Transportation State Highway Administration
Office of Planning and Preliminary Engineering
Environmental Planning Division
Noise Abatement Design & Analysis Team
I-495 & I-270 Managed Lane Study
LAND USES AND RECEPTORS
NSAs 115-B, 116-C,125-B, 126-C, 127-D, 128-B, 129-B, 130-B,131-B & 132-C; Undeveloped Areas G-104 & G-105
ALTERNATIVE 5
BUILD NOISE CONDITIONS
Land Uses and Representative Receptors



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

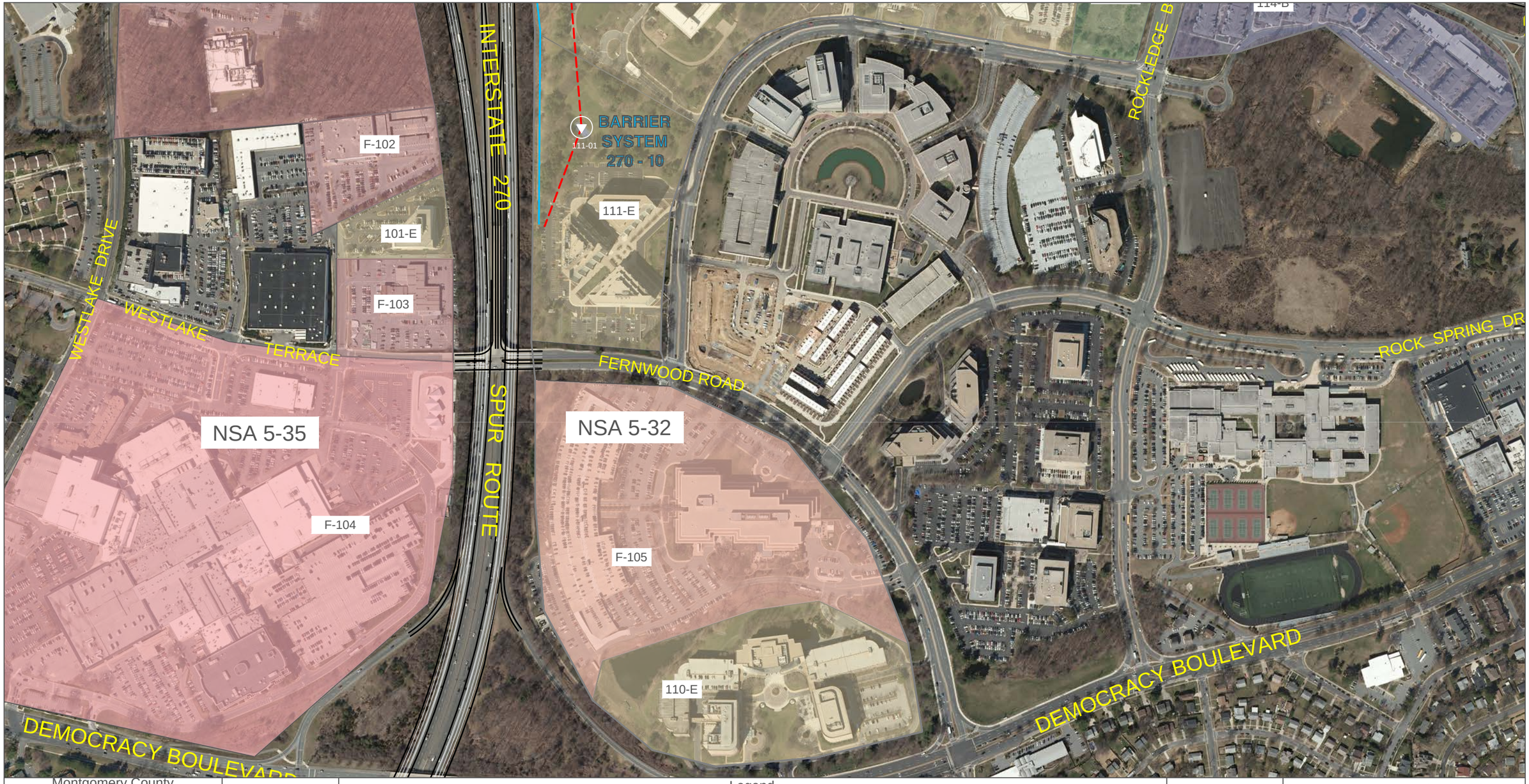
Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSAs 117-B, 118-C,121-B, 122-B, 123-B, 1223A-B, 124-B, 125-B & 126-C; Undeveloped Areas G-103 & G-104

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

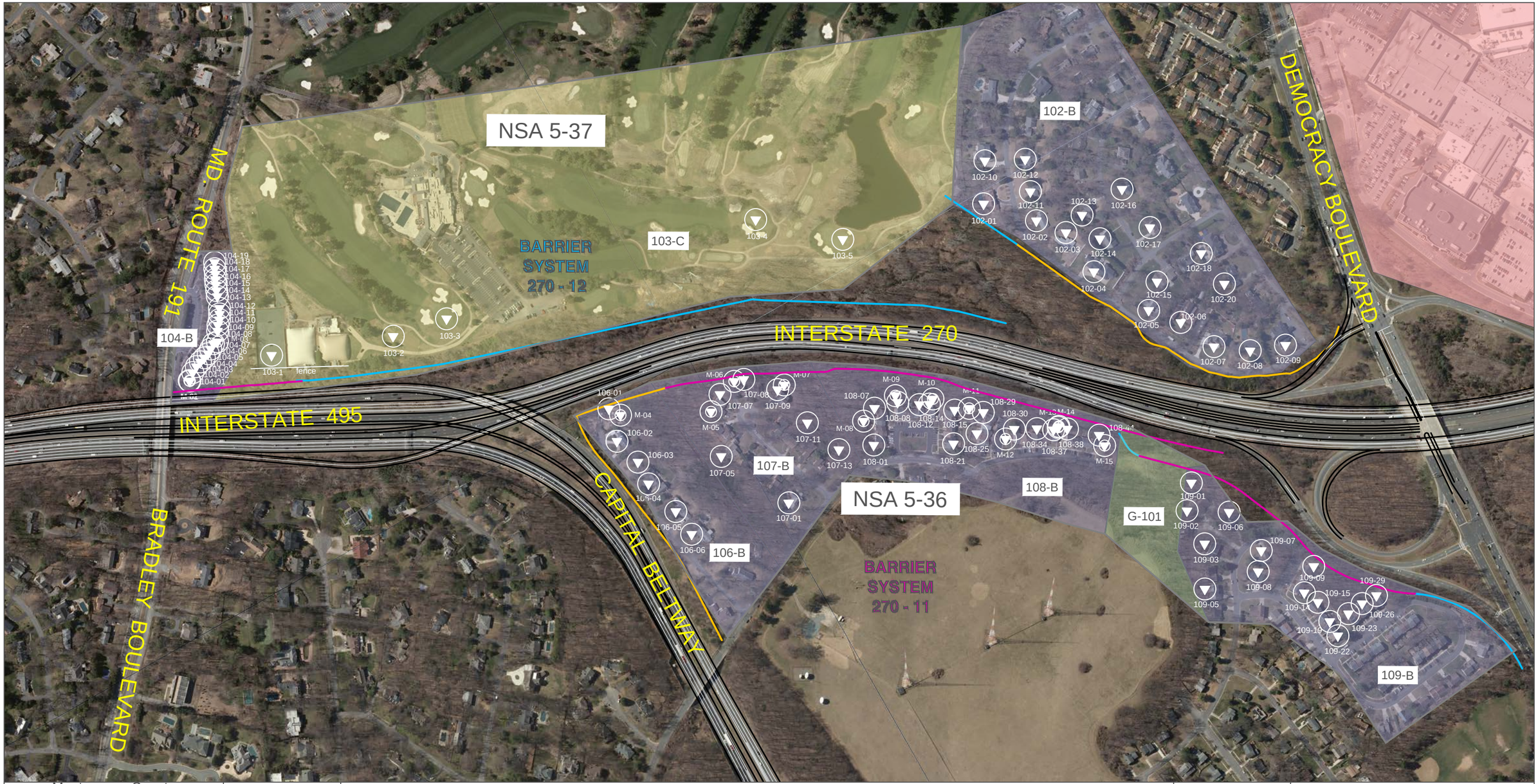
Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

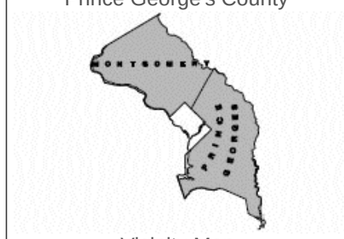
LAND USES AND RECEPTORS
NSAs 101-E, 110-E & 111-E;
Non-Sensitive Areas F-102,
F-103, F-104 & F-105

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Noise Measurement Receptor Site (M1-1)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- Modeled Receptor (101-1)

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

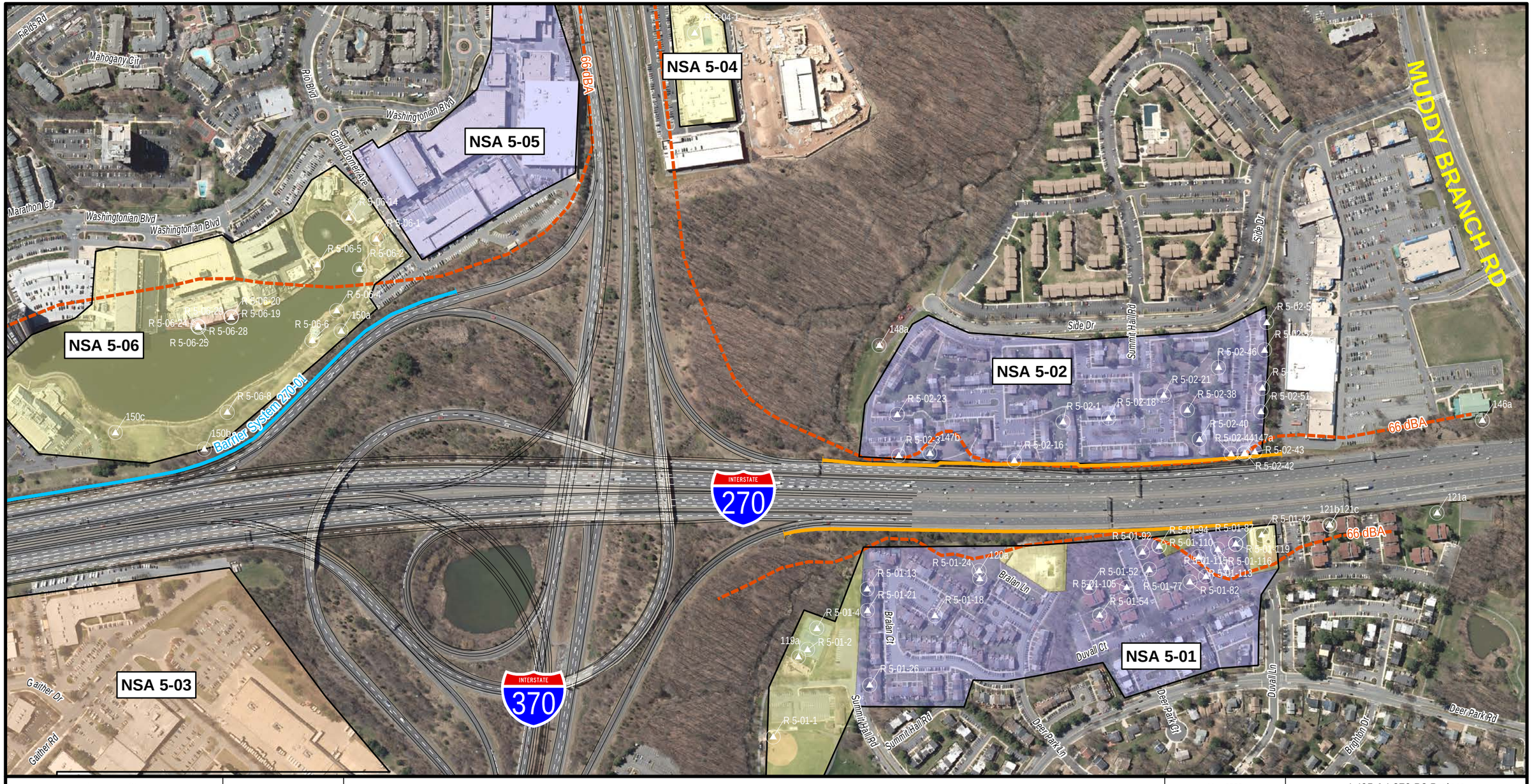
Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSAs 102-B, 103-C,104-B, 106-B, 107-B, 108-B & 109-B;
Undeveloped Area G-101

ALTERNATIVE 5
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site

- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

May 2020

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 P3 Project

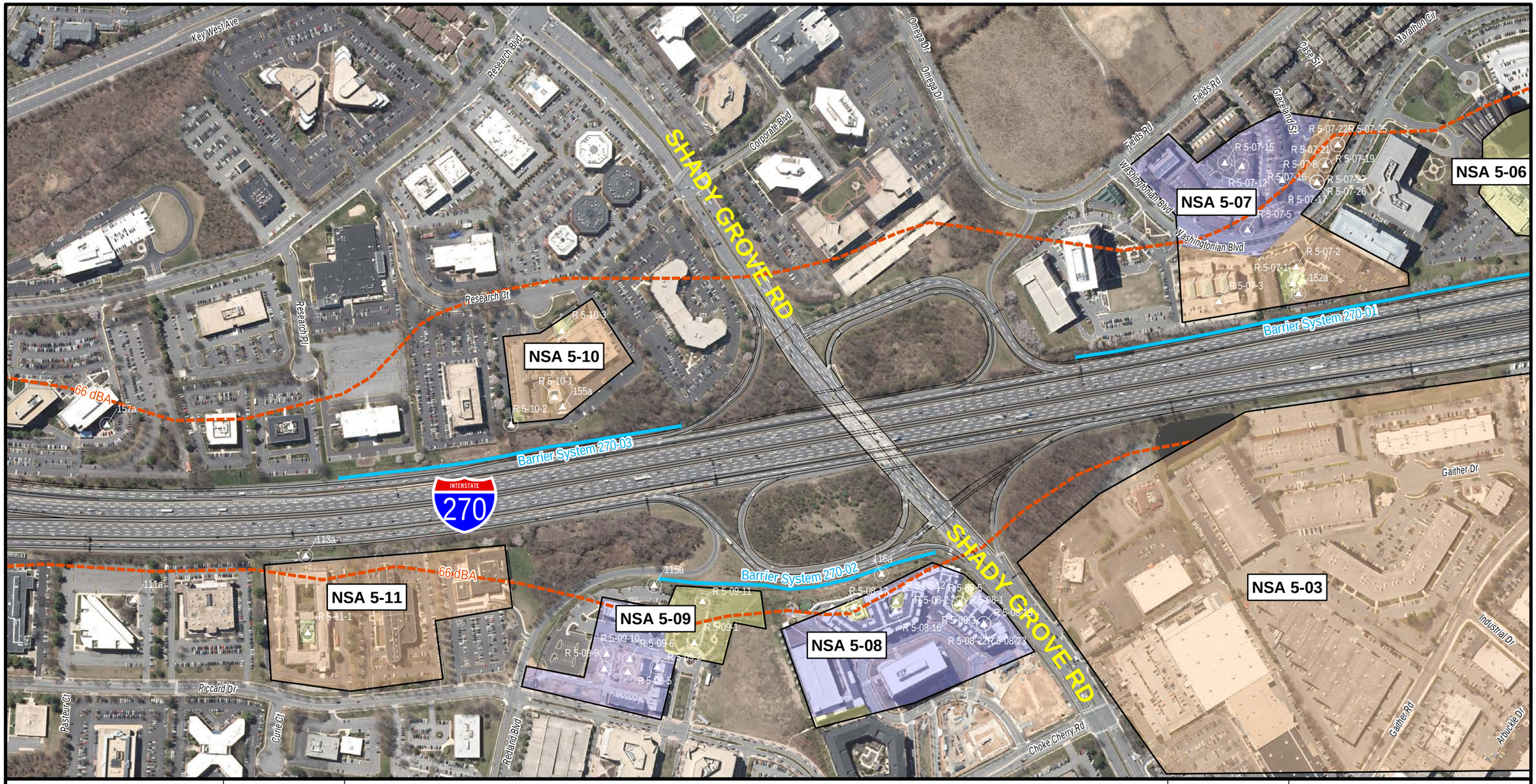
LAND USES AND RECEPTORS NSA 5-01 to 5-06

ALTERNATIVES 8, 9, and 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-65

Document Path: G:\Projects\309XX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_All8&4_Sheet_Layout.mxd
Date Saved: 5/11/2020 5:51:38 PM



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site

- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

May 2020

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 P3 Project

LAND USES AND RECEPTORS NSA 5-07 to 5-11

ALTERNATIVES 8, 9, and 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-66

Document Path: G:\Projects\309XX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_All8&4_Sheet_Layout.mxd
Date Saved: 5/11/2020 5:51:38 PM



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site

- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

August 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 P3 Project

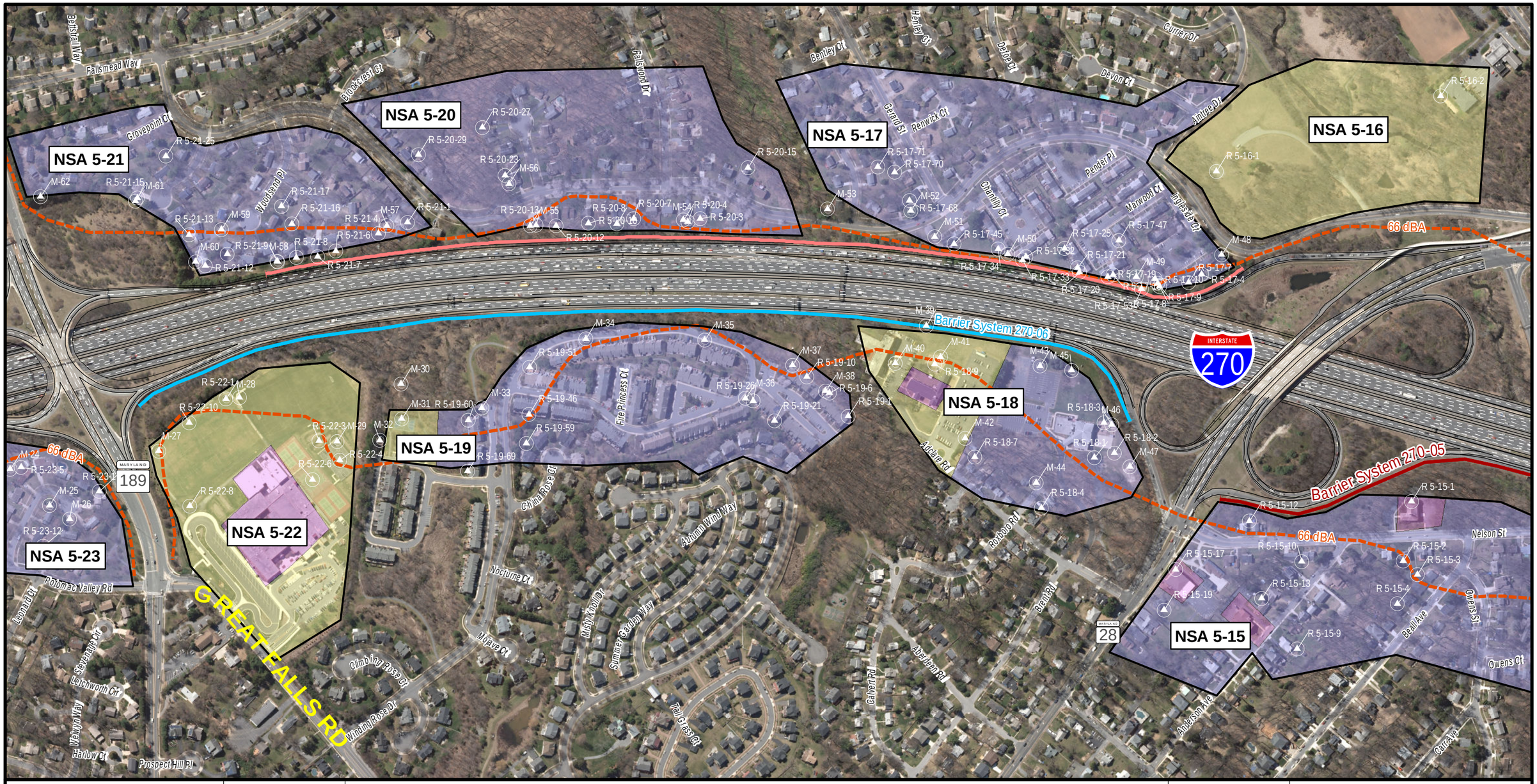
LAND USES AND RECEPTORS
NSA 5-12 to 5-14

ALTERNATIVES 8, 9, and 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-67

Document Path: G:\Projects\309XXX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_Alt8&4_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:21:10 PM



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site

- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

August 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 P3 Project

LAND USES AND RECEPTORS NSA 5-15 to 5-22

ALTERNATIVES 8, 9, and 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-68

Document Path: G:\Projects\309XXX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_Alt8&4_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:21:10 PM



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site

- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

August 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 P3 Project

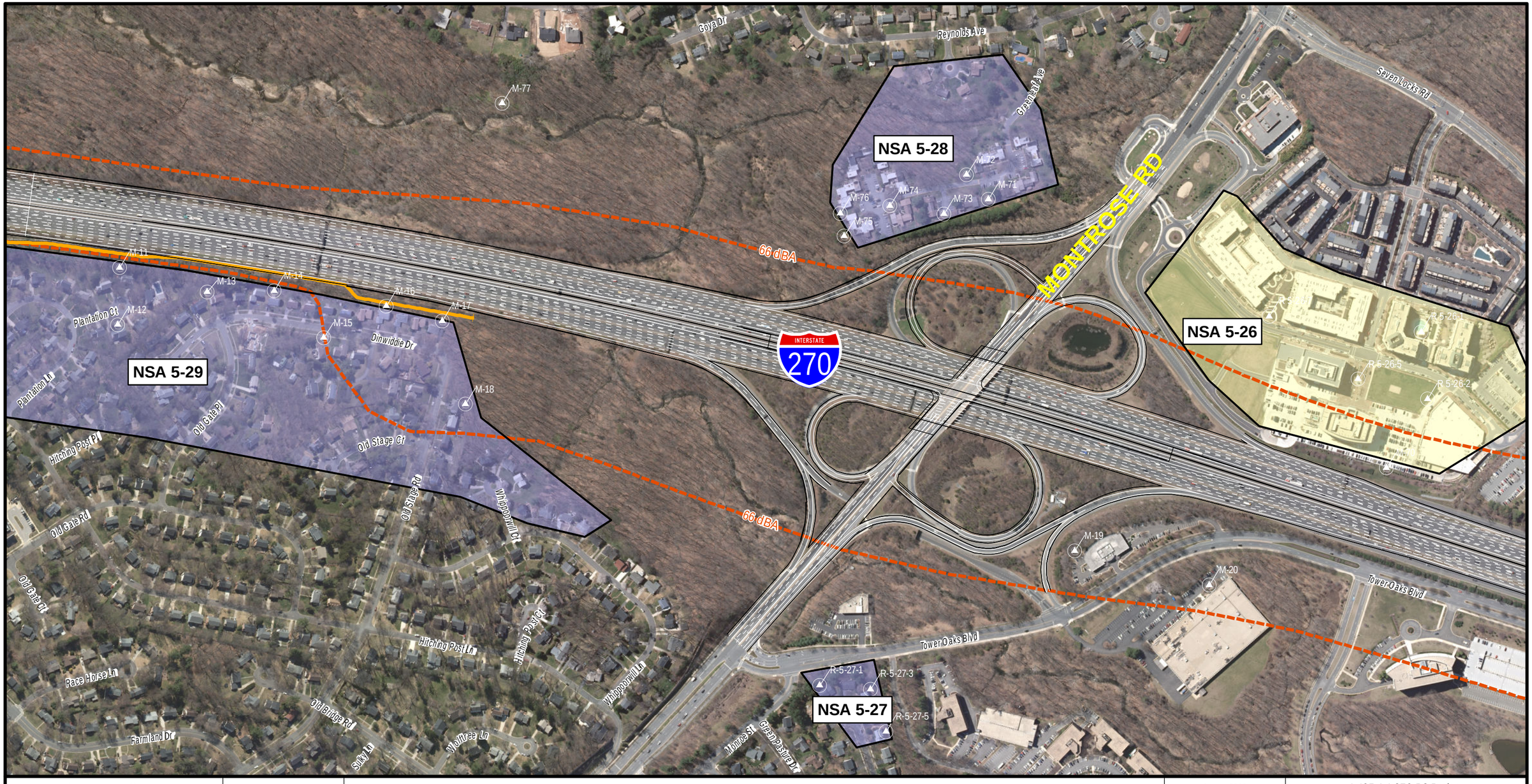
LAND USES AND RECEPTORS NSA 5-23 to 5-26

ALTERNATIVES 8, 9, and 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-69

Document Path: G:\Projects\309XXX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_Alt8&84_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:21:10 PM



Montgomery County
Prince George's County



Vicinity Map

0 390
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site

- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

August 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 P3 Project

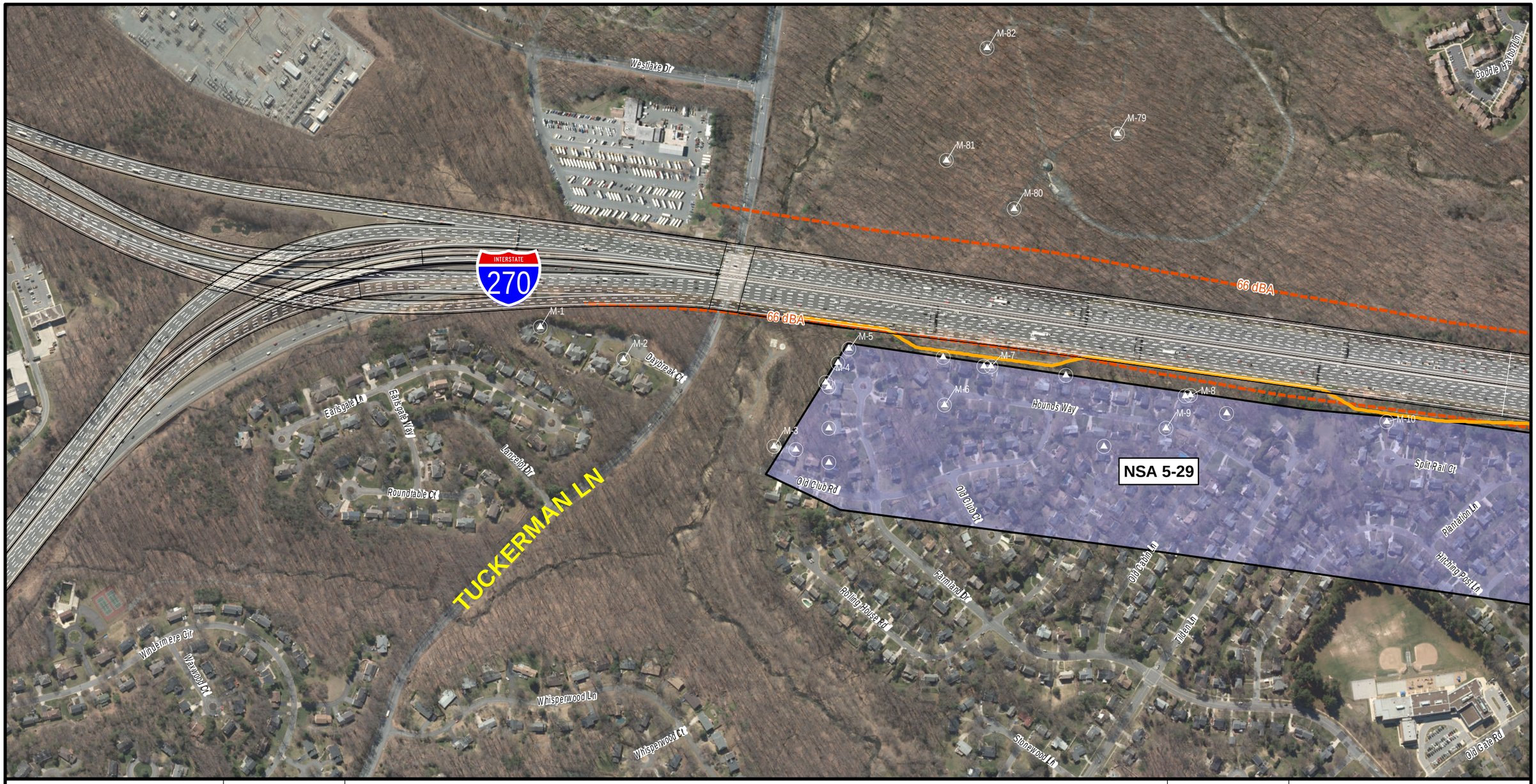
LAND USES AND RECEPTORS NSA 5-26 to 5-27

ALTERNATIVES 8, 9, and 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-70

Document Path: G:\Projects\309XXX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_Alt8&2_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:30:27 PM



Montgomery County
Prince George's County



Vicinity Map

0 390
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

August 2019

Maryland Department of Transportation State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 P3 Project

LAND USES AND RECEPTORS

ALTERNATIVES 8, 9, and 13C BUILD NOISE CONDITIONS

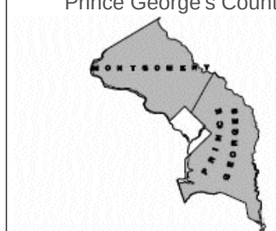
Land Uses and Representative Receptors

Map-71

Document Path: G:\Projects\309XX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_All8&2_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:30:27 PM



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

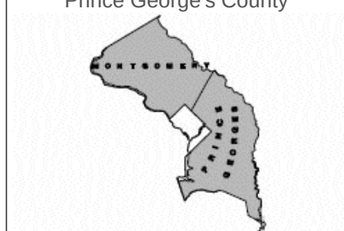
LAND USES AND RECEPTORS
NSAs 112-E, 113-E, 114-E,133-B, 134-B, 135-B, 136-B & 201-B; Non-Sensitive Areas F-101 & F206; Undeveloped Areas G-102 & G-106

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

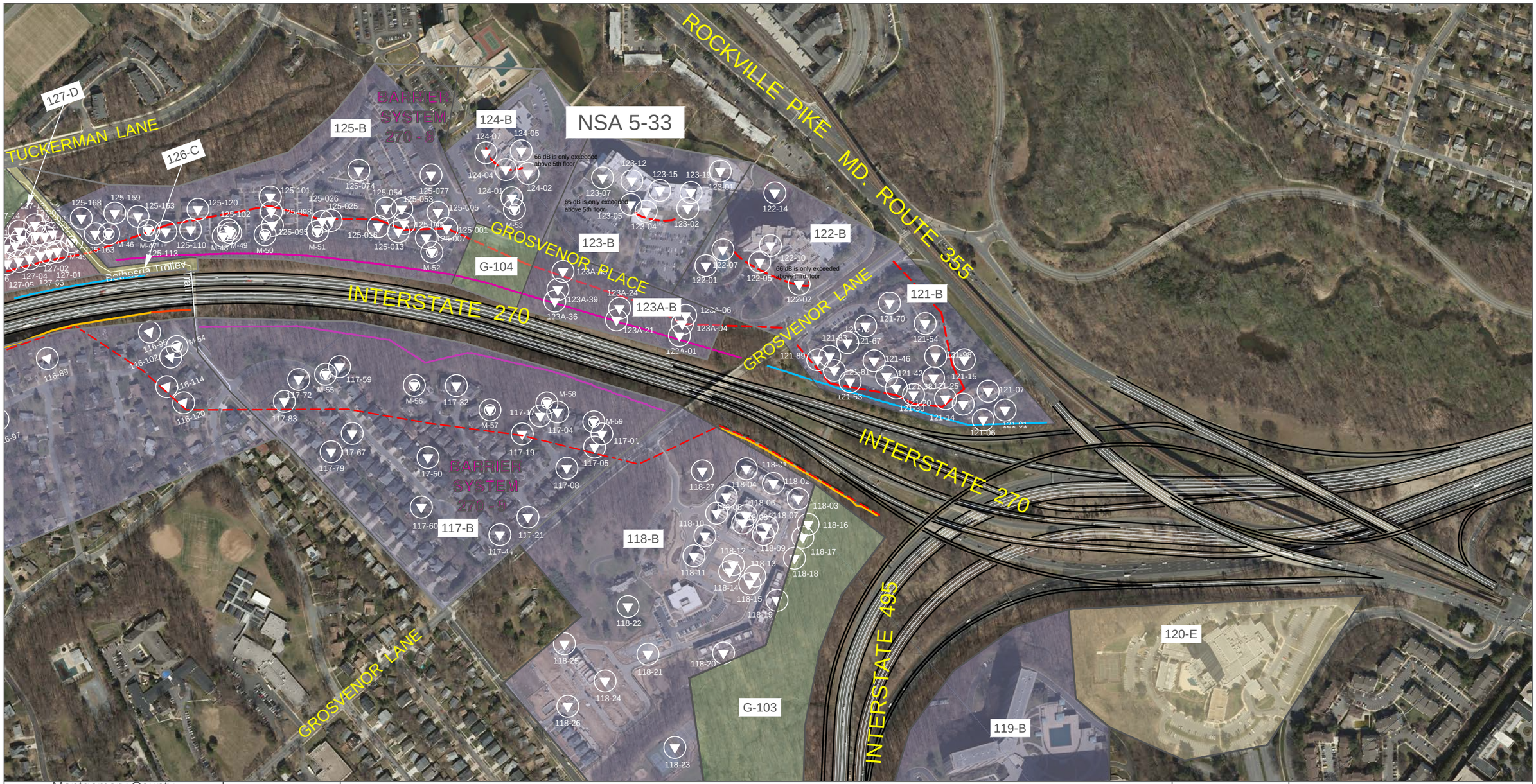
Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

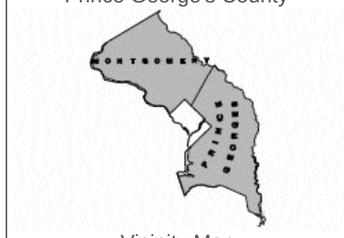
Land Uses and Representative Receptors

LAND USES AND RECEPTORS
NSAs 115-B, 116-C,125-B, 126-C, 127-D, 128-B, 129-B, 130-B,131-B & 132-C; Undeveloped Areas G-104 & G-105

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour

Legend

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

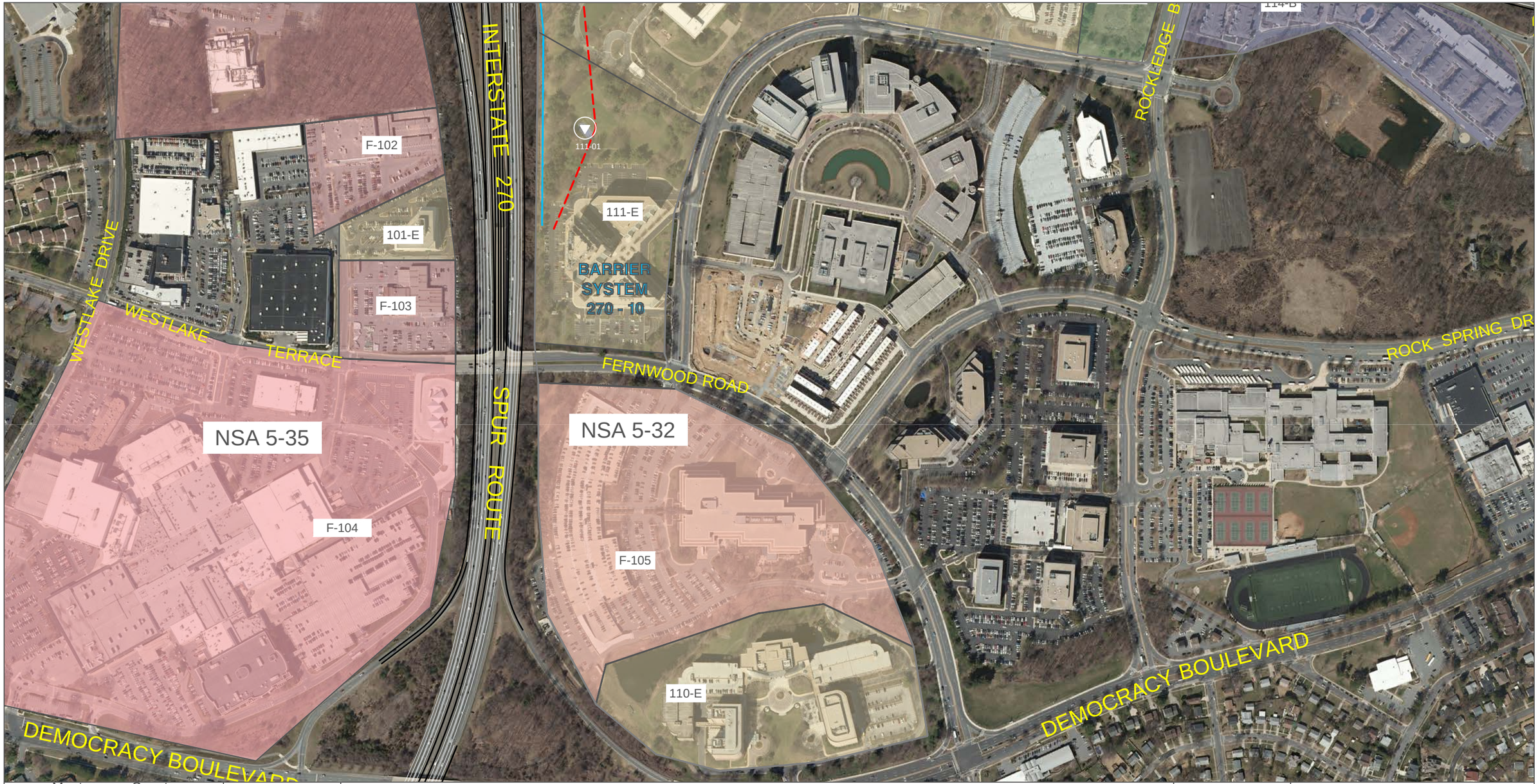
Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

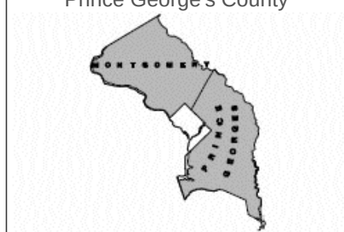
LAND USES AND RECEPTORS
NSAs 117-B, 118-C,121-B, 122-B, 123-B, 1223A-B, 124-B, 125-B & 126-C; Undeveloped Areas G-103 & G-104

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

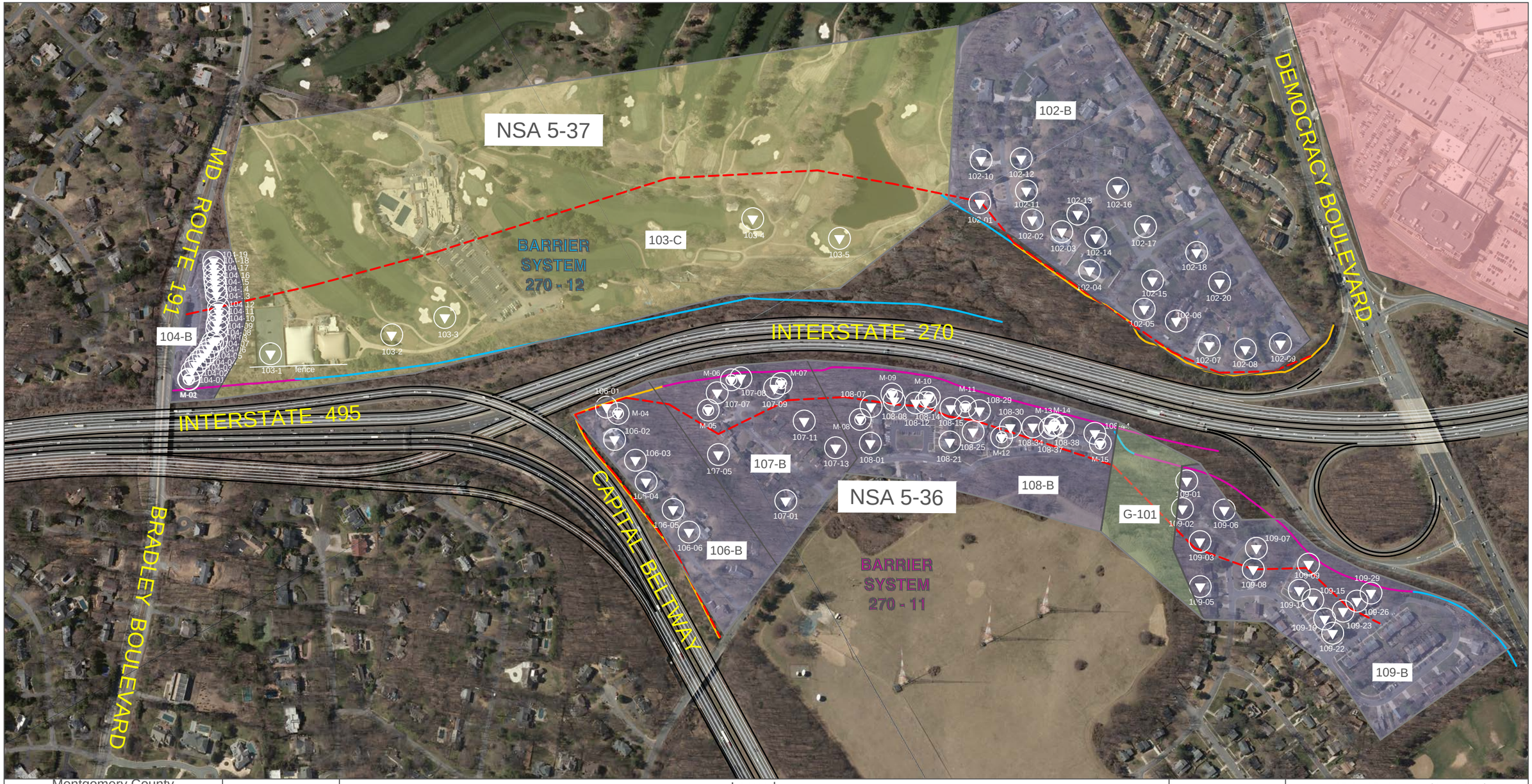
Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSAs 101-E, 110-E & 111-E;
Non-Sensitive Areas F-102, F-103, F-104 & F-105

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors



Montgomery County
Prince George's County

Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- M1-1 Noise Measurement Receptor Site
- 101-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS
NSAs 102-B, 103-C,104-B, 106-B, 107-B, 108-B & 109-B;
Undeveloped Area G-101

ALTERNATIVES
8, 9, 10, 13B AND 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors



Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site

- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

October 2019

Maryland
Department of Transportation
State Highway Administration

Office of
Planning and Preliminary
Engineering

Environmental Planning
Division

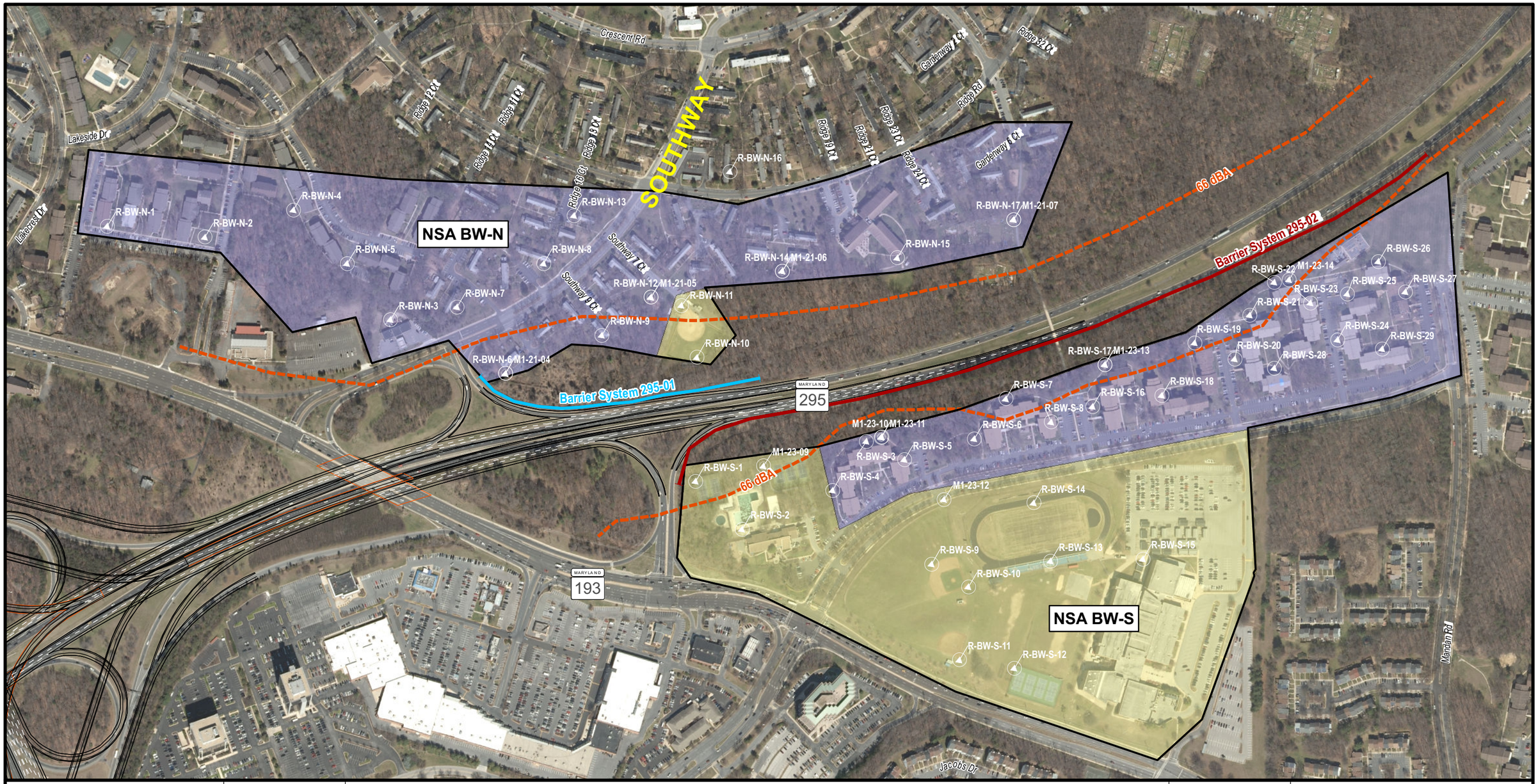
Noise Abatement Design
& Analysis Team

I-495 & I-270 P3 Project

LAND USES AND RECEPTORS
NSA I-95 N to I-95 S
ALTERNATIVES
5, 8, 9, 10, 13B, 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Document Path: G:\Projects\309XX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_Alt_I-95_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:32:25 PM



Montgomery County
Prince George's County



Vicinity Map

0 390
Scale in Feet

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Reasonable or Feasible
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- NSA Boundary

- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M-# Noise Measurement Receptor Site

- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R-# Modeled Receptor

August 2019

Maryland
Department of Transportation
State Highway Administration

Office of
Planning and Preliminary
Engineering

Environmental Planning
Division

Noise Abatement Design
& Analysis Team

I-495 & I-270 P3 Project

LAND USES AND RECEPTORS
NSA BW N to BW S

ALTERNATIVES
5, 8, 9, 10, 13B, 13C
BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map-78

Document Path: G:\Projects\309XXX\309800_MDOT_Statewide_Engineering_Services\001_I495_I270\GIS\309800_001_MDOT_Alt_BW_Sheet_Layout.mxd
Date Saved: 8/26/2019 7:27:42 PM

MITIGATION IN THIS AREA IS BEING EVALUATED IN COORDINATION WITH VDOT UNDER THE VDOT HIGHWAY TRAFFIC NOISE IMPACT ANALYSIS GUIDANCE MANUAL. RESULTS WILL BE INCLUDED IN THE FEIS

NSA VA-01

NSA VA-02

NSA VA-03

NSA VA-04

CAPITAL BELTWAY

GEORGE WASHINGTON MEMORIAL PARKWAY

INTERSTATE 495

Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA VA-1, VA-2, VA-3 & VA-4

ALTERNATIVE 5 BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 79

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-79_8&2BB_VA_CAPBWNSE.dgn
5/15/2020

MITIGATION IN THIS AREA IS BEING EVALUATED IN COORDINATION WITH VDOT UNDER THE VDOT HIGHWAY TRAFFIC NOISE IMPACT ANALYSIS GUIDANCE MANUAL. RESULTS WILL BE INCLUDED IN THE FEIS

NSA VA-01

NSA VA-02

NSA VA-03

NSA VA-04

CAPITAL BELTWAY

GEORGE WASHINGTON MEMORIAL PARKWAY

INTERSTATE 495

Montgomery County
Prince George's County



Vicinity Map

0 400
Scale in Feet

Legend

- Existing Barrier to Remain
- Feasible and Reasonable
- Not Feasible and Reasonable
- Existing Barrier to be Replaced
- 66 dBA Noise Contour
- Land Use Activity Category B Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category C Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category D Noise Sensitive Area (INTERIOR)
- M1-1 Noise Measurement Receptor Site
- Land Use Activity Category E Noise Sensitive Area (EXTERIOR)
- Land Use Activity Category F Non-Noise Sensitive Area
- Land Use Activity Category G Non-Noise Sensitive Area
- R1-1 Modeled Receptor

May 2019

Maryland Department of Transportation
State Highway Administration

Office of Planning and Preliminary Engineering

Environmental Planning Division

Noise Abatement Design & Analysis Team

I-495 & I-270 Managed Lane Study

LAND USES AND RECEPTORS NSA VA-1, VA-2, VA-3 & VA-4

ALTERNATIVES 8, 9, 10, 13B AND 13C BUILD NOISE CONDITIONS

Land Uses and Representative Receptors

Map 80

pw:\shavmpwx.shacadd.ad.mdot.mdstate:SHAPWP3\Documents\12- I495-I270 CR P3- Project Team\12.7 NEPA\12.7.6 NEPA Process and Documentation\12.7.6.9 Noise\T1_TNAR 2019\CADD\pNA-80_8&4BB_VA_CAPBWNSE.dgn
5/15/2020

APP A

APPENDIX A

TNM MODEL RUNS

I-495 AND I-270 MANAGED LANES STUDY
March 2020

U.S. Department of Transportation
Federal Highway Administration

and

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

1 INTRODUCTION

1.1 General

This appendix documents the TNM model input used in both the TNM model validation and the barrier designs. The TNM model utilized four TNM objects to approximate the study area:

- Roadways
- Receptors (Receivers)
- Barriers
- Terrain Lines

2 TNM MODEL VALIDATION RUNS

The TNM models used for validation are listed below:

2.1 I-495 Capital Beltway

NSA	TNM Run	Barrier Design
1-01,1-02,1-03,1-04	*TMS01, TMS02, TMS03, TMS04*	
1-05	*TMS05, TMS06*	
1-06, 1-07	*TMS07, TMS08*	
1-07,1-08	*TMS08, TMS09*	
1-09, 1-10, 1-11	*TMS14, TMS15, TMS16*	
1-11, 1-13, 1-14	*TMS12, TMS13*	
1-12, 1-14	*TMS10, TMS11*	
1-15	*1-04a PTMS35,1-04a PTMS37, 1-04a PTMS39, 1-04a PTMS40, 1-04a PTMS41, 1-04a PTMS42*	
1-16	*1-04a TMS23, 1-04a TMS24*	
1-17, 1-18	*1-04a TMS21, 1-04a TMS22*	
1-19	*PTMS43, PTMS44, PTMS45, PTMS46, PTMS47, PTMS48, PTMS50*	
1-20, 1-21, 1-22	*PTMS25, PTMS26, PTMS27*	
1-23	*TMS40, TMS41*	
1-25	*TMS39*	
1-26	*TMS20*	
1-27	*TMS42*	
1-28	*TMS17*	
1-29	*TMS18*	
1-30	*1-12 TMS27, 1-12 TMS28, 1-12 TMS29*	
1-31	*1-12 TMS31, 1-12 TMS32, 1-12 TMS33*	
1-32	*1-12 TMS30*	
1-33	*TMS34*	
1-35	*TMS60*	
1-37	*TMS19*	

2-01	*TMS75*
2-02	*TMS105*
2-03	*TMS77*
2-04	*TMS78, TMS79*
2-05	*TMS66, TMS76*
2-06	*TMS80*
2-07	*TMS86*
2-08	*TMS85*
2-09	*TMS91*
2-10	*TMS90*
2-11	*TMS89*
2-12	*TMS96*
2-13	*TMS98, TMS99, TMS100*
2-14	*TMS102, TMS103*
2-15	*TMS56, TMS57*
2-16	*TMS58, TMS59*
2-17	*TMS61*
2-18	*TMS60*
2-19	*TMS62*
2-20	*TMS63*
2-21	*TMS84*
2-22	*TMS83*
2-23	*TMS81, TMS82*
2-24	*TMS71*
2-25	*TMS72*
2-26	*TMS68, TMS69, TMS70*
2-27	*TMS73, TMS74*
2-28	*2-12 TMS35*
2-29	*2-12 TMS36*
2-30	*TMS54*
2-31	*TMS51, TMS52, TMS53*
2-32	*TMS45, TMS46*
2-33	*2-11 TMS43, 2-11 TMS44*
3-01, 3-02, 3-06	*PTMS01, PTMS02, PTMS03, PTMS04, PTMS05, PTMS06, PTMS07, PTMS08, PTMS09, PTMS10, PTMS11, PTMS12, PTMS14, PTMS15*
3-03	*TMS65*
3-04	*TMS64*
3-05	*TMS87*
3-06	*TMS92, TMS93*
3-07	*TMS88*
3-08	*TMS95*
3-09	*TMS94*
3-10	*TMS38*
3-11	*PTMS55, PTMS56, PTMS57*

3-12	*TMS50*
3-13	*TMS49*
3-14	*TMS46, TMS47, TMS48*
3-15	*3-01 PTMS22, 3-01 PTMS23*
3-16	*3-01 PTMS19, 3-01 PTMS20, 3-01 PTMS21, 3-01 PTMS24*
4-01	*TMS104, TMS105*
4-02	*TMS96*
4-03	*TMS100*
4-04	*TMS101*

See **Section 2** for a complete account of the TNM Model Validation.

2.2 I-270 Region A: I-495 to south to Tuckerman Lane

NSA	TNM Run	Barrier Design
5-37	*TMS01*	
5-36	*TMS02 > sha-test-a*	*exis-barr_15353N0*
5-36	*TMS03*	
5-31	*TMS04*	*Existing*
5-31	*TMS05*	*Existing*
5-33,5-34	*TMS06*	
5-33	*TMS07*	
5-33	*TMS08*	
5-33	*TMS09*	
5-34	*TMS10*	*Existing*

See **Section 2** for a complete account of the TNM Model Validation.

2.3 I-270 Region B: south to Tuckerman Lane to MD 28

NSA	TNM Run	Barrier Design
5-30	*TMS-01*	*15121N0*
5-29	*TMS-02 > 15121N0_full*	*w exis-barr*
5-29	*TMS-03 > 15106R0*	*w 15121N0 & 15106R0*
5-26, 5-27	*TMS-04*	
5-23	*TMS-05*	*15122NO-RetWall*
5-19,5-22	*TMS-06 > sha-terr2*	
5-19	*TMS-07 & TMS-07 > M-37elev*	
5-18	*TMS-08 > sha-test-b3*	
5-17,5-18	*TMS-09*	*15123N0*
5-17, 5-20	*TMS-10 > sha-test-d*	*w 15123N0*
5-21	*TMS-11 > sha-test-d*	*exis-barr 15123N0 & RW_15253R0*
5-24	*TMS-12*	
5-28	*TMS-13*	
5-28	*TMS-14*	

See **Section 2** for a complete account of the TNM Model Validation.

2.4 I-270 Region C: MD 28 to north of I-370

NSA	TNM Run	Barrier Design
5-12,5-14	*TMS01_DGAC*	*vew profile exis-barr*
5-10,5-11,5-12	*TMS02_DGAC*	
5-06,5-07	*TMS03_DGAC*	
5-02	*TMS04_DGAC*	
5-01	*TMS05_DGAC*	*15166R0 & 15126N0*
5-08,5-09,5-10	*TMS09_DGAC*	
5-01	*TMS10_DGAC*	

See **Section 2** for a complete account of the TNM Model Validation.

2.5 I-95 & MD 295

NSA	TNM Run	Barrier Design
	I95_Validation_Run	*vew profile exis-barr*
	B-W_Validation_Run	

See **Section 2** for a complete account of the TNM Model Validation.

3 TNM MODEL IMPACT ANALYSIS RUNS

The TNM models used for impact determinations are listed below:

3.1 I-495 Capital Beltway

NSA	TNM Run	Barrier Design
1-02, 1-04, 1-05	*1-01 IA IL 8&2, 1-01 IA IL 8&4*	
1-01, 1-03	*1-01 IA OL 8&2, 1-01 IA OL 8&4*	
1-10, 1-12	*1-02 IA IL 8&2, 1-02 IA IL 8&4*	
1-09, 1-11	*1-02 IA OL 8&2, 1-02 IA OL 8&4*	
1-13, 1-14	*1-03 IA OL 8&2, 1-03 IA OL 8&4*	
1-15, 1-16, 1-17, 1-18, 3-17	*1-04 IA IL 8&2, 1-04 IA IL 8&4*	
1-08	*1-05 IA IL 8&2, 1-05 IA IL 8&4*	
1-20	*1-06 IA 8&2-20, 1-06 IA 8&4-20*	
1-22	*1-06 IA 8&2-22, 1-06 IA 8&4-22*	
1-21	*1-07 IA 8&2 NSA 21, 1-07 IA 8&4 NSA 21*	
1-24	*1-07 IA IL 8&2, 1-07 IA IL 8&4*	
1-23	*1-07 IA OL 8&2 NSA 23, 1-07 IA OL 8&4 NSA 23*	
1-25	*1-07 IA OL 8&2 NSA 25, 1-07 IA OL 8&4 NSA 25*	
1-33	*1-08 IA OL 8&2, 1-08 IA OL 8&4*	
1-26, 1-37	*1-09 IA OL 8&2, 1-09 IA OL 8&4*	
1-27	*1-10 IA IL 8&2, 1-10 IA IL 8&4*	
1-28, 1-29	*1-11 IA IL 8&2, 1-11 IA IL 8&4*	
1-30, 1-32	*1-12 IA IL 8&2, 1-12 IA IL 8&4*	

1-31	*1-12 IA OL 8&2, 1-12 IA OL 8&4*
3-18	*1-14A IA IL 8&2, 1-14A IA IL 8&4*
1-06	*1-15 IA OL 8&2, 1-15 IA OL 8&4*
1-34	*1-16 IA OL 8&2, 1-16 IA OL 8&4*
1-36	*1-17 IA IL 8&2, 1-17 IA IL 8&4*
2-02, 4-01	*2-01 IA IL 8&2, 2-01 IA IL 8&4*
2-05	*2-02 IA IL 8&2, 2-02 IA IL 8&4*
2-03, 2-04, 2-06	*2-02 IA OL 8&2, 2-02 IA OL 8&4*
2-07, 2-08	*2-03 IA IL 8&2, 2-03 IA IL 8&4*
2-09	*2-04 IA IL 8&2, 2-04 IA IL 8&4*
2-10	*2-05 IA IL 8&2, 2-05 IA IL 8&4*
2-11	*2-05 IA OL 8&2, 2-05 IA OL 8&4*
2-13, 4-03	*2-06A IA IL 8&2, 2-06A IA IL 8&4*
2-12, 4-02	*2-06A IA OL 8&2, 2-06A IA OL 8&4*
2-14, 2-16	*2-06B IA IL 8&2, 2-06B IA IL 8&4*
2-15, 4-04	*2-06B IA OL 8&2, 2-06B IA OL 8&4*
2-18, 2-20, 1-35	*2-06C IA IL 8&2, 2-06C IA IL 8&4*
2-17, 2-19	*2-06C IA OL 8&2, 2-06C IA OL 8&4*
2-23	*2-07 IA OL 8&2, 2-07 IA OL 8&4*
2-21, 2-22	*2-07A IA IL 8&2, 2-07A IA IL 8&4*
2-24, 2-26	*2-08 IA IL 8&2, 2-08 IA IL 8&4*
2-25, 2-27	*2-08 IA OL 8&2, 2-08 IA OL 8&4*
2-31	*2-09 IA IL 8&2, 2-09 IA IL 8&4*
2-30	*2-09 IA OL 8&2, 2-09 IA OL 8&4*
2-32	*2-10 IA IL 8&2, 2-10 IA IL 8&4*
2-33	*2-11 IA 8&2, 2-11 IA 8&4*
2-28, 2-29	*2-12 IA 8&2, 2-12 IA 8&4*
2-01	*2-13 IA OL 8&2, 2-13 IA OL 8&4*
3-15, 3-16	*3-01 IA 8&2, 3-01 IA 8&4*
3-12	*3-02 IA IL 8&2, 3-02 IA IL 8&4*
3-01	*3-03 IA OL 8&2, 3-03 IA OL 8&4*
3-05	*3-04 IA 8&2, 3-04 IA 8&4*
3-08, 3-09	*3-05 IA 8&2, 3-05 IA 8&4*
3-06	*3-06 IA IL 8&2, 3-06 IA IL 8&4*
3-02, 3-04	*3-07 IA IL 8&2, 3-07 IA IL 8&4*
3-10	*3-08 IA OL 8&2, 3-08 IA OL 8&4*
3-14	*3-09 IA IL 8&2, 3-09 IA IL 8&4*
3-13	*3-09 IA OL 8&2, 3-09 IA OL 8&4*
3-11	*3-10 IA OL 8&2, 3-10 IA OL 8&4*
3-07	*3-11 IA OL 8&2, 3-11 IA OL 8&4*
VA-1, VA-2, VA-3, VA-4	*VA_8&2, VA_8&4*

See **Section 3** for a complete account of the Impact Analysis

3.2 I-270 Dwight D. Eisenhower Memorial Highway

NSA	TNM Run	Barrier Design
5-01	*270_8+2_NSA01, 270_8+4_NSA01*	
5-02, 5-03, 5-04, 5-06, 5-07	*270_8+2_NSA02_07, 270_8+4_NSA02_07*	
5-08, 5-09, 5-10, 5-11, 5-12	*270_8+2_NSA08_12, 270_8+4_NSA08_12*	
5-13, 5-14, 5-15, 5-16, 5-17	*270_8+2_NSA13_17, 270_8+4_NSA13_17*	
5-13, 5-14, 5-15, 5-16, 5-17	*270_8+2_NSA13_17_2, 270_8+4_NSA_13_17_2*	
5-18, 5-19, 5-20	*270_8+2_NSA18_20, 270_8+4_NSA18_20*	
5-21, 5-22, 5-23, 5-24, 5-25, 5-26, 5-27, 5-28	*270_8+2_NSA21_28, 270_8+4_NSA21_28*	
5-29	*270_8+2_NSA29, 270_8+4_NSA29*	

See **Section 3** for a complete account of the Impact Analysis

3.3 I-95 & MD 295

NSA	TNM Run	Barrier Design
	I-95_EX, I-95_BD	
	B-W_EX, B-W_BD	

See **Section 3** for a complete account of the Impact Analysis

4 TNM MODEL BARRIER ANALYSIS RUNS

The TNM models used for barrier design are listed below:

4.1 I-495 Capital Beltway

NSA	TNM Run	Barrier Design
1-02, 1-04, 1-05	*1-01 IA IL 8&2 BA, 1-01 IA IL 8&4 BA*	*view profile 1-2, 1-4, 1-5*
1-01, 1-03	*1-01 IA OL 8&2 BA, 1-01 IA OL 8&4 BA*	*view profile 1-1, 1-3*
1-10, 1-12	*1-02 IA IL 8&2 BA, 1-02 IA IL 8&4 BA*	*view profile 1-10, 1-12A*
1-09, 1-11	*1-02 IA OL 8&2 BA, 1-02 IA OL 8&4 BA*	*view profile 1-9, 1-11C*
1-13, 1-14	*1-03 IA OL 8&2 BA, 1-03 IA OL 8&4 BA*	*view profile 1-13, 1-14A*
1-15, 1-16, 1-17, 1-18, 3-17	*1-04 IA IL 8&2 BA, 1-04 IA IL 8&4 BA*	*view profile 1-16*
1-08	*1-05 IA IL 8&2 BA, 1-05 IA IL 8&4 BA*	*view profile 1-8*
1-20	*1-06 IA 8&2-20 BA, 1-06 IA 8&4-20 BA*	*view profile 1-20A*
1-22	*1-06 IA 8&2-22 BA, 1-06 IA 8&4-22 BA*	*HMMH_1-06-NSA-22*
1-21	*1-07 IA 8&2 BA21, 1-07 IA 8&4 BA21*	*HMMH_1-07_NSA21*
1-24	*1-07 IA IL 8&2 BA, 1-07 IA IL 8&4 BA*	*HMMH_1-07 IA IL*
1-23	*1-07 IA OL 8&2 BA23, 1-07 IA OL 8&4 BA23*	*view profile 1-23A*
1-25	*1-07 IA OL 8&2 BA25, 1-07 IA OL 8&4 BA25*	*view profile 1-25*
1-33	*1-08 IA OL 8&2 BA, 1-08 IA OL 8&4 BA*	*view profile 1-33A*
1-26, 1-37	*1-09 IA OL 8&2 BA, 1-09 IA OL 8&4 BA*	*BS 1 and 2, BS3*
1-27	*1-10 IA IL 8&2 BA, 1-10 IA IL 8&4 BA*	*INPUT HEIGHTS*
1-28, 1-29	*1-11 IA IL 8&2 BA, 1-11 IA IL 8&4 BA*	*opt1*

1-30, 1-32	1-12 IA IL 8&2 BA, 1-12 IA IL 8&4 BA	
1-31	1-12 IA OL 8&2 BA, 1-12 IA OL 8&4 BA	
3-18	1-14A IA IL 8&2 BA, 1-14A IA IL 8&4 BA	view profile 2-21, 2-22, 3-18
1-06	1-15 IA OL 8&2 BA, 1-15 IA OL 8&4 BA	view profile 1-6
1-34	1-16 IA OL 8&2 BA, 1-16 IA OL 8&4 BA	Opt Combined
1-36	1-17 IA IL 8&2 BA, 1-17 IA IL 8&4 BA	view profile 1-36
2-02, 4-01	2-01 IA IL 8&2 BA, 2-01 IA IL 8&4 BA	view profile 2-2
2-05	2-02 IA IL 8&2 BA, 2-02 IA IL 8&4 BA	view profile 2-5
2-03, 2-04, 2-06	2-02 IA OL 8&2 BA, 2-02 IA OL 8&4 BA	view profile
2-07, 2-08	2-03 IA IL 8&2 BA, 2-03 IA IL 8&4 BA	view profile 2-7, 2-8
2-09	2-04 IA IL 8&2 BA, 2-04 IA IL 8&4 BA	view profile 2-9
2-10	2-05 IA IL 8&2 BA, 2-05 IA IL 8&4 BA	view profile 2-10
2-11	2-05 IA OL 8&2 BA, 2-05 IA OL 8&4 BA	view profile 2-11
2-13, 4-03	2-06A IA IL 8&2 BA, 2-06A IA IL 8&4 BA	view profile 2-13
2-12, 4-02	2-06A IA OL 8&2 BA, 2-06A IA OL 8&4 BA	view profile 2-12A
2-14, 2-16	2-06B IA IL 8&2 BA, 2-06B IA IL 8&4 BA	view profile 2-14, 2-16
2-15, 4-04	2-06B IA OL 8&2 BA, 2-06B IA OL 8&4 BA	view profile 4-4, 2-15A
2-18, 2-20, 1-35	2-06C IA IL 8&2 BA, 2-06C IA IL 8&4 BA	view profile 1-35, 2-18, 2-20
2-17, 2-19	2-06C IA OL 8&2 BA, 2-06C IA OL 8&4 BA	view profile 2-17, 2-19A
2-23	2-07 IA OL 8&2 BA, 2-07 IA OL 8&4 BA	view profile 2-23
2-21, 2-22	2-07A IA IL 8&2 BA, 2-07A IA IL 8&4 BA	view profile 2-21, 2-22, 3-18
2-24, 2-26	2-08 IA IL 8&2 BA, 2-08 IA IL 8&4 BA	view profile 2-24, 2-26
2-25, 2-27	2-08 IA OL 8&2 BA, 2-08 IA OL 8&4 BA	view profile 2-25, 2-27
2-31	2-09 IA IL 8&2 BA, 2-09 IA IL 8&4 BA	existing barrier to remain, ex barr + repl sections
2-30	2-09 IA OL 8&2 BA, 2-09 IA OL 8&4 BA	existing barrier to remain, ex barr + repl sections
2-32	2-10 IA IL 8&2 BA, 2-10 IA IL 8&4 BA	replacement barrier opt1
2-33	2-11 IA 8&2 BA, 2-11 IA 8&4 BA	
2-28, 2-29	2-12 IA 8&2 BA, 2-12 IA 8&4 BA	view profile 2-28, 2-29, 3-11
2-01	2-13 IA OL 8&2 BA, 2-13 IA OL 8&4 BA	view profile 2-1
3-15, 3-16	3-01 IA 8&2 BA, 3-01 IA 8&4 BA	Opt1
3-12	3-02 IA IL 8&2 BA, 3-02 IA IL 8&4 BA	existing barrier to remain
3-01	3-03 IA OL 8&2 BA, 3-03 IA OL 8&4 BA	view profile 3-1
3-05	3-04 IA 8&2 BA, 3-04 IA 8&4 BA	
3-08, 3-09	3-05 IA 8&2 BA, 3-05 IA 8&4 BA	view profile 3-8, 3-9
3-06	3-06 IA IL 8&2 BA, 3-06 IA IL 8&4 BA	view profile 3-6
3-02, 3-04	3-07 IA IL 8&2 BA, 3-07 IA IL 8&4 BA	view profile 3-2, 3-4
3-10	3-08 IA OL 8&2 BA, 3-08 IA OL 8&4 BA	view profile 3-10
3-14	3-09 IA IL 8&2 BA, 3-09 IA IL 8&4 BA	ex barr rem + repl barr
3-13	3-09 IA OL 8&2 BA, 3-09 IA OL 8&4 BA	bld cond prop barr
3-11	3-10 IA OL 8&2 BA, 3-10 IA OL 8&4 BA	HMMH_1-04 IA IL
3-07	3-11 IA OL 8&2 BA, 3-11 IA OL 8&4 BA	view profile 3-7A

See **Section 4** for a complete account of the Barrier Analysis

4.2 I-270 Dwight D. Eisenhower Memorial Highway

NSA	TNM Run	Barrier Design
5-06, 5-07	*8+2_Wall_1*	*LTSD from Validation Run*
5-08, 5-09	*8+2_Wall_2*	*WALL 2_8+4 OPTZD*
5-10	*8+2_Wall_3*	*Barrier 3_8+2 OPTZD, Wall 3_8+4 OPTZD*
5-13, 5-14, 5-15	*8+2_Wall_4-5*	*Wall_4_8+4_OPTZD_v2, Barrier 5_8+2 OPTZD, Wall 5_8+4 OPTZD*
5-18, 5-19, 5-22	*8+2_Wall_6*	*WALL 6_8+2 OPTZD, Wall 6_8+4 OPTZD*

See **Section 4** for a complete account of the Barrier Analysis

4.3 I-95 & MD 295

NSA	TNM Run	Barrier Design
	I-95_Wall_1_2	*Wall_1_I-95_BD*
	B-W_Wall_1_2	*Wall_1_BW_BD_OPTZD*

See **Section 4** for a complete account of the Barrier Analysis

APP B

APPENDIX B

DESIGN TRAFFIC VOLUMES

I-495 AND I-270 MANAGED LANES STUDY
March 2020

U.S. Department of Transportation
Federal Highway Administration

and

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

I-270 / I-495 Managed Lanes Study - Highest Noise Hour Volumes and Truck Percentages

Roadway	Segment	Inner Loop		Outer Loop		Vehicle Class				
		# of Lanes	LOS C/D Volumes*	# of Lanes	LOS C/D Volumes*	Motorcycles	Autos	Buses	Medium Trucks	Heavy Trucks
I-495 General Purpose Lanes (Clockwise)	GW Pkwy to Clara Barton Pkwy (American Legion Bridge)	5	7,280	5	7,280	0.16%	92.36%	0.89%	2.18%	4.41%
	Clara Barton Pkwy to MD 190	4	5,805	4	5,805	0.20%	92.01%	0.95%	2.33%	4.51%
	MD 190 to I-270 Spur	5	7,335	5	7,335	0.32%	93.02%	0.76%	2.07%	3.83%
	I-270 Spur to MD 187	3	4,335	3	4,335	0.10%	91.66%	0.75%	2.63%	4.86%
	MD 187 to MD 355	3	4,340	3	4,340	0.10%	91.74%	0.70%	2.27%	5.19%
	MD 355 to MD 185	4	5,760	4	5,760	0.25%	91.15%	0.95%	4.13%	3.52%
	MD 185 to MD 97	4	5,760	4	5,760	0.22%	91.16%	0.90%	4.15%	3.57%
	MD 97 to US 29	4	5,775	4	5,775	0.24%	91.44%	0.89%	3.89%	3.54%
	US 29 to MD 193	5	7,365	4	5,890	0.31%	93.45%	0.84%	2.24%	3.16%
	MD 193 to MD 650	4	5,830	4	5,830	0.20%	92.47%	1.01%	2.16%	4.16%
	MD 650 to I-95	5	7,415	6	8,900	0.23%	94.30%	0.74%	1.97%	2.76%
	Within I-95 Interchange	4	5,940	4	5,940	0.19%	94.48%	0.65%	2.40%	2.28%
	I-95 to US 1	6	8,630	6	8,630	0.04%	91.19%	0.41%	2.83%	5.53%
	US 1 to MD 201	4	5,800	4	5,800	0.01%	89.49%	0.26%	2.63%	7.61%
	MD 201 to MD 295	4	5,735	5	7,170	0.24%	90.63%	1.72%	2.35%	5.06%
	MD 295 to MD 450	4	5,725	4	5,725	0.05%	90.62%	1.35%	3.00%	4.98%
	MD 450 to US 50	4	5,735	5	7,165	0.27%	90.59%	1.66%	2.31%	5.17%
	US 50 to MD 202	4	5,570	4	5,570	0.23%	87.42%	1.15%	4.61%	6.59%
	MD 202 to Arena Dr	6	8,505	6	8,505	0.31%	89.34%	1.35%	2.89%	6.11%
	Arena Dr to MD 214	5	7,225	5	7,225	0.27%	91.48%	0.85%	2.27%	5.13%
	MD 214 to Ritchie Marlboro Rd	4	5,795	4	5,795	0.22%	91.75%	0.77%	2.50%	4.76%
	Ritchie Marlboro Rd to MD 4	4	5,700	4	5,700	0.09%	90.17%	1.06%	2.59%	6.09%
	MD 4 to Forestville Rd	4	5,610	4	5,610	0.14%	88.35%	0.52%	4.31%	6.68%
	Forestville Rd to MD 5	4	5,650	4	5,650	0.13%	89.07%	0.44%	4.15%	6.21%
	MD 5 to MD 414	4	5,505	4	5,505	0.59%	85.78%	1.38%	2.49%	9.76%
Express Toll Lanes**	Single Lane ETL	1	1,535	1	1,535	0.20%	97.80%	1.00%	0.50%	0.50%
	Two Lane ETL	2	3,070	2	3,070	0.20%	97.80%	1.00%	0.50%	0.50%

** Based on number of lanes and truck percentage using Highway Capacity Manaul (HCM6) formulas*

** Assumptions: PHF = 0.94, Terrain = Level, Free Flow Speed = 65 mph*

*** ETL volumes apply to all segments on I-495 and I-270, assumed vehicle classification data as shown*

I-270 / I-495 Managed Lanes Study - Highest Noise Hour Volumes and Truck Percentages

Roadway	Segment	Northbound		Southbound		Vehicle Class				
		# of Lanes	LOS C/D Volumes*	# of Lanes	LOS C/D Volumes*	Motorcycles	Autos	Buses	Medium Trucks	Heavy Trucks
I-270 General Purpose Lanes (South to North)	West Spur from I-495 to Democracy Blvd	2	2,945	2	2,945	0.21%	93.58%	0.75%	1.87%	3.59%
	West Spur from Democracy Blvd to I-270 Merge	3	4,520	4	6,025	0.30%	95.85%	0.21%	0.83%	2.81%
	East Spur from MD 355 to MD 187	2	2,935	2	2,935	0.23%	93.15%	0.77%	3.62%	2.23%
	East Spur from MD 187 to I-270	2	2,915	2	2,915	0.07%	92.57%	0.95%	3.94%	2.47%
	I-270 Spur Merge to Montrose Rd	6	8,880	6	8,880	0.14%	94.15%	0.66%	2.85%	2.20%
	Montrose Rd to MD 189	6	8,890	6	8,890	0.03%	94.41%	0.69%	2.57%	2.30%
	MD 189 to MD 28	6	8,890	6	8,890	0.03%	94.41%	0.69%	2.57%	2.30%
	MD 28 to Shady Grove Rd	5	7,425	6	8,910	0.03%	94.62%	0.67%	2.31%	2.37%
	Shady Grove Rd to I-370	6	8,680	7	10,125	0.27%	91.56%	0.82%	4.17%	3.18%
Express Toll Lanes**	Single Lane ETL	1	1,535	1	1,535	0.20%	97.80%	1.00%	0.50%	0.50%
	Two Lane ETL	2	3,070	2	3,070	0.20%	97.80%	1.00%	0.50%	0.50%

** Based on number of lanes and truck percentage using Highway Capacity Manaul (HCM6) formulas*

** Assumptions: PHF = 0.94, Terrain = Level, Free Flow Speed = 65 mph*

*** ETL volumes apply to all segments on I-495 and I-270, assumed vehicle classification data as shown*

I-270 / I-495 Managed Lanes Study - Highest Noise Hour Volumes and Truck Percentages - Major Cross Roads

Location	SB / WB		NB / EB		Vehicle Class				
	# of Lanes	LOS Volumes*	# of Lanes	LOS Volumes*	Motorcycles	Autos	Buses	Medium Trucks	Heavy Trucks
I-95, North of I-495	4	5,605	4	5,605	0.15%	88.23%	1.73%	3.00%	6.89%
MD 295 (Baltimore-Washington Pkwy), North of I-495	3	4,605	3	4,605	0.04%	98.03%	0.39%	1.41%	0.13%
MD 295 (Baltimore-Washington Pkwy), South of I-495	3	4,095	2	3,040	0.03%	97.07%	0.51%	2.25%	0.14%
US 50, East of I-495	4	5,740	6	8,505	0.32%	90.67%	0.89%	4.12%	4.00%
MD 5, North of I-495	3	3,960	3	4,105	0.25%	96.73%	0.61%	1.18%	1.23%
MD 5, South of I-495	4	5,985	5	7,480	0.42%	95.02%	0.65%	1.84%	2.07%
George Washington Parkway, East of I-495 (Virginia)	2	3,055	2	3,055	0.05%	97.45%	0.50%	2.00%	0.00%

** Based on number of lanes and truck percentage using Highway Capacity Manaul (HCM6) formulas*

** Assumptions: PHF = 0.94, Terrain = Level, Free Flow Speed = 65 mph, Basic Freeway segment*

APP C

APPENDIX C

TNM VALIDATION RESULTS

I-495 AND I-270 MANAGED LANES STUDY
March 2020

U.S. Department of Transportation
Federal Highway Administration

and

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

1 TNM MODEL VALIDATION RESULTS

1.1 General

After Noise Measurements and Traffic Counts were obtained, a TNM Model was developed for the Study area, inputting all pertinent roadways, terrain, and structural elements thought to be needed for adequately characterizing the Study area's noise environment. Each Noise Measurement Receptor was accurately represented in the model by a TNM Modeled Receptor. The model was then validated by testing it under each of the traffic conditions encountered during the traffic monitoring sessions. MDOT SHA considers a TNM Model to be properly validated when the Modeled Noise Levels are within ±3 dB(A) of the Measured Noise Levels for most of the receptors. In order to bring the model into validation, modifications were applied by inputting additional terrain and structural elements in an orderly sequence of TNM runs, with each new model revision, or "Case," being re-tested until the validation criteria were determined met by MDOT SHA.

This Appendix summarizes the results of model validation completed as part of the analysis.

2 I-495 (CAPITAL BELTWAY – MARYLAND)

Table C-1: TNM Model Validation Results: I-495 in Maryland

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
1-01	M1-01-01	2004-09-30	1020-1040	72	74	+2	Yes			TMS01
	M1-01-02	2004-09-30	1100-1120	73	72	-1	Yes			TMS02
	M1-01-03	2004-09-30	1140-1200	65	66	+1	Yes			TMS03
	M1-01-04	2004-09-30	1220-1240	64	N/A	N/A			1	TMS04
1-02	M1-02-01	2004-09-30	1020-1040	65	64	**-1**	Yes			TMS01
	M1-02-02	2004-09-30	1100-1120	64	62	**-2**	Yes			TMS02
	M1-02-03	2004-09-30	1140-1200	71	74	**+3**	Yes			TMS03
	M1-02-04	2004-09-30	1220-1240	71	74	**+3**	Yes			TMS04
	M1-02-05	2004-09-30	1220-1240	65	63	**-2**	Yes			TMS04
1-03	M1-03-01	2004-09-30	1020-1040	66	65	-1	Yes			TMS01
	M1-03-02	2004-09-30	1100-1120	68	70	+2	Yes			TMS02
	M1-03-03	2004-09-30	1220-1240	77	79	+2	Yes			TMS04
1-04	M1-04-01	2004-09-30	1020-1040	67	70	+3	Yes			TMS01
	M1-04-02	2004-09-30	1100-1120	68	71	+3	Yes			TMS02
	M1-04-03	2004-09-30	1140-1200	67	70	+3	Yes			TMS03
	M1-04-04	2004-09-30	1140-1200	66	66	0	Yes			TMS03
	M1-04-05	2004-09-30	1100-1120	67	69	+2	Yes			TMS02
	M1-04-06	2004-09-30	1020-1040	69	70	+1	Yes			TMS01
	M1-04-07	2004-09-30	1220-1240	67	68	+1	Yes			TMS04

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
1-05	M1-05-01	2004-09-30	1400-1420	67	66	-1	Yes			TMS05
	M1-05-02	2004-09-30	1440-1500	67	68	+1	Yes			TMS06
	M1-05-03	2004-09-30	1440-1500	63	66	+3	Yes			TMS06
	M1-05-04	2004-09-30	1400-1420	63	66	+3	Yes			TMS05
	M1-05-05	2004-09-30	1440-1500	69	69	0	Yes			TMS06
	M1-05-06	2004-09-30	1400-1420	64	61	-3	Yes			TMS05
1-06	M1-06-01	2004-10-05	1020-1040	72	73	+1	Yes			TMS07
	M1-06-02	2004-10-05	1100-1120	69	72	+3	Yes			TMS08
	M1-06-03	2004-10-05	1140-1200	66	67	+1	Yes			TMS09
1-07	M1-07-01	2004-10-05	1100-1120	73	74	+1	Yes			TMS08
	M1-07-02	2004-10-05	1140-1200	71	73	+2	Yes			TMS09
	M1-07-03	2004-10-05	1020-1040	72	75	+3	Yes			TMS07
1-08	M1-08-01	2004-10-05	1140-1200	65	64	-1	Yes			TMS09
	M1-08-02	2004-10-05	1100-1120	64	67	+3	Yes			TMS08
	M1-08-03	2004-10-05	1020-1040	64	66	+2	Yes			TMS07
1-09	M1-09-01	2004-10-08	1020-1040	65	67	+2	Yes			TMS14
	M1-09-02	2004-10-08	1100-1120	63	65	+2	Yes			TMS15
	M1-09-03	2004-10-08	1140-1200	59	59	0	Yes			TMS16
1-10	M1-10-01	2004-10-08	1020-1040	66	69	+3	Yes			TMS14
	M1-10-02	2004-10-08	1100-1120	64	67	+3	Yes			TMS15
	M1-10-03	2004-10-08	1100-1120	59	59	0	Yes			TMS15
	M1-10-04	2004-10-08	1020-1040	66	69	+3	Yes			TMS14
	M1-10-05	2004-10-08	1100-1120	69	72	+3	Yes			TMS15
	M1-10-06	2004-10-08	1020-1040	70	72	+2	Yes			TMS14
	M1-10-07	2004-10-08	1020-1040	64	67	+3	Yes			TMS14
	M1-10-08	2004-10-08	1100-1120	77	N/A	N/A			1	TMS15
1-11	M1-11-01	2004-10-08	1140-1200	64	67	+3	Yes			TMS16
	M1-11-02	2004-10-08	1140-1200	68	71	+3	Yes			TMS16
	M1-11-03	2004-10-05	1520-1540	57	59	+2	Yes			TMS13
	M1-11-04	2004-10-05	1440-1500	69	70	+1	Yes			TMS12
1-12	M1-12-01	2004-10-05	1400-1420	63	60	-3	Yes			TMS11
	M1-12-02	2004-10-05	1320-1340	65	66	+1	Yes			TMS10
1-13	M1-13-01	2004-10-05	1440-1500	63	66	+3	Yes			TMS12
	M1-13-02	2004-10-05	1520-1540	62	62	0	Yes			TMS13
1-14	M1-14-01	2004-10-05	1400-1420	59	61	+2	Yes			TMS11
	M1-14-02	2004-10-05	1320-1340	63	61	-2	Yes			TMS10
	M1-14-03	2004-10-05	1400-1420	64	63	-1	Yes			TMS11
	M1-14-04	2004-10-05	1520-1540	65	68	+3	Yes			TMS13
	M1-14-05	2004-10-05	1400-1420	61	64	+3	Yes			TMS11

NSA	Receptor	Measurement Date and Time	Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M1-14-06	2004-10-05 1440-1500	67	70	+3	Yes			TMS12
1-15	M1-15-01		61	62	+1	Yes			PTMS39
	M1-15-02		53	53	0	Yes			PTMS39
	M1-15-03		54	55	+1	Yes			PTMS39
	M1-15-04		66	69	+3	Yes			PTMS39
	M1-15-05		66	69	+3	Yes			PTMS40
	M1-15-06		N/A	N/A	N/A			1	PTMS40
	M1-15-07		52	53	+1	Yes			PTMS40
	M1-15-08		55	53	-2	Yes			PTMS40
	M1-15-09		60	62	+2	Yes			PTMS35
	M1-15-10		51	53	+2	Yes			PTMS35
	M1-15-11		48	51	+3	Yes			PTMS41
	M1-15-12		54	53	-1	Yes			PTMS35
	M1-15-13		59	59	0	Yes			PTMS35
	M1-15-14		51	52	+1	Yes			PTMS41
	M1-15-15		52	53	+1	Yes			PTMS41
	M1-15-16		56	57	+1	Yes			PTMS41
	M1-15-17		51	54	+3	Yes			PTMS37
	M1-15-18		50	52	+2	Yes			PTMS37
	M1-15-19		54	56	+2	Yes			PTMS37
	M1-15-20		55	56	+1	Yes			PTMS37
	M1-15-21		53	56	+3	Yes			PTMS42
	M1-15-22		59	57	-2	Yes			PTMS42
	M1-15-23		62	62	0	Yes			PTMS42
1-16	M1-16-01	2004-10-13 1240-1300	65	64	-1	Yes			TMS24
	M1-16-02	2004-10-13 1200-1220	75	78	+3	Yes			TMS23
	M1-16-03	2004-10-13 1200-1220	70	69	-1	Yes			TMS23
	M1-16-04	2004-10-13 1240-1300	68	70	+2	Yes			TMS24
	M1-16-05	2004-10-13 1200-1220	65	67	+2	Yes			TMS23
	M1-16-06	2004-10-13 1240-1300	58	61	+3	Yes			TMS24
1-17	M1-17-01	2004-10-13 1020-1040	59	62	+3	Yes			TMS21
	M1-17-02	2004-10-13 1100-1120	75	74	-1	Yes			TMS22
	M1-17-03	2004-10-13 1020-1040	60	63	+3	Yes			TMS21
	M1-17-04	2004-10-13 1100-1120	61	64	+3	Yes			TMS22
1-18	M1-18-01	2004-10-13 1100-1120	66	68	+2	Yes			TMS22
	M1-18-02	2004-10-13 1020-1040	65	66	+1	Yes			TMS21
1-19	M1-19-01		60	61	+1	Yes			PTMS50
	M1-19-02		63	63	0	Yes			PTMS45
	M1-19-03		64	66	+2	Yes			PTMS50

NSA	Receptor	Measurement Date and Time	Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M1-19-04		63	60	-3	Yes			PTMS46
	M1-19-05		57	57	0	Yes			PTMS46
	M1-19-06		57	54	-3	Yes			PTMS45
	M1-19-07		53	51	-2	Yes			PTMS45
	M1-19-08		64	61	-3	Yes			PTMS49
	M1-19-09		65	65	0	Yes			PTMS44
	M1-19-10		58	59	+1	Yes			PTMS44
	M1-19-11		57	55	-2	Yes			PTMS48
	M1-19-12		64	64	0	Yes			PTMS43
	M1-19-13		60	59	-1	Yes			PTMS43
	M1-19-14		54	54	0	Yes			PTMS43
	M1-19-15		65	65	0	Yes			PTMS47
	M1-19-16		64	67	+3	Yes			PTMS44
1-20	M1-20-02		66	66	0	Yes			PTMS25
	M1-20-03		70	70	0	Yes			PTMS25
	M1-20-04		77	77	0	Yes			PTMS25
	M1-20-09		75	76	+1	Yes			PTMS25
	M1-20-09		75	75	0	Yes			PTMS26
	M1-20-09		75	75	0	Yes			PTMS27
	M1-20-11		68	68	0	Yes			PTMS26
	M1-20-15		70	70	0	Yes			PTMS26
	M1-20-16		66	66	0	Yes			PTMS26
	M1-20-18		63	63	0	Yes			PTMS26
	M1-20-19		71	71	0	Yes			PTMS26
	M1-20-19		71	71	0	Yes			PTMS27
	M1-20-20		63	63	0	Yes			PTMS27
	M1-20-21		69	69	0	Yes			PTMS27
	M1-20-22		57	57	0	Yes			PTMS27
1-21	M1-21-01	2004-10-22 1100-1120	53	55	+2	Yes			TMS26
	M1-21-02	2004-10-22 1100-1120	72	75	+3	Yes			TMS26
	M1-21-03	2004-10-22 1100-1120	53	56	+3	Yes			TMS26
1-22	M1-22-01	2004-10-22 1100-1120	66	69	+3	Yes			TMS26
	M1-22-02	2004-10-22 1100-1120	72	75	+3	Yes			TMS26
1-23	M1-23-01	2004-11-02 1100-1120	72	72	0	Yes			TMS41
	M1-23-02	2004-11-02 1100-1120	58	58	0	Yes			TMS41
	M1-23-03	2004-11-02 1100-1120	55	54	-1	Yes			TMS41
	M1-23-04	2004-11-02 1100-1120	67	70	+3	Yes			TMS41
	M1-23-05	2004-11-02 1020-1040	57	57	0	Yes			TMS40
	M1-23-06	2004-11-02 1020-1040	63	65	+2	Yes			TMS40

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M1-23-07	2004-11-02	1020-1040	57	58	+1	Yes			TMS40
	M1-23-08	2004-11-02	1020-1040	53	55	+2	Yes			TMS40
1-25	M1-25-01	2004-11-02	0940-1000	66	69	+3	Yes			TMS39
	M1-25-02	2004-11-02	0940-1000	56	58	+2	Yes			TMS39
	M1-25-03	2004-11-02	0940-1000	63	66	+3	Yes			TMS39
	M1-25-04	2004-11-02	0940-1000	55	57	+2	Yes			TMS39
1-26	M1-26-01	2004-10-12	1340-1400	70	73	+3	Yes			TMS20
	M1-26-02	2004-10-12	1340-1400	59	61	+2	Yes			TMS20
	M1-26-03	2004-10-12	1340-1400	73	74	+1	Yes			TMS20
	M1-26-04	2004-10-12	1340-1400	63	63	0	Yes			TMS20
1-27	M1-27-01	2004-11-02	1300-1320	68	71	+3	Yes			TMS42
	M1-27-02	2004-11-02	1300-1320	61	64	+3	Yes			TMS42
	M1-27-03	2004-11-02	1300-1320	61	61	0	Yes			TMS42
	M1-27-04	2004-11-02	1300-1320	58	59	+1	Yes			TMS42
1-28	M1-28-01	2004-10-12	1020-1040	68	71	+3	Yes			TMS17
	M1-28-02	2004-10-12	1020-1040	68	69	+1	Yes			TMS17
	M1-28-03	2004-10-12	1020-1040	68	70	+2	Yes			TMS17
	M1-28-04	2004-10-12	1020-1040	70	71	+1	Yes			TMS17
1-29	M1-29-01	2004-10-12	1100-1120	63	66	+3	Yes			TMS18
	M1-29-02	2004-10-12	1100-1120	59	60	+1	Yes			TMS18
	M1-29-03	2004-10-12	1100-1120	72	75	+3	Yes			TMS18
	M1-29-04	2004-10-12	1100-1120	63	66	+3	Yes			TMS18
1-30	M1-30-01	2004-10-26	1000-1020	57	57	0	Yes			TMS27
	M1-30-02	2004-10-26	1000-1020	64	66	+2	Yes			TMS27
	M1-30-03	2004-10-26	1000-1020	69	71	+2	Yes			TMS27
	M1-30-04	2004-10-26	1000-1020	67	67	0	Yes			TMS27
	M1-30-05	2004-10-26	1000-1020	59	59	0	Yes			TMS27
	M1-30-06	2004-10-26	1040-1100	56	59	+3	Yes			TMS28
	M1-30-07	2004-10-26	1040-1100	63	65	+2	Yes			TMS28
	M1-30-08	2004-10-26	1040-1100	66	67	+1	Yes			TMS28
	M1-30-09	2004-10-26	1040-1100	55	53	-2	Yes			TMS28
	M1-30-10	2004-10-26	1120-1140	57	56	-1	Yes			TMS29
	M1-30-11	2004-10-26	1120-1140	74	74	0	Yes			TMS29
	M1-30-12	2004-10-26	1120-1140	72	74	+2	Yes			TMS29
1-31	M1-31-01	2004-10-26	1440-1500	68	71	+3	Yes			TMS33
	M1-31-02	2004-10-26	1440-1500	58	56	-2	Yes			TMS33
	M1-31-03	2004-10-26	1440-1500	67	67	0	Yes			TMS33
	M1-31-04	2004-10-26	1440-1500	58	59	+1	Yes			TMS33
	M1-31-05	2004-10-26	1440-1500	62	59	-3	Yes			TMS33

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M1-31-06	2004-10-26	1400-1420	65	62	-3	Yes			TMS32
	M1-31-07	2004-10-26	1400-1420	57	55	-2	Yes			TMS32
	M1-31-08	2004-10-26	1400-1420	67	70	+3	Yes			TMS32
	M1-31-09	2004-10-26	1400-1420	63	60	-3	Yes			TMS32
	M1-31-10	2004-10-26	1400-1420	68	71	+3	Yes			TMS32
	M1-31-11	2004-10-26	1320-1340	59	59	0	Yes			TMS31
	M1-31-12	2004-10-26	1320-1340	73	76	+3	Yes			TMS31
	M1-31-13	2004-10-26	1320-1340	65	67	+2	Yes			TMS31
	M1-31-14	2004-10-26	1320-1340	66	67	+1	Yes			TMS31
1-32	M1-32-01	2004-10-26	1200-1220	61	61	0	Yes			TMS30
	M1-32-02	2004-10-26	1200-1220	65	66	+1	Yes			TMS30
	M1-32-03	2004-10-26	1200-1220	52	51	-1	Yes			TMS30
1-33	M1-33-01	2004-10-28	1020-1040	65	64	-1	Yes			TMS34
	M1-33-02	2004-10-28	1020-1040	57	60	+3	Yes			TMS34
	M1-33-03	2004-10-28	1020-1040	55	58	+3	Yes			TMS34
	M1-33-04	2004-10-28	1020-1040	61	59	-2	Yes			TMS34
	M1-33-05	2004-10-28	1020-1040	57	59	+2	Yes			TMS34
	M1-33-06	2004-10-28	1020-1040	66	68	+2	Yes			TMS34
1-35	M1-35-01	2004-11-18	1240-1300	71	73	+2	Yes			TMS60
1-37	M1-37-01	2004-10-12	1240-1300	66	68	+2	Yes			TMS19
	M1-37-02	2004-10-12	1240-1300	68	69	+1	Yes			TMS19
2-01	M2-01-01	2004-12-16	1020-1040	62	59	-3	Yes			TMS75
	M2-01-02	2004-12-16	1020-1040	60	60	0	Yes			TMS75
	M2-01-03	2004-12-16	1020-1040	60	57	-3	Yes			TMS75
	M2-01-04	2004-12-16	1020-1040	54	57	+3	Yes			TMS75
	M2-01-05	2004-12-16	1020-1040	55	58	+3	Yes			TMS75
	M2-01-06	2004-12-16	1020-1040	60	63	+3	Yes			TMS75
2-02	M2-02-01	2005-01-26	1320-1340	65	65	**0**	Yes			TMS105
	M2-02-02	2005-01-26	1320-1340	60	60	**0**	Yes			TMS105
	M2-02-03	2005-01-26	1320-1340	67	64	**-3**	Yes			TMS105
	M2-02-04	2005-01-26	1320-1340	67	68	**+1**	Yes			TMS105
	M2-02-05	2005-01-26	1320-1340	61	59	**-2**	Yes			TMS105
	M2-02-06	2005-01-26	1400-1420	61	58	**-3**	Yes			TMS106
	M2-02-07	2005-01-26	1400-1420	66	63	**-3**	Yes			TMS106
	M2-02-08	2005-01-26	1400-1420	67	64	**-3**	Yes			TMS106
	M2-02-09	2005-01-26	1400-1420	68	69	**+1**	Yes			TMS106
	M2-02-10	2005-01-26	1400-1420	64	61	**-3**	Yes			TMS106
2-03	M2-03-01	2004-12-16	1200-1220	55	55	0	Yes			TMS77
	M2-03-02	2004-12-16	1200-1220	63	61	-2	Yes			TMS77

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M2-03-03	2004-12-16	1200-1220	61	58	-3	Yes			TMS77
	M2-03-04	2004-12-16	1200-1220	55	52	-3	Yes			TMS77
	M2-03-05	2004-12-16	1200-1220	59	55	-4		No	2	TMS77
2-04	M2-04-01	2004-12-16	1240-1300	63	61	-2	Yes			TMS78
	M2-04-02	2004-12-16	1240-1300	58	57	-1	Yes			TMS78
	M2-04-03	2004-12-16	1240-1300	62	60	-2	Yes			TMS78
	M2-04-04	2004-12-16	1240-1300	59	56	-3	Yes			TMS78
	M2-04-05	2004-12-16	1240-1300	58	57	-1	Yes			TMS78
	M2-04-06	2004-12-16	1240-1300	64	61	-3	Yes			TMS78
	M2-04-07	2004-12-16	1320-1340	55	55	0	Yes			TMS79
	M2-04-08	2004-12-16	1320-1340	60	58	-2	Yes			TMS79
	M2-04-09	2004-12-16	1320-1340	55	56	+1	Yes			TMS79
	M2-04-10	2004-12-16	1320-1340	57	56	-1	Yes			TMS79
	M2-04-11	2004-12-16	1320-1340	57	57	0	Yes			TMS79
	M2-04-12	2004-12-16	1320-1340	61	62	+1	Yes			TMS79
2-05	M2-05-01	2004-11-23	1120-1140	61	58	-3	Yes			TMS66
	M2-05-02	2004-11-23	1120-1140	63	61	-2	Yes			TMS66
	M2-05-03	2004-11-23	1120-1140	61	61	0	Yes			TMS66
	M2-05-04	2004-11-23	1120-1140	59	57	-2	Yes			TMS66
	M2-05-05	2004-11-23	1120-1140	60	58	-2	Yes			TMS66
	M2-05-05	2004-12-16	1120-1140	60	58	-2	Yes			TMS76
	M2-05-06	2004-12-16	1120-1140	60	61	+1	Yes			TMS76
	M2-05-07	2004-12-16	1120-1140	54	56	+2	Yes			TMS76
	M2-05-08	2004-12-16	1120-1140	57	57	0	Yes			TMS76
	M2-05-09	2004-12-16	1120-1140	57	57	0	Yes			TMS76
	M2-05-10	2004-12-16	1120-1140	57	55	-2	Yes			TMS76
	M2-05-11	2004-11-23	1120-1140	58	55	-3	Yes			TMS66
	M2-05-12	2004-11-23	1120-1140	56	56	0	Yes			TMS66
2-06	M2-06-01	2004-12-16	1400-1420	55	57	+2	Yes			TMS80
	M2-06-02	2004-12-16	1400-1420	59	59	0	Yes			TMS80
	M2-06-03	2004-12-16	1400-1420	54	55	+1	Yes			TMS80
	M2-06-04	2004-12-16	1400-1420	57	58	+1	Yes			TMS80
	M2-06-05	2004-12-16	1400-1420	55	57	+2	Yes			TMS80
	M2-06-06	2004-12-16	1400-1420	59	60	+1	Yes			TMS80
2-07	M2-07-01	2005-01-10	1400-1420	65	65	0	Yes			TMS86
	M2-07-02	2005-01-10	1400-1420	59	60	+1	Yes			TMS86
	M2-07-03	2005-01-10	1400-1420	57	55	-2	Yes			TMS86
	M2-07-04	2005-01-10	1400-1420	64	67	+3	Yes			TMS86
	M2-07-05	2005-01-10	1400-1420	58	60	+2	Yes			TMS86

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M2-07-06	2005-01-10	1400-1420	64	67	+3	Yes			TMS86
2-08	M2-08-01	2005-01-10	1320-1340	62	64	+2	Yes			TMS85
	M2-08-02	2005-01-10	1320-1340	63	65	+2	Yes			TMS85
	M2-08-03	2005-01-10	1320-1340	61	61	0	Yes			TMS85
	M2-08-04	2005-01-10	1320-1340	65	62	-3	Yes			TMS85
	M2-08-05	2005-01-10	1320-1340	61	58	-3	Yes			TMS85
	M2-08-06	2005-01-10	1320-1340	64	61	-3	Yes			TMS85
2-09	M2-09-01	2005-01-12	1220-1240	61	62	+1	Yes			TMS91
	M2-09-02	2005-01-12	1220-1240	62	60	-2	Yes			TMS91
	M2-09-03	2005-01-12	1220-1240	59	61	+2	Yes			TMS91
	M2-09-04	2005-01-12	1220-1240	58	61	+3	Yes			TMS91
	M2-09-05	2005-01-12	1220-1240	61	63	+2	Yes			TMS91
	M2-09-06	2005-01-12	1220-1240	60	61	+1	Yes			TMS91
2-10	M2-10-01	2005-01-12	1140-1200	66	63	-3	Yes			TMS90
	M2-10-02	2005-01-12	1140-1200	62	61	-1	Yes			TMS90
	M2-10-03	2005-01-12	1140-1200	65	63	-2	Yes			TMS90
	M2-10-04	2005-01-12	1140-1200	65	65	0	Yes			TMS90
	M2-10-05	2005-01-12	1140-1200	67	65	-2	Yes			TMS90
2-11	M2-11-01	2005-01-12	1020-1040	64	63	-1	Yes			TMS88
	M2-11-02	2005-01-12	1100-1120	66	67	+1	Yes			TMS89
	M2-11-03	2005-01-12	1100-1120	73	70	-3	Yes			TMS89
	M2-11-04	2005-01-12	1100-1120	70	70	0	Yes			TMS89
	M2-11-05	2005-01-12	1100-1120	65	64	-1	Yes			TMS89
	M2-11-06	2005-01-12	1100-1120	68	71	+3	Yes			TMS89
	M2-11-07	2005-01-12	1100-1120	65	63	-2	Yes			TMS89
2-12	M2-12-01	2005-01-18	1120-1140	64	65	+1	Yes			TMS96
	M2-12-02	2005-01-18	1120-1140	68	66	-2	Yes			TMS96
	M2-12-03	2005-01-18	1200-1220	69	66	-3	Yes			TMS97
	M2-12-04	2005-01-18	1200-1220	64	63	-1	Yes			TMS97
	M2-12-05	2005-01-18	1200-1220	64	63	-1	Yes			TMS97
	M2-12-06	2005-01-18	1200-1220	64	64	0	Yes			TMS97
	M2-12-07	2005-01-18	1200-1220	66	64	-2	Yes			TMS97
2-13	M2-13-01	2005-01-18	1420-1440	69	70	+1	Yes			TMS100
	M2-13-02	2005-01-18	1420-1440	66	69	+3	Yes			TMS100
	M2-13-03	2005-01-18	1320-1340	64	63	-1	Yes			TMS99
	M2-13-04	2005-01-18	1320-1340	62	61	-1	Yes			TMS99
	M2-13-05	2005-01-18	1320-1340	62	61	-1	Yes			TMS99
	M2-13-06	2005-01-18	1320-1340	62	59	-3	Yes			TMS99
	M2-13-07	2005-01-18	1320-1340	68	66	-2	Yes			TMS99

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M2-13-08	2005-01-18	1240-1300	57	57	0	Yes			TMS98
	M2-13-09	2005-01-18	1240-1300	62	60	-2	Yes			TMS98
	M2-13-10	2005-01-18	1240-1300	60	63	+3	Yes			TMS98
	M2-13-11	2005-01-18	1240-1300	66	65	-1	Yes			TMS98
	M2-13-12	2005-01-18	1240-1300	64	67	+3	Yes			TMS98
2-14	M2-14-01	2005-01-26	1120-1140	56	56	0	Yes			TMS103
	M2-14-02	2005-01-26	1120-1140	61	61	0	Yes			TMS103
	M2-14-03	2005-01-26	1120-1140	51	54	+3	Yes			TMS103
	M2-14-04	2005-01-26	1120-1140	59	59	0	Yes			TMS103
	M2-14-05	2005-01-26	1120-1140	57	56	-1	Yes			TMS103
	M2-14-06	2005-01-26	1120-1140	50	53	+3	Yes			TMS103
	M2-14-07	2005-01-26	1040-1100	58	58	0	Yes			TMS102
	M2-14-08	2005-01-26	1040-1100	63	62	-1	Yes			TMS102
	M2-14-09	2005-01-26	1040-1100	54	54	0	Yes			TMS102
	M2-14-10	2005-01-26	1040-1100	55	54	-1	Yes			TMS102
2-15	M2-15-01	2004-11-18	1000-1020	62	62	0	Yes			TMS56
	M2-15-02	2004-11-18	1000-1020	58	56	-2	Yes			TMS56
	M2-15-03	2004-11-18	1000-1020	63	62	-1	Yes			TMS56
	M2-15-04	2004-11-18	1000-1020	59	57	-2	Yes			TMS56
	M2-15-05	2004-11-18	1000-1020	64	61	-3	Yes			TMS56
	M2-15-06	2004-11-18	1040-1100	63	62	-1	Yes			TMS57
	M2-15-07	2004-11-18	1040-1100	58	57	-1	Yes			TMS57
	M2-15-08	2004-11-18	1040-1100	63	63	0	Yes			TMS57
	M2-15-09	2004-11-18	1040-1100	67	68	+1	Yes			TMS57
	M2-15-10	2004-11-18	1040-1100	66	65	-1	Yes			TMS57
2-16	M2-16-01	2004-11-18	1120-1140	64	62	-2	Yes			TMS58
	M2-16-02	2004-11-18	1120-1140	58	60	+2	Yes			TMS58
	M2-16-03	2004-11-18	1120-1140	64	66	+2	Yes			TMS58
	M2-16-04	2004-11-18	1200-1220	66	67	+1	Yes			TMS59
	M2-16-05	2004-11-18	1200-1220	62	63	+1	Yes			TMS59
	M2-16-06	2004-11-18	1200-1220	67	64	-3	Yes			TMS59
	M2-16-07	2004-11-18	1200-1220	62	65	+3	Yes			TMS59
	M2-16-08	2004-11-18	1200-1220	69	69	0	Yes			TMS59
	M2-16-09	2004-11-18	1120-1140	64	61	-3	Yes			TMS58
2-17	M2-17-01	2004-11-18	1320-1340	64	66	+2	Yes			TMS61
	M2-17-02	2004-11-18	1320-1340	61	63	+2	Yes			TMS61
	M2-17-03	2004-11-18	1320-1340	62	64	+2	Yes			TMS61
	M2-17-04	2004-11-18	1320-1340	53	56	+3	Yes			TMS61
	M2-17-05	2004-11-18	1320-1340	65	65	0	Yes			TMS61

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
2-18	M2-18-01	2004-11-18	1240-1300	60	62	+2	Yes			TMS60
	M2-18-02	2004-11-18	1240-1300	56	59	+3	Yes			TMS60
	M2-18-03	2004-11-18	1240-1300	55	57	+2	Yes			TMS60
	M2-18-04	2004-11-18	1240-1300	64	63	-1	Yes			TMS60
	M2-18-05	2004-11-18	1240-1300	57	59	+2	Yes			TMS60
2-19	M2-19-01	2004-11-18	1400-1420	66	66	0	Yes			TMS62
	M2-19-02	2004-11-18	1400-1420	63	64	+1	Yes			TMS62
	M2-19-03	2004-11-18	1400-1420	61	59	-2	Yes			TMS62
	M2-19-04	2004-11-18	1400-1420	61	61	0	Yes			TMS62
2-20	M2-20-01	2004-11-18	1440-1500	63	66	+3	Yes			TMS63
	M2-20-02	2004-11-18	1440-1500	59	60	+1	Yes			TMS63
	M2-20-03	2004-11-18	1440-1500	55	56	+1	Yes			TMS63
	M2-20-04	2004-11-18	1440-1500	59	60	+1	Yes			TMS63
	M2-20-05	2004-11-18	1440-1500	63	62	-1	Yes			TMS63
2-21	M2-21-01	2005-01-10	1220-1240	64	59	-5		No	3	TMS84
	M2-21-02	2005-01-10	1220-1240	65	62	-3	Yes			TMS84
	M2-21-03	2005-01-10	1220-1240	65	63	-2	Yes			TMS84
	M2-21-04	2005-01-10	1220-1240	66	63	-3	Yes			TMS84
	M2-21-05	2005-01-10	1220-1240	65	66	+1	Yes			TMS84
	M2-21-06	2005-01-10	1220-1240	66	63	-3	Yes			TMS84
2-22	M2-22-01	2005-01-10	1140-1200	68	69	+1	Yes			TMS83
	M2-22-02	2005-01-10	1140-1200	62	64	+2	Yes			TMS83
	M2-22-03	2005-01-10	1140-1200	68	68	0	Yes			TMS83
	M2-22-04	2005-01-10	1140-1200	61	62	+1	Yes			TMS83
	M2-22-05	2005-01-10	1140-1200	64	63	-1	Yes			TMS83
	M2-22-06	2005-01-10	1140-1200	62	62	0	Yes			TMS83
2-23	M2-23-01	2005-01-10	1100-1120	66	67	+1	Yes			TMS82
	M2-23-02	2005-01-10	1100-1120	66	65	-1	Yes			TMS82
	M2-23-03	2005-01-10	1100-1120	66	66	0	Yes			TMS82
	M2-23-04	2005-01-10	1100-1120	61	64	+3	Yes			TMS82
	M2-23-05	2005-01-10	1100-1120	67	66	-1	Yes			TMS82
	M2-23-06	2005-01-10	1020-1040	66	65	-1	Yes			TMS81
	M2-23-07	2005-01-10	1020-1040	60	62	+2	Yes			TMS81
	M2-23-08	2005-01-10	1020-1040	68	66	-2	Yes			TMS81
	M2-23-09	2005-01-10	1020-1040	68	65	-3	Yes			TMS81
	M2-23-10	2005-01-10	1020-1040	63	61	-2	Yes			TMS81
	M2-23-11	2005-01-10	1020-1040	66	68	+2	Yes			TMS81
2-24	M2-24-01	2004-11-29	1200-1220	64	62	-2	Yes			TMS71
	M2-24-02	2004-11-29	1200-1220	61	61	0	Yes			TMS71

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M2-24-03	2004-11-29	1200-1220	62	62	0	Yes			TMS71
	M2-24-04	2004-11-29	1200-1220	60	62	+2	Yes			TMS71
	M2-24-09	2004-11-29	1200-1220	63	61	-2	Yes			TMS71
	M2-24-12	2004-11-29	1200-1220	77	80	+3	Yes			TMS71
2-25	M2-25-01	2004-11-29	1240-1300	58	60	+2	Yes			TMS72
	M2-25-02	2004-11-29	1240-1300	60	62	+2	Yes			TMS72
	M2-25-03	2004-11-29	1240-1300	59	62	+3	Yes			TMS72
	M2-25-04	2004-11-29	1240-1300	64	64	0	Yes			TMS72
	M2-25-05	2004-11-29	1240-1300	64	64	0	Yes			TMS72
	M2-25-06	2004-11-29	1240-1300	66	65	-1	Yes			TMS72
	M2-25-07	2004-11-29	1240-1300	58	61	+3	Yes			TMS72
2-26	M2-26-01	2004-11-29	1120-1140	62	61	-1	Yes			TMS70
	M2-26-02	2004-11-29	1120-1140	64	63	-1	Yes			TMS70
	M2-26-03	2004-11-29	1120-1140	60	59	-1	Yes			TMS70
	M2-26-04	2004-11-29	1120-1140	64	63	-1	Yes			TMS70
	M2-26-05	2004-11-29	1120-1140	59	58	-1	Yes			TMS70
	M2-26-06	2004-11-29	1040-1100	63	65	+2	Yes			TMS69
	M2-26-07	2004-11-29	1040-1100	63	64	+1	Yes			TMS69
	M2-26-08	2004-11-29	1040-1100	66	67	+1	Yes			TMS69
	M2-26-09	2004-11-29	1040-1100	65	63	-2	Yes			TMS69
	M2-26-10	2004-11-29	1040-1100	59	60	+1	Yes			TMS69
	M2-26-11	2004-11-29	1040-1100	60	60	0	Yes			TMS69
	M2-26-12	2004-11-29	1000-1020	63	64	+1	Yes			TMS68
	M2-26-13	2004-11-29	1000-1020	59	60	+1	Yes			TMS68
	M2-26-14	2004-11-29	1000-1020	66	65	-1	Yes			TMS68
	M2-26-15	2004-11-29	1000-1020	62	61	-1	Yes			TMS68
	M2-26-16	2004-11-29	1000-1020	68	65	-3	Yes			TMS68
	M2-26-17	2004-11-29	1000-1020	64	63	-1	Yes			TMS68
2-27	M2-27-01	2004-11-29	1320-1340	68	68	0	Yes			TMS73
	M2-27-02	2004-11-29	1320-1340	61	63	+2	Yes			TMS73
	M2-27-03	2004-11-29	1320-1340	56	59	+3	Yes			TMS73
	M2-27-04	2004-11-29	1320-1340	62	65	+3	Yes			TMS73
	M2-27-05	2004-11-29	1320-1340	61	61	0	Yes			TMS73
	M2-27-06	2004-11-29	1320-1340	64	63	-1	Yes			TMS73
	M2-27-07	2004-11-29	1400-1420	66	65	-1	Yes			TMS74
	M2-27-08	2004-11-29	1400-1420	63	61	-2	Yes			TMS74
	M2-27-09	2004-11-29	1400-1420	69	66	-3	Yes			TMS74
	M2-27-10	2004-11-29	1400-1420	61	64	+3	Yes			TMS74
	M2-27-11	2004-11-29	1400-1420	65	68	+3	Yes			TMS74

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M2-27-12	2004-11-29	1400-1420	69	68	-1	Yes			TMS74
2-28	M2-28-01	2004-10-28	1120-1140	57	58	+1	Yes			TMS35
	M2-28-02	2004-10-28	1120-1140	56	56	0	Yes			TMS35
	M2-28-03	2004-10-28	1120-1140	63	60	-3	Yes			TMS35
	M2-28-04	2004-10-28	1120-1140	64	61	-3	Yes			TMS35
2-29	M2-29-01	2004-10-28	1200-1220	64	67	+3	Yes			TMS36
	M2-29-02	2004-10-28	1200-1220	64	62	-2	Yes			TMS36
	M2-29-03	2004-10-28	1200-1220	57	55	-2	Yes			TMS36
	M2-29-04	2004-10-28	1200-1220	59	59	0	Yes			TMS36
2-30	M2-30-01	2004-11-16	1320-1340	60	61	+1	Yes			TMS54
	M2-30-02	2004-11-16	1320-1340	62	63	+1	Yes			TMS54
	M2-30-03	2004-11-16	1320-1340	62	64	+2	Yes			TMS54
	M2-30-04	2004-11-16	1320-1340	58	60	+2	Yes			TMS54
	M2-30-05	2004-11-16	1320-1340	63	64	+1	Yes			TMS54
	M2-30-06	2004-11-16	1400-1420	65	66	+1	Yes			TMS55
	M2-30-07	2004-11-16	1400-1420	61	62	+1	Yes			TMS55
	M2-30-08	2004-11-16	1400-1420	64	65	+1	Yes			TMS55
	M2-30-09	2004-11-16	1400-1420	58	60	+2	Yes			TMS55
	M2-30-10	2004-11-16	1400-1420	63	60	-3	Yes			TMS55
2-31	M2-31-01	2004-11-16	1240-1300	65	68	+3	Yes			TMS53
	M2-31-02	2004-11-16	1240-1300	63	64	+1	Yes			TMS53
	M2-31-03	2004-11-16	1240-1300	58	59	+1	Yes			TMS53
	M2-31-04	2004-11-16	1240-1300	62	59	-3	Yes			TMS53
	M2-31-05	2004-11-16	1240-1300	62	63	+1	Yes			TMS53
	M2-31-06	2004-11-16	1200-1220	63	63	0	Yes			TMS52
	M2-31-07	2004-11-16	1200-1220	63	63	0	Yes			TMS52
	M2-31-08	2004-11-16	1200-1220	57	60	+3	Yes			TMS52
	M2-31-09	2004-11-16	1200-1220	64	63	-1	Yes			TMS52
	M2-31-10	2004-11-16	1200-1220	63	61	-2	Yes			TMS52
	M2-31-11	2004-11-16	1120-1140	65	62	-3	Yes			TMS51
	M2-31-12	2004-11-16	1120-1140	59	60	+1	Yes			TMS51
	M2-31-13	2004-11-16	1120-1140	64	63	-1	Yes			TMS51
	M2-31-14	2004-11-16	1120-1140	66	67	+1	Yes			TMS51
2-32	M2-32-01	2004-11-11	1240-1300	68	65	-3	Yes			TMS46
	M2-32-02	2004-11-11	1240-1300	62	59	-3	Yes			TMS46
	M2-32-03	2004-11-11	1200-1220	63	62	-1	Yes			TMS45
	M2-32-04	2004-11-11	1200-1220	64	66	+2	Yes			TMS45
	M2-32-05	2004-11-11	1200-1220	61	63	+2	Yes			TMS45
	M2-32-06	2004-11-11	1200-1220	67	68	+1	Yes			TMS45

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M2-32-07	2004-11-11	1200-1220	62	65	+3	Yes			TMS45
2-33	M2-33-01	2004-11-11	1000-1020	64	63	-1	Yes			TMS43
	M2-33-02	2004-11-11	1000-1020	62	59	-3	Yes			TMS43
	M2-33-03	2004-11-11	1000-1020	61	60	-1	Yes			TMS43
	M2-33-04	2004-11-11	1000-1020	63	60	-3	Yes			TMS43
	M2-33-05	2004-11-11	1000-1020	66	64	-2	Yes			TMS43
	M2-33-06	2004-11-11	1040-1100	65	62	-3	Yes			TMS44
	M2-33-07	2004-11-11	1040-1100	60	61	+1	Yes			TMS44
	M2-33-08	2004-11-11	1040-1100	62	61	-1	Yes			TMS44
	M2-33-09	2004-11-11	1040-1100	69	67	-2	Yes			TMS44
3-01	M3-01-01			65	68	+3	Yes			PTMS12
	M3-01-02			70	68	-2	Yes			PTMS14
	M3-01-03			70	71	+1	Yes			PTMS14
	M3-01-04			72	75	+3	Yes			PTMS15
	M3-01-05			75	78	+3	Yes			PTMS10
	M3-01-06			74	72	-2	Yes			PTMS10
	M3-01-07	2005-02-02	1240-1300	76	75	-1	Yes			PTMS12
	M3-01-08	2005-02-02	1240-1300	70	71	+1	Yes			PTMS11
	M3-01-09	2005-02-02	1240-1300	65	57	-8		No	4	PTMS11
	M3-01-10	2005-02-02	1240-1300	68	71	+3	Yes			PTMS11
	M3-01-11			77	75	-2	Yes			PTMS09
	M3-01-12			63	63	0	Yes			PTMS09
	M3-01-13			72	73	+1	Yes			PTMS08
	M3-01-14			64	65	+1	Yes			PTMS08
	M3-01-15	2005-02-02	1320-1340	68	70	+2	Yes			PTMS07
	M3-01-16	2005-02-02	1320-1340	72	73	+1	Yes			PTMS07
	M3-01-17	2005-02-02	1320-1340	62	64	+2	Yes			PTMS06
	M3-01-18	2005-02-02	1320-1340	68	71	+3	Yes			PTMS07
	M3-01-19	2005-02-02	1320-1340	65	66	+1	Yes			PTMS04
	M3-01-20	2005-02-02	1320-1340	74	71	-3	Yes			PTMS04
	M3-01-21	2005-02-02	1320-1340	69	70	+1	Yes			PTMS06
	M3-01-22	2005-02-02	1320-1340	75	75	0	Yes			PTMS03
	M3-01-23	2005-02-02	1320-1340	68	68	0	Yes			PTMS05
	M3-01-24	2005-02-02	1320-1340	76	74	-2	Yes			PTMS05
	M3-01-25	2005-02-02	1240-1300	72	73	+1	Yes			PTMS02
	M3-01-26	2005-02-02	1240-1300	74	75	+1	Yes			PTMS02
	M3-01-27	2005-02-02	1320-1340	70	71	+1	Yes			PTMS03
	M3-01-28			73	75	+2	Yes			PTMS01
	M3-01-29			73	75	+2	Yes			PTMS01

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
3-02	M3-02-01	2005-02-02	1200-1220	73	75	+2	Yes			PTMS03
	M3-02-02	2005-02-02	1200-1220	57	59	+2	Yes			PTMS02
	M3-02-03	2005-02-02	1200-1220	74	74	0	Yes			PTMS03
	M3-02-04	2005-02-02	1200-1220	73	73	0	Yes			PTMS02
	M3-02-05	2005-02-02	1200-1220	73	72	-1	Yes			PTMS01
	M3-02-06	2005-02-02	1200-1220	59	62	+3	Yes			PTMS01
	M3-02-07	2005-02-02	1200-1220	69	68	-1	Yes			PTMS01
	M3-02-08	2005-02-02	1200-1220	70	71	+1	Yes			PTMS02
3-03	M3-03-01	2004-11-23	1040-1100	65	66	+1	Yes			TMS65
	M3-03-02	2004-11-23	1040-1100	61	64	+3	Yes			TMS65
	M3-03-03	2004-11-23	1040-1100	61	60	-1	Yes			TMS65
	M3-03-04	2004-11-23	1040-1100	57	54	-3	Yes			TMS65
	M3-03-05	2004-11-23	1040-1100	55	58	+1	Yes			TMS65
	M3-03-06	2004-11-23	1040-1100	62	59	-3	Yes			TMS65
3-04	M3-04-01	2004-11-23	1000-1020	61	60	-1	Yes			TMS64
	M3-04-02	2004-11-23	1000-1020	57	55	-2	Yes			TMS64
	M3-04-03	2004-11-23	1000-1020	59	59	0	Yes			TMS64
	M3-04-04	2004-11-23	1000-1020	57	56	-1	Yes			TMS64
	M3-04-05	2004-11-23	1000-1020	58	56	-2	Yes			TMS64
	M3-04-06	2004-11-23	1000-1020	59	56	-3	Yes			TMS64
3-05	M3-05-01	2005-01-10	1440-1500	57	60	+3	Yes			TMS87
	M3-05-02	2005-01-10	1440-1500	62	60	-2	Yes			TMS87
	M3-05-03	2005-01-10	1440-1500	58	60	+2	Yes			TMS87
	M3-05-04	2005-01-10	1440-1500	60	63	+3	Yes			TMS87
3-06	M3-06-01			68	69	+1	Yes			PTMS03
	M3-06-02			68	70	+2	Yes			PTMS03
	M3-06-03			65	66	+1	Yes			PTMS03
	M3-06-04			68	71	+3	Yes			PTMS01
	M3-06-05			66	66	0	Yes			PTMS01
	M3-06-06			74	76	+2	Yes			PTMS02
	M3-06-07			70	72	+2	Yes			PTMS02
	M3-06-08			73	75	+2	Yes			PTMS02
	M3-06-09			65	67	+2	Yes			PTMS03
	M3-06-10			71	72	+1	Yes			PTMS02
	M3-06-11	2005-01-12	1300-1320	67	68	+1	Yes			TMS92
	M3-06-12			62	65	+3	Yes			PTMS02
	M3-06-13	2005-01-12	1300-1320	66	68	+2	Yes			TMS92
	M3-06-14	2005-01-12	1300-1320	57	60	+3	Yes			TMS92
	M3-06-15	2005-01-12	1300-1320	68	70	+2	Yes			TMS92

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M3-06-16	2005-01-12	1300-1320	68	67	-1	Yes			TMS92
	M3-06-17	2005-01-12	1400-1420	65	68	+3	Yes			TMS93
	M3-06-18	2005-01-12	1400-1420	61	64	+3	Yes			TMS93
	M3-06-19	2005-01-12	1400-1420	62	65	+3	Yes			TMS93
	M3-06-20	2005-01-12	1400-1420	68	71	+3	Yes			TMS93
3-07	M3-07-01	2005-01-12	1020-1040	67	58	-9		No	5	TMS88
	M3-07-02	2005-01-12	1020-1040	66	58	-8		No	5	TMS88
	M3-07-03	2005-01-12	1020-1040	68	58	-10		No	5	TMS88
	M3-07-04	2005-01-12	1020-1040	63	62	-1	Yes			TMS88
3-08	M3-08-01	2005-01-18	1040-1100	60	58	-2	Yes			TMS95
	M3-08-02	2005-01-18	1040-1100	58	59	+1	Yes			TMS95
	M3-08-03	2005-01-18	1040-1100	58	58	0	Yes			TMS95
	M3-08-04	2005-01-18	1040-1100	62	62	0	Yes			TMS95
	M3-08-05	2005-01-18	1040-1100	59	59	0	Yes			TMS95
3-09	M3-09-01	2005-01-18	1000-1020	63	61	-2	Yes			TMS94
	M3-09-02	2005-01-18	1000-1020	64	62	-2	Yes			TMS94
	M3-09-03	2005-01-18	1000-1020	64	63	-1	Yes			TMS94
	M3-09-04	2005-01-18	1000-1020	60	57	-3	Yes			TMS94
	M3-09-05	2005-01-18	1000-1020	57	57	0	Yes			TMS94
3-10	M3-10-01	2004-10-28	1400-1420	55	57	+2	Yes			TMS38
	M3-10-02	2004-10-28	1400-1420	62	62	0	Yes			TMS38
	M3-10-03	2004-10-28	1400-1420	59	56	-3	Yes			TMS38
	M3-10-04	2004-10-28	1400-1420	61	61	0	Yes			TMS38
	M3-10-05	2004-10-28	1320-1340	62	61	-1	Yes			TMS37
	M3-10-06	2004-10-28	1320-1340	55	55	0	Yes			TMS37
	M3-10-07	2004-10-28	1320-1340	64	62	-2	Yes			TMS37
	M3-10-08	2004-10-28	1320-1340	57	60	+3	Yes			TMS37
3-11	M3-11-01	2005-02-02	1420-1440	70	68	-2	Yes			PTMS55
	M3-11-02	2005-02-02	1420-1440	63	64	+1	Yes			PTMS55
	M3-11-03	2005-02-02	1420-1440	65	67	+2	Yes			PTMS57
	M3-11-04	2005-02-02	1420-1440	58	61	+3	Yes			PTMS57
	M3-11-06	2005-02-02	1420-1440	51	N/A	N/A	Yes			PTMS56
	M3-11-07	2005-02-02	1420-1440	70	69	-1	Yes			PTMS56
	M3-11-08	2005-02-02	1420-1440	59	58	-1	Yes			PTMS56
3-12	M3-12-01	2004-11-16	1020-1040	60	61	+1	Yes			TMS50
	M3-12-02	2004-11-16	1020-1040	59	61	+2	Yes			TMS50
	M3-12-03	2004-11-16	1020-1040	56	54	-2	Yes			TMS50
	M3-12-04	2004-11-16	1020-1040	59	58	-1	Yes			TMS50
	M3-12-05	2004-11-16	1020-1040	61	61	0	Yes			TMS50

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
3-13	M3-13-01	2004-11-11	1440-1500	65	66	+1	Yes			TMS49
	M3-13-02	2004-11-11	1440-1500	64	63	-1	Yes			TMS49
	M3-13-03	2004-11-11	1440-1500	60	60	0	Yes			TMS49
	M3-13-04	2004-11-11	1440-1500	62	61	-1	Yes			TMS49
	M3-13-05	2004-11-11	1320-1340	63	65	+2	Yes			TMS47
	M3-13-06	2004-11-11	1320-1340	68	71	+3	Yes			TMS47
3-14	M3-14-01	2004-11-11	1400-1420	61	61	0	Yes			TMS48
	M3-14-02	2004-11-11	1400-1420	61	61	0	Yes			TMS48
	M3-14-03	2004-11-11	1400-1420	63	61	-2	Yes			TMS48
	M3-14-04	2004-11-11	1400-1420	64	63	-1	Yes			TMS48
	M3-14-05	2004-11-11	1320-1340	64	62	-2	Yes			TMS47
	M3-14-06	2004-11-11	1320-1340	66	64	-2	Yes			TMS47
	M3-14-07	2004-11-11	1240-1300	64	64	0	Yes			TMS46
	M3-14-08	2004-11-11	1240-1300	62	59	-3	Yes			TMS46
3-15	M3-15-01			62	62	0	Yes			PTMS22
	M3-15-02			58	61	+3	Yes			PTMS23
	M3-15-03			60	63	+3	Yes			PTMS23
	M3-15-04			64	65	+1	Yes			PTMS22
	M3-15-05			64	67	+3	Yes			PTMS23
	M3-15-06			61	63	+2	Yes			PTMS22
	M3-15-07			68	71	+3	Yes			PTMS22
	M3-15-08			69	71	+2	Yes			PTMS22
	M3-15-09			59	60	+1	Yes			PTMS23
	M3-15-10			65	65	0	Yes			PTMS23
3-16	M3-16-01			63	64	+1	Yes			PTMS24
	M3-16-02			60	61	+1	Yes			PTMS22
	M3-16-03			57	60	+3	Yes			PTMS22
	M3-16-04			61	60	-1	Yes			PTMS24
	M3-16-05			65	62	-3	Yes			PTMS21
	M3-16-06			62	65	+3	Yes			PTMS21
	M3-16-08			67	70	+3	Yes			PTMS21
	M3-16-09			61	63	+2	Yes			PTMS21
	M3-16-10			55	56	+1	Yes			PTMS21
	M3-16-11			69	70	+1	Yes			PTMS21
	M3-16-12			70	68	-2	Yes			PTMS20
	M3-16-13			66	67	+1	Yes			PTMS20
	M3-16-14			59	62	+3	Yes			PTMS20
	M3-16-15			71	73	+2	Yes			PTMS20
	M3-16-16			63	65	+2	Yes			PTMS20

NSA	Receptor	Measurement Date and Time	Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M3-16-17		70	72	+2	Yes			PTMS20
	M3-16-18		64	65	+1	Yes			PTMS20
	M3-16-19		61	64	+3	Yes			PTMS20
	M3-16-20		76	77	+1	Yes			PTMS22
	M3-16-21		59	61	+2	Yes			PTMS20
	M3-16-22		71	71	0	Yes			PTMS19
	M3-16-23		78	76	-2	Yes			PTMS19
	M3-16-24		69	66	-3	Yes			PTMS19
	M3-16-25		61	59	-2	Yes			PTMS19
	M3-16-26		72	74	+2	Yes			PTMS19
	M3-16-27		63	64	+1	Yes			PTMS19
4-01	M4-01-01	2005-01-26 1240-1300	60	59	-1	Yes			TMS104
	M4-01-02	2005-01-26 1240-1300	65	66	+1	Yes			TMS104
	M4-01-03	2005-01-26 1240-1300	67	70	+3	Yes			TMS104
	M4-01-04	2005-01-26 1240-1300	68	70	+2	Yes			TMS104
	M4-01-05	2005-01-26 1320-1340	61	61	0	Yes			TMS105
4-02	M4-02-01	2005-01-18 1120-1140	76	79	+3	Yes			TMS96
	M4-02-02	2005-01-18 1120-1140	77	77	0	Yes			TMS96
4-03	M4-03-01	2005-01-18 1420-1440	72	74	+2	Yes			TMS100
	M4-03-02	2005-01-18 1420-1440	68	70	+2	Yes			TMS100
	M4-03-03	2005-01-18 1420-1440	72	75	+3	Yes			TMS100
4-04	M4-04-01	2005-01-26 1000-1020	63	65	+2	Yes			TMS101
	M4-04-02	2005-01-26 1000-1020	62	62	0	Yes			TMS101
	M4-04-03	2005-01-26 1000-1020	63	63	0	Yes			TMS101
	M4-04-04	2005-01-26 1000-1020	61	59	-2	Yes			TMS101
				Non-Validating Model Points			**6**		

Notes:

1. *All Noise Levels are shown as hourly equivalent sound levels (Leq[h]) with units in A-weighted decibels (dB[A]). The level is rounded to the nearest whole decibel in accordance with MDOT SHA guidelines.*
2. *Noise test was influenced by Fernwood Road, which was not counted for validation run.*
3. *Noise test was influenced by MD Route 1, which was not counted for validation run.*
4. *Side Street traffic not counted and not included in model, new homes constructed since testing was done and it's not entirely clear what all houses should be removed for validation, ground lines and contour file may be different than testing conditions as a result of construction.*
5. *This does not validate due to the absence of modeled local traffic on Forest Glen Road. Traffic cannot be modeled on Forest Glen Road because there were not traffic counts performed and because the tested receiver was less than 25 feet from the roadway. When the receiver is less than 25 feet from the center of roadway, TNM breaks down and does not compute noise levels correctly.*

3 I-270 (DWIGHT D. EISENHOWER MEMORIAL HIGHWAY)

Table C-2: TNM Model Validation Summary: I-270

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
5-37	M-101	2015-10-14	1410-1430	73	75	+2	Yes			TMS01
	M-102	2015-10-14	1410-1430	75	76	+1	Yes		1	TMS01
	M-103	2015-10-14	1410-1430	67	70	+3	Yes			TMS01
5-36	M-104	2015-10-16	1020-1040	68	63	**-5**		No	2	TMS02
	M-105	2015-10-16	1020-1040	69	70	+1	Yes			TMS02
	M-106	2015-10-16	1020-1040	76	76	0	Yes			TMS02
	M-107	2015-10-16	1020-1040	72	72	0	Yes			TMS02
	M-108	2015-10-16	1020-1040	64	62	-2	Yes			TMS02
	M-109	2015-10-16	1020-1040	68	67	-1	Yes			TMS02
	M-110	2015-10-16	0940-1000	69	68	-1	Yes			TMS03
	M-111	2015-10-16	0940-1000	69	70	+1	Yes			TMS03
	M-112	2015-10-16	0940-1000	64	67	+3	Yes			TMS03
	M-113	2015-10-16	0940-1000	71	74	+3	Yes			TMS03
	M-114	2015-10-16	0940-1000	74	75	+1	Yes		1	TMS03
	M-115	2015-10-16	0940-1000	73	72	-1	Yes			TMS03
5-30	M-116	2015-10-16	1430-1450	60	58	-2	Yes			TMS04
	M-117	2015-10-16	1430-1450	60	56	**-4**		No		TMS04
	M-118	2015-10-16	1430-1450	64	64	0	Yes			TMS04
	M-119	2015-10-16	1430-1450	60	58	-2	Yes			TMS04
	M-120	2015-10-16	1430-1450	65	65	0	Yes			TMS04
	M-121	2015-10-16	1430-1450	63	60	-3	Yes			TMS04
5-31	M-122	2015-10-16	1240-1300	59	57	-2	Yes			TMS05
	M-123	2015-10-16	1240-1300	60	58	-2	Yes			TMS05
	M-124	2015-10-16	1240-1300	58	58	0	Yes			TMS05
	M-125	2015-10-16	1240-1300	60	60	0	Yes			TMS05
	M-126	2015-10-16	1240-1300	61	59	-2	Yes			TMS05
	M-127	2015-10-16	1240-1300	57	56	-1	Yes			TMS05
5-33	M-128	2015-10-16	1140-1200	66	65	-1	Yes			TMS06
	M-129	2015-10-16	1140-1200	62	61	-1	Yes			TMS06
	M-130	2015-10-16	1140-1200	59	58	-1	Yes			TMS06
	M-131	2015-10-16	1140-1200	64	66	+2	Yes			TMS06
	M-132	2015-10-16	1140-1200	67	68	+1	Yes			TMS06
	M-135	2015-10-14	1050-1110	67	67	0	Yes			TMS07
	M-136	2015-10-14	1050-1110	72	71	-1	Yes			TMS07
	M-137	2015-10-14	1050-1110	63	64	+1	Yes			TMS07
	M-138	2015-10-14	1050-1110	66	68	+2	Yes			TMS07

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M-139	2015-10-14	1050-1110	70	70	0	Yes		1	TMS07
	M-140	2015-10-14	1050-1110	65	66	+1	Yes			TMS07
	M-141	2015-10-14	1130-1150	66	67	+1	Yes			TMS08
	M-142	2015-10-14	1130-1150	65	67	+2	Yes			TMS08
	M-143	2015-10-14	1130-1150	67	69	+2	Yes		1	TMS08
	M-144	2015-10-14	1130-1150	65	64	-1	Yes			TMS08
	M-145	2015-10-14	1130-1150	63	60	-3	Yes			TMS08
	M-146	2015-10-14	1130-1150	61	58	-3	Yes			TMS08
	M-147	2015-10-14	1130-1150	63	64	+1	Yes			TMS08
	M-148	2015-10-14	1210-1230	66	67	+1	Yes			TMS09
	M-149	2015-10-14	1210-1230	69	69	0	Yes		1	TMS09
	M-150	2015-10-14	1210-1230	67	67	0	Yes			TMS09
	M-151	2015-10-14	1210-1230	66	65	-1	Yes			TMS09
	M-152	2015-10-14	1210-1230	67	67	0	Yes			TMS09
	M-153	2015-10-14	1210-1230	60	58	-2	Yes			TMS09
5-34	M-133	2015-10-16	1140-1200	64	64	0	Yes			TMS06
	M-134	2015-10-16	1140-1200	62	56	**-6**		No		TMS06
	M-154	2015-10-14	1310-1330	63	64	+1	Yes			TMS10
	M-155	2015-10-14	1310-1330	67	68	+1	Yes			TMS10
	M-156	2015-10-14	1310-1330	67	66	-1	Yes			TMS10
	M-157	2015-10-14	1310-1330	63	65	+2	Yes			TMS10
	M-158	2015-10-14	1310-1330	66	67	+1	Yes			TMS10
	M-159	2015-10-14	1310-1330	65	65	0	Yes			TMS10
5-30	M-201	2015-09-16	1300-1320	69	69	0	Yes			TMS-01
	M-202	2015-09-16	1300-1320	66	63	-3	Yes			TMS-01
5-29	M-203	2015-09-16	1300-1320	60	60	0	Yes			TMS-01
	M-204	2015-09-16	1300-1320	63	63	0	Yes			TMS-01
	M-205	2015-09-16	1300-1320	65	64	-1	Yes			TMS-01
	M-206	2015-09-16	1300-1320	61	59	-2	Yes			TMS-01
	M-207	2015-09-16	1040-1100	65* (67)	62	-3	Yes		3	TMS-02
	M-208	2015-09-16	1040-1100	65* (67)	63	-2	Yes		3	TMS-02
	M-209	2015-09-16	1040-1100	54* (62)	54	0	Yes		3	TMS-02
	M-210	2015-09-16	1040-1100	62* (63)	64	+2	Yes		3	TMS-02
	M-211	2015-09-16	1040-1100	65* (66)	62	-3	Yes		3	TMS-02
	M-212	2015-09-16	1040-1100	61	58	-3	Yes			TMS-02
	M-213	2015-09-16	1350-1410	63	61	-2	Yes			TMS-03
	M-214	2015-09-16	1350-1410	65	62	-3	Yes			TMS-03
	M-215	2015-09-16	1350-1410	61	61	0	Yes			TMS-03
	M-216	2015-09-16	1350-1410	69	66	-3	Yes			TMS-03

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M-217	2015-09-16	1350-1410	68	67	-1	Yes			TMS-03
	M-218	2015-09-16	1350-1410	60	61	+1	Yes			TMS-03
5-27	M-219	2015-09-02	1400-1420	60	62	+2	Yes			TMS-04
	M-220	2015-09-02	1400-1420	62	62	0	Yes			TMS-04
5-23	M-221	2015-09-02	1110-1130	56	56	0	Yes			TMS-05
	M-222	2015-09-02	1110-1130	54	55	+1	Yes			TMS-05
	M-223	2015-09-02	1110-1130	52	49	-3	Yes			TMS-05
	M-224	2015-09-02	1110-1130	60	58	-2	Yes			TMS-05
	M-225	2015-09-02	1110-1130	54	52	-2	Yes			TMS-05
	M-226	2015-09-02	1110-1130	54	52	-2	Yes			TMS-05
5-22	M-227	2015-08-18	1350-1410	58	57	-1	Yes			TMS-06
	M-228	2015-08-18	1350-1410	57	60	+3	Yes			TMS-06
	M-229	2015-08-18	1350-1410	62	62	0	Yes			TMS-06
5-19	M-230	2015-08-18	1350-1410	61	60	-1	Yes			TMS-06
	M-231	2015-08-18	1350-1410	60	60	0	Yes			TMS-06
	M-232	2015-08-18	1350-1410	n/a	60	?			4	TMS-06
	M-233	2015-08-18	1050-1110	59	61	+2	Yes			TMS-07
	M-234	2015-08-18	1050-1110	63	63	0	Yes			TMS-07
	M-235	2015-08-18	1050-1110	62	62	0	Yes			TMS-07
	M-236	2015-08-18	1050-1110	60	62	+2	Yes			TMS-07
	M-237	2015-08-18	1050-1110	66	68	+2	Yes		5	TMS-07
	M-238	2015-08-18	1050-1110	62	63	+1	Yes			TMS-07
5-18	M-239	2015-08-18	1140-1200	74	73	-1	Yes			TMS-08
	M-240	2015-08-18	1140-1200	63	59	-4		No		TMS-08
	M-241	2015-08-18	1140-1200	64	64	0	Yes			TMS-08
	M-242	2015-08-18	1140-1200	57	60	+3	Yes		6	TMS-08
	M-243	2015-08-18	1140-1200	56	57	+1	Yes			TMS-08
	M-244	2015-08-18	1140-1200	64	70	+6		No	**2**	TMS-08
	M-245	2015-08-18	1300-1320	67	72	+5		No		TMS-09
	M-246	2015-08-18	1300-1320	63	64	+1	Yes			TMS-09
	M-247	2015-08-18	1300-1320	61	61	0	Yes			TMS-09
5-17	M-248	2015-08-18	1300-1320	58	60	+2	Yes			TMS-09
	M-249	2015-08-18	1300-1320	63	62	-1	Yes			TMS-09
	M-250	2015-08-18	1300-1320	62	60	-2	Yes			TMS-09
	M-251	2015-08-18	1000-1020	62* (63)	60	-2	Yes		3	TMS-10
	M-252	2015-08-18	1000-1020	60* (62)	59	-1	Yes		3	TMS-10
	M-253	2015-08-18	1000-1020	58* (60)	57	-1	Yes		3	TMS-10
5-20	M-254	2015-08-18	1000-1020	62* (65)	61	-1	Yes		3	TMS-10
	M-255	2015-08-18	1000-1020	64* (67)	62	-2	Yes		3	TMS-10

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M-256	2015-08-18	1000-1020	58* (61)	59	+1	Yes		3	TMS-10
5-21	M-257	2015-09-02	1030-1050	58	59	+1	Yes			TMS-11
	M-258	2015-09-02	1030-1050	66	64	-2	Yes			TMS-11
	M-259	2015-09-02	1030-1050	58	60	+2	Yes			TMS-11
	M-260	2015-09-02	1030-1050	68	71	+3	Yes			TMS-11
	M-261	2015-09-02	1030-1050	54	54	0	Yes			TMS-11
	M-262	2015-09-02	1030-1050	56	58	+2	Yes			TMS-11
5-24	M-263	2015-09-02	1150-1210	58	58	0	Yes			TMS-12
	M-264	2015-09-02	1150-1210	57	57	0	Yes			TMS-12
	M-265	2015-09-02	1150-1210	56	57	+1	Yes			TMS-12
	M-266	2015-09-02	1150-1210	58	59	+1	Yes			TMS-12
	M-267	2015-09-02	1150-1210	57	58	+1	Yes			TMS-12
	M-268	2015-09-02	1150-1210	56	59	+3	Yes			TMS-12
5-26	*M-269*	*n/a*		*n/a*					*7*	*n/a*
	M-270	*2015-09-02*	*1400-1420*	*69*	*71*	*+2*	*Yes*			*TMS-04*
5-28	M-271	2015-09-02	1310-1330	49	50	+1	Yes			TMS-13
	M-272	2015-09-02	1310-1330	49	50	+1	Yes			TMS-13
	M-273	2015-09-02	1310-1330	50	51	+1	Yes			TMS-13
	M-274	2015-09-02	1310-1330	52	51	-1	Yes			TMS-13
	M-275	2015-09-02	1310-1330	57	57	0	Yes			TMS-13
	M-276	2015-09-02	1310-1330	57	55	-2	Yes			TMS-13
	M-277	2015-09-16	1140-1200	58	53	-5		No		TMS-14
	M-278	2015-09-16	1140-1200	50	49	-1	Yes			TMS-14
	M-279	2015-09-16	1140-1200	56	59	+3	Yes			TMS-14
	M-280	2015-09-16	1140-1200	64	62	-2	Yes			TMS-14
	M-281	2015-09-16	1140-1200	60	58	-2	Yes			TMS-14
	M-282	2015-09-16	1140-1200	52	55	+3	Yes			TMS-14
5-12	M-301	2015-10-12	1045-1105	63	61	-2	Yes			TMS01
	M-302	2015-10-12	1045-1105	68	62	-6		No	**2**	TMS01
	M-303	2015-10-12	1045-1105	65	59	-6		No	**2**	TMS01
	M-304	2015-10-12	1210-1230	62	59	-3	Yes			TMS02
5-11	*M-305*	*2015-10-12*	*1210-1230*	*65*	*67*	*+2*	*Yes*		*8*	*TMS02*
	M-306	*2015-10-12*	*1210-1230*	*73*	*75*	*+2*	*Yes*		*8*	*TMS02*
5-09	M-307	2015-11-4	1100-1120	63	65	+2	Yes			TMS09
5-08	M-308	2015-11-4	1100-1120	66	67	+1	Yes			TMS09
5-01	M-309	2015-11-4	1530-1550	58	57	-1	Yes			TMS10
	M-310	2015-11-4	1530-1550	61	61	0	Yes			TMS10
	M-311	2015-11-4	1530-1550	64	59	-4		No	**2**	TMS10
	M-312	2015-11-4	1530-1550	65	61	-3	Yes		1	TMS10

NSA	Receptor	Measurement Date and Time		Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)		Notes	Traffic Monitoring Session
	M-313	2015-10-14	1135-1155	68	63	-5		No	2	TMS05
5-02	M-329	2015-10-14	1015-1035	67	65	-2	Yes			TMS04
	M-330	2015-10-14	1015-1035	62	61	-1	Yes			TMS04
	M-331	2015-10-14	1015-1035	55	58	+3	Yes			TMS04
5-06	M-332	2015-10-12	1425-1445	64	62	-2	Yes			TMS03
	M-333	2015-10-12	1425-1445	68	68	0	Yes			TMS03
	M-334	2015-10-12	1425-1445	61	63	+2	Yes			TMS03
5-07	M-335	2015-10-12	1425-1445	67	70	+3	Yes			TMS03
5-10	M-336	2015-11-4	1100-1120	n/a	67	?			9	TMS09
	M-337	2015-10-12	1210-1230	63	66	+3	Yes			TMS02
5-14	M-338	2015-10-12	1045-1105	64	66	+2	Yes			TMS01
					Non-Validating Model Points			**11**		

Notes:

1. *Elevated receptor to represent balcony use.*
2. ***Critical non-validating receptor. See explanation in Section 2.3.3/page xx).***
3. *The reported measured noise level has been adjusted for cicada background noise observed during measurements. The actual field measured level is shown in parenthesis.*
4. *This measurement was not validated, because of equipment malfunction*
5. *Elevated receptor to represent balcony use.*
6. *Although this measurement was taken within NSA 215-C, it is associated with NSA 216-B due to its proximity to the nearby house and the lack of use in that area of the church property.*
7. *This measurement was not validated, because the property owner would not grant permission to conduct noise monitoring*
8. *Since these NSAs require no further consideration, the validation results are superfluous.*
9. *Meter error, logging data was lost.*

4 I-95 (NORTH OF CAPITAL BELTWAY)

Table C-3: TNM Model Validation Summary: I-95

NSA	Receptor	Measurement Date and Time	Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)	Notes	Traffic Monitoring Session
I-95-N	M3-17-28	2018-11-19 1410-1430	72	74	+2	Yes		TMS01
	M3-17-27	2018-11-19 1410-1430	67	67	0	Yes		TMS01
	M3-17-26	2018-11-19 1410-1430	66	63	-3	Yes		TMS01
	M3-17-25	2018-11-19 1410-1430	63	63	0	Yes		TMS01
	M3-17-24	2018-11-19 1330-1350	61	59	-2	Yes		TMS01
I-95-S	M1-17-05	2018-11-19 1330-1350	63	60	-3	Yes		TMS01
	M1-17-06	2018-11-19 1330-1350	58	59	+1	Yes		TMS01
	M1-17-07	2018-11-19 1330-1350	64	64	0	Yes		TMS01
Non-Validating Model Points						**0**		

Notes:

1. *All Noise Levels are shown as hourly equivalent sound levels (Leq[h]) with units in A-weighted decibels (dB[A]). The level is rounded to the nearest whole decibel in accordance with MDOT SHA guidelines.*

5 MD 295 (BALTIMORE-WASHINGTON PARKWAY)

Table C-4: TNM Model Validation Summary: MD 295 Baltimore Parkway

NSA	Receptor	Measurement Date and Time	Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)	Notes	Traffic Monitoring Session
BW-N	M1-21-04	2018-11-19 1110-1130	62	64	+2	Yes		TMS03
	M1-21-05	2018-11-19 1110-1130	57	58	+1	Yes		TMS03
	M1-21-06	2018-11-19 1110-1130	57	57	0	Yes		TMS03
	M1-21-07	2018-11-19 1110-1130	55	52	-3	Yes		TMS03
BW-S	M1-23-09	2018-11-19 1110-1130	62	63	+1	Yes		TMS03
	M1-23-10	2018-11-19 1030-1050	60	59	-1	Yes		TMS03
	M1-23-11	2018-11-19 1030-1050	62	65	+3	Yes		TMS03
	M1-23-12	2018-11-19 1030-1050	59	47	-12	No	2	TMS03
	M1-23-13	2018-11-19 1030-1050	64	64	0	Yes		TMS03
	M1-23-14	2018-11-19 1030-1050	65	65	0	Yes		TMS03
Non-Validating Model Points						**1**		

Notes:

1. *All Noise Levels are shown as hourly equivalent sound levels (Leq[h]) with units in A-weighted decibels (dB[A]). The level is rounded to the nearest whole decibel in accordance with MDOT SHA guidelines.*
2. *No traffic available on Hanover Pkwy or counted during measurement.*

6 I-495 (CAPITAL BELTWAY - VIRGINIA)

Table C-5: TNM Model Validation Summary: I-495 in Virginia

NSA	Receptor	Measurement Date and Time	Measured Noise Level dB(A)	Modeled Noise Level dB(A)	Difference dB(A)	Validating Model Point? (Yes) or (No)	Notes	Traffic Monitoring Session
VA-2	MON-1		75	75	0	Yes		
	MON-2		59	62	+3	Yes		
	MON-5		63	63	0	Yes		
VA-3	MON-3		56	53	-3	Yes		
	MON-4		66	64	-2	Yes		
	MON-6		58	56	-2	Yes		
Non-Validating Model Points						**0**		

Notes:

1. *All Noise Levels are shown as hourly equivalent sound levels (Leq[h]) with units in A-weighted decibels (dB[A]). The level is rounded to the nearest whole decibel in accordance with MDOT SHA guidelines.*

APP D

APPENDIX D

IMPACT ANALYSIS RESULTS

I-495 AND I-270 MANAGED LANES STUDY
March 2020

U.S. Department of Transportation
Federal Highway Administration

and

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

1 IMPACT ANALYSIS RESULTS

1.1 General

This appendix summarizes the most pertinent receptor data for the entire Study. The table lists the predicted noise levels and it also indicates in **bold red font** if the level is impacted for the particular land use and highlights that level if it equals or exceeds 75-dB(A). Additionally, the table shows when a receptor has the maximum noise level within an NSA, whether or not the receptor coincides with a noise measurement site, and if the receptor was elevated to model multi-story balconies.

2 I-495 (CAPITAL BELTWAY – MARYLAND)

Table D-1: Predicted Noise Levels, I-495 in Maryland

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
1-01	M1-01-01	**75**	✓	**75**	✓	✓
	M1-01-02	**74**		**74**		✓
	M1-01-03	**66**		**66**		✓
	M1-01-04	65		**67**		✓
	R1-01-01	61		**66**		
	R1-01-02	63		65		
	R1-01-03	64		**70**		
	R1-01-04	62		63		
	R1-01-05	52		53		
	R1-01-06	51		52		
	R1-01-07	**71**		**72**		
	R1-01-08	56		58		
	R1-01-09	65		**69**		
	R1-01-10	**68**		**71**		
1-02	M1-02-01	**66**		**66**		✓
	M1-02-02	**66**		**66**		✓
	M1-02-03	**75**	✓	**76**	✓	✓
	M1-02-04	**74**		**76**	✓	✓
	M1-02-05	65		**67**		✓
	R1-02-01	**74**		**74**		
	R1-02-02	64		**66**		
	R1-02-03	61		61		
	R1-02-04	**66**		**66**		
	R1-02-05	63		63		
	R1-02-06	65		65		
	R1-02-07	61		61		
	R1-02-08	61		62		
	R1-02-09	64		**67**		
	R1-02-10	62		64		
1-03	M1-03-01	65		**67**		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	M1-03-02	70		76		✓
	M1-03-03	80	✓	82	✓	✓
	R1-03-01	61		63		
	R1-03-03	56		57		
	R1-03-04	56		57		
	R1-03-05	64		65		
	R1-03-06	60		62		
	R1-03-07	65		68		
	R1-03-08	58		59		
	R1-03-09	63		64		
	R1-03-10	51		52		
	R1-03-11	61		61		
1-04	M1-04-01	71		73		✓
	M1-04-02	74	✓	76	✓	✓
	M1-04-03	71		73		✓
	M1-04-04	67		69		✓
	M1-04-05	70		70		✓
	M1-04-06	72		75		✓
	M1-04-07	68		72		✓
	R1-04-01	68		71		
	R1-04-02	60		61		
	R1-04-03	60		60		
	R1-04-04	57		57		
	R1-04-05	59		60		
	R1-04-06	71		71		
	R1-04-07	63		64		
	R1-04-08	56		56		
	R1-04-09	63		65		
	R1-04-10	59		60		
	R1-04-11	63		64		
	R1-04-12	57		58		
	R1-04-13	62		63		
	R1-04-14	62		62		
	R1-04-15	64		66		
	R1-04-16	66		69		
	R1-04-17	66		67		
1-05	M1-05-01	69		72		✓
	M1-05-02	73	✓	73	✓	✓
	M1-05-03	70		72		✓
	M1-05-04	68		68		✓
	M1-05-05	71		72		✓
	M1-05-06	65		67		✓
	R1-05-01	66		68		
	R1-05-02	63		63		
	R1-05-03	66		67		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R1-05-04	66		67		
	R1-05-05	56		57		
	R1-05-06	67		72		
	R1-05-07	65		66		
	R1-05-08	62		63		
	R1-05-09	64		63		
	R1-05-10	60		60		
	R1-05-11	61		63		
1-06	M1-06-01	75	✓	75	✓	✓
	M1-06-02	75	✓	75	✓	✓
	M1-06-03	75	✓	75	✓	✓
	R1-06-01	60		63		
	R1-06-02	64		65		
	R1-06-03	58		59		
	R1-06-04	56		57		
	R1-06-05	62		63		
	R1-06-06	56		56		
1-08	M1-08-01	69		69		✓
	M1-08-02	71	✓	72	✓	✓
	M1-08-03	65		68		✓
	R1-08-01	59		60		
	R1-08-02	57		57		
	R1-08-03	58		59		
	R1-08-04	56		56		
1-09	M1-09-01	76	✓	79	✓	✓
	M1-09-02	73		78		✓
	M1-09-03	62		59		✓
	R1-09-01	64		66		
	R1-09-02	61		63		
	R1-09-03	62		64		
	R1-09-04	59		61		
	R1-09-05	59		60		
	R1-09-06	60		60		
	R1-09-07	59		59		
	R1-09-08	61		60		
1-10	M1-10-01	74		76		✓
	M1-10-02	74		76		✓
	M1-10-03	64		67		✓
	M1-10-05	77	✓	77	✓	✓
	M1-10-06	76		77		✓
	M1-10-07	73		73		✓
	M1-10-08	65		62		✓
	R1-10-01	64		65		
	R1-10-02	59		60		
	R1-10-03	65		64		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R1-10-04	68		68		
	R1-10-05	63		64		
	R1-10-06	59		59		
	R1-10-07	64		66		
	R1-10-08	62		63		
	R1-10-09	64		64		
	R1-10-10	61		62		
	R1-10-11	61		61		
	R1-10-12	76		76		
	R1-10-13	63		63		
	R1-10-14	62		63		
	R1-10-15	69		71		
	R1-10-16	61		60		
	R1-10-17	60		58		
	R1-10-18	63		62		
	R1-10-19	62		60		
	R1-10-20	71		71		
	R1-10-21	64		65		
	R1-10-22	70		70		
	R1-10-23	74		74		
	R1-10-24	74		75		
1-11	M1-11-01	67		68		✓
	M1-11-02	74		77	✓	✓
	M1-11-03	65		66		✓
	M1-11-04	76	✓	77	✓	✓
	R1-11-01	65		66		
	R1-11-02	59		60		
	R1-11-03	66		67		
	R1-11-04	63		63		
	R1-11-05	65		65		
	R1-11-06	59		60		
	R1-11-07	58		58		
	R1-11-08	65		67		
	R1-11-09	63		65		
	R1-11-10	63		65		
	R1-11-11	62		63		
	R1-11-12	64		65		
	R1-11-13	60		61		
	R1-11-14	67		68		
	R1-11-15	71		72		
	R1-11-16	71		72		
1-12	M1-12-01	67		68		✓
	M1-12-02	68		70		✓
	R1-12-01	62		62		
	R1-12-02	62		64		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R1-12-03	62		63		
	R1-12-04	61		62		
	R1-12-05	60		61		
	R1-12-06	60		61		
	R1-12-07	63		64		
	R1-12-08	69	✓	71	✓	
1-13	M1-13-01	68		69		✓
	M1-13-02	66		68		✓
	R1-13-01	69		71	✓	
	R1-13-02	67		69		
	R1-13-03	70	✓	71	✓	
	R1-13-04	68		70		
	R1-13-05	64		65		
1-14	M1-14-01	65		66		✓
	M1-14-02	66		68		✓
	M1-14-03	66		68		✓
	M1-14-04	71		72		✓
	M1-14-05	66		67		✓
	M1-14-06	74	✓	75	✓	✓
	R1-14-01	63		65		
	R1-14-02	64		65		
	R1-14-03	65		66		
	R1-14-04	68		69		
	R1-14-05	66		67		
	R1-14-06	71		72		
	R1-14-07	72		73		
	R1-14-08	66		68		
	R1-14-09	64		67		
	R1-14-10	68		69		
	R1-14-11	66		68		
	R1-14-12	64		66		
	R1-14-13	62		64		
	R1-14-14	63		65		
	R1-14-15	66		66		
	R1-14-16	68		69		
	R1-14-17	68		68		
	R1-14-18	72		73		
	R1-14-19	74		73		
	R1-14-20	64		66		
	R1-14-21	70		72		
	R1-14-22	67		68		
	R1-14-23	71		72		
	R1-14-24	67		69		
	R1-14-25	66		70		
1-15	R1-15-01	66		66		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R1-15-02	69		70		
	R1-15-03	63		64		
	R1-15-04	58		59		
	R1-15-05	60		63		
	R1-15-06	58		58		
	R1-15-07	57		57		
	R1-15-08	58		59		
	R1-15-09	76	✓	77	✓	
1-16	M1-16-01	68		70		✓
	M1-16-02	78	✓	80	✓	✓
	M1-16-03	70		70		✓
	M1-16-04	68		69		✓
	M1-16-05	67		67		✓
	M1-16-06	60		62		✓
	R1-16-01	66		67		
	R1-16-02	59		58		
	R1-16-03	59		59		
	R1-16-04	67		69		
	R1-16-05	59		60		
	R1-16-06	57		58		
	R1-16-07	60		61		
	R1-16-08	65		65		
	R1-16-09	62		62		
	R1-16-10	64		63		
	R1-16-11	64		65		
	R1-16-12	64		64		
1-17	M1-17-01	65		65		✓
	M1-17-02	75	✓	75	✓	✓
	M1-17-03	66		66		✓
	M1-17-04	65		66		✓
	R1-17-01	63		63		
	R1-17-02	68		69		
	R1-17-03	62		63		
	R1-17-04	67		67		
	R1-17-05	63		64		
	R1-17-06	73		73		
1-18	M1-18-01	68		74	✓	✓
	M1-18-02	67		69		✓
	R1-18-01	69		71		
	R1-18-02	58		60		
	R1-18-03	59		62		
	R1-18-04	60		61		
	R1-18-05	58		60		
	R1-18-06	69	✓	72		
	R1-18-07	66		68		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R1-18-08	57		59		
	R1-18-09	63		66		
	R1-18-10	62		64		
1-19[5]	N/A	N/A		N/A		
1-20	M1-20-01	66		66		✓
	M1-20-02	68		68		✓
	M1-20-03	72		72		✓
	M1-20-05	78		78		✓
	M1-20-06	71		71		✓
	M1-20-07	77		77		✓
	M1-20-08	79	✓	79	✓	✓
	M1-20-10	69		69		✓
	M1-20-11	74		74		✓
	M1-20-12	68		68		✓
	M1-20-13	78		78		✓
	M1-20-14	78		78		✓
	M1-20-15	78		78		✓
	M1-20-16	70		70		✓
	M1-20-17	68		68		✓
	M1-20-18	70		70		✓
	M1-20-19	78		78		✓
	M1-20-20	69		69		✓
	M1-20-21	74		74		✓
	M1-20-22	61		61		✓
	M1-20-23	65		65		✓
	M1-20-24	62		62		✓
	M1-20-25	76		76		✓
	R1-20-01	57		57		
	R1-20-02	62		62		
	R1-20-03	67		67		
	R1-20-04	73		73		
	R1-20-05	66		66		
	R1-20-06	67		67		
	R1-20-07	75		75		
	R1-20-08	66		66		
	R1-20-09	61		61		
	R1-20-10	60		60		
	R1-20-11	65		65		
	R1-20-12	57		57		
	R1-20-13	56		56		
	R1-20-14	64		64		
	R1-20-15	75		75		
1-21	M1-21-01	59		60		✓
	M1-21-02	78	✓	80	✓	✓
	M1-21-03	59		60		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R1-21-01	70		71		
	R1-21-02	59		60		
	R1-21-03	63		64		
	R1-21-04	61		62		
	R1-21-05	58		58		
	R1-21-06	77		79		
	R1-21-07	77		80		
	R1-21-08	74		76		
	R1-21-09	62		63		
	R1-21-10	60		60		
	R1-21-11	65		67		
	R1-21-12	64		67		
1-22	M1-22-01	72		72		✓
	R1-22-01	66		68		
	R1-22-02	62		63		
	R1-22-03	73		76		
	R1-22-04	78	✓	79	✓	
	R1-22-05	67		71		
	R1-22-06	65		73		
	R1-22-07	56		63		
	R1-22-08	56		68		
1-23	M1-23-01	77		78	✓	✓
	M1-23-02	62		62		✓
	M1-23-03	59		59		✓
	M1-23-04	75		75		✓
	M1-23-05	61		60		✓
	M1-23-06	67		67		✓
	M1-23-07	62		61		✓
	M1-23-08	58		58		✓
	R1-23-01	68		68		
	R1-23-02	67		76		
	R1-23-03	66		78	✓	
	R1-23-04	58		58		
	R1-23-05	60		61		
	R1-23-06	70		71		
	R1-23-07	61		61		
	R1-23-08	56		56		
	R1-23-09	60		59		
	R1-23-10	59		59		
	R1-23-11	78	✓	78	✓	
	R1-23-12	64		63		
	R1-23-13	58		58		
	R1-23-14	57		57		
	R1-23-15	63		63		
	R1-23-16	57		57		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R1-23-17	74		72		
	R1-23-18	59		59		
	R1-23-19	66		69		
	R1-23-20	74		75		
1-24	R1-24-01	65		65		
	R1-24-02	66	✓	66	✓	
1-25	M1-25-1	72	✓	73	✓	✓
	M1-25-2	62		62		✓
	M1-25-3	69		70		✓
	M1-25-4	61		61		✓
	R1-25-01	71		71		
	R1-25-02	60		60		
	R1-25-03	59		59		
	R1-25-04	59		60		
1-26	M1-26-01	75		76		✓
	M1-26-02	64		66		✓
	M1-26-03	75		75		✓
	M1-26-04	65		66		✓
	R1-26-01	62		63		
	R1-26-02	61		63		
	R1-26-03	64		65		
	R1-26-04	59		60		
	R1-26-05	64		65		
	R1-26-06	75		76		
	R1-26-07	77	✓	77	✓	
	R1-26-08	57		57		
	R1-26-09	67		69		
	R1-26-10	68		69		
	R1-26-11	66		67		
	R1-26-12	57		58		
	R1-26-13	61		61		
	R1-26-14	73		74		
	R1-26-15	66		66		
	R1-26-16	65		66		
	R1-26-17	66		67		
	R1-26-18	62		63		
	R1-26-19	62		63		
	R1-26-20	60		60		
	R1-26-21	66		67		
	R1-26-22	64		65		
	R1-26-23	66		67		
	R1-26-24	65		67		
	R1-26-25	62		63		
1-27	M1-27-01	72	✓	72	✓	✓
	M1-27-02	66		66		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	M1-27-03	63		63		✓
	M1-27-04	61		61		✓
	R1-27-01	66		66		
	R1-27-02	64		65		
	R1-27-03	62		62		
	R1-27-04	61		61		
	R1-27-05	66		66		
	R1-27-06	61		61		
1-28	M1-28-01	72	✓	72	✓	✓
	M1-28-02	69		70		✓
	M1-28-03	70		70		✓
	M1-28-04	71		72	✓	✓
	R1-28-01	69		69		
	R1-28-02	64		65		
	R1-28-03	63		63		
	R1-28-04	61		62		
	R1-28-05	64		64		
	R1-28-06	63		64		
	R1-28-07	64		64		
	R1-28-08	67		67		
	R1-28-09	67		67		
	R1-28-10	67		67		
	R1-28-11	70		70		
	R1-28-12	71		72	✓	
1-29	M1-29-01	68		68		✓
	M1-29-02	62		63		✓
	M1-29-03	77	✓	78	✓	✓
	M1-29-04	68		68		✓
	R1-29-01	61		62		
	R1-29-02	64		64		
	R1-29-03	63		63		
	R1-29-04	66		66		
	R1-29-05	65		66		
	R1-29-06	62		62		
1-30	M1-30-01	60		60		✓
	M1-30-02	68		68		✓
	M1-30-03	73		73		✓
	M1-30-04	67		68		✓
	M1-30-05	61		61		✓
	M1-30-06	62		61		✓
	M1-30-07	66		65		✓
	M1-30-08	68		68		✓
	M1-30-09	58		57		✓
	M1-30-10	60		59		✓
	M1-30-11	76		76		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	M1-30-12	76		76		✓
	R1-30-01	61		61		
	R1-30-02	60		60		
	R1-30-03	60		60		
	R1-30-04	58		58		
	R1-30-05	61		61		
	R1-30-06	61		60		
	R1-30-07	62		62		
	R1-30-08	60		60		
	R1-30-09	58		57		
	R1-30-10	63		62		
	R1-30-11	66		66		
	R1-30-12	71		71		
	R1-30-13	77	✓	77	✓	
	R1-30-14	65		65		
	R1-30-15	67		67		
	R1-30-16	69		70		
1-31	M1-31-01	74		74		✓
	M1-31-02	59		59		✓
	M1-31-03	68		68		✓
	M1-31-04	61		61		✓
	M1-31-05	61		61		✓
	M1-31-06	64		63		✓
	M1-31-07	59		58		✓
	M1-31-08	71		71		✓
	M1-31-09	62		62		✓
	M1-31-10	71		72		✓
	M1-31-11	61		61		✓
	M1-31-12	77	✓	77	✓	✓
	M1-31-13	67		67		✓
	M1-31-14	65		65		✓
	R1-31-01	65		65		
	R1-31-02	59		59		
	R1-31-03	63		63		
	R1-31-04	60		61		
	R1-31-05	59		59		
	R1-31-06	71		70		
	R1-31-07	70		69		
	R1-31-08	75		74		
	R1-31-09	57		57		
	R1-31-10	58		58		
	R1-31-11	55		55		
	R1-31-12	63		63		
	R1-31-13	61		61		
	R1-31-14	63		63		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R1-31-15	65		65		
	R1-31-16	59		60		
	R1-31-17	59		59		
	R1-31-18	62		63		
	R1-31-19	65		64		
	R1-31-20	71		70		
1-32	M1-32-01	65		66	✓	✓
	M1-32-02	66	✓	65		✓
	M1-32-03	56		57		✓
	R1-32-01	60		60		
	R1-32-02	59		59		
1-33	M1-33-01	76	✓	79	✓	✓
	M1-33-02	62		63		✓
	M1-33-03	61		61		✓
	M1-33-04	62		62		✓
	M1-33-05	61		61		✓
	M1-33-06	72		72		✓
	R1-33-01	67		69		
	R1-33-02	60		61		
	R1-33-03	60		61		
	R1-33-04	64		64		
1-34	R1-34-01	67		67		
	R1-34-02	64		65		
	R1-34-03	67		67		
	R1-34-04	66		65		
	R1-34-05	68		68		
	R1-34-06	66		65		
	R1-34-07	71		70		
	R1-34-08	79	✓	79	✓	
1-35	M1-35-01	76		75		✓
	R1-35-01	70		70		
	R1-35-02	66		67		
	R1-35-03	66		66		
	R1-35-04	59		60		
	R1-35-05	56		56		
	R1-35-06	79	✓	72		
	R1-35-07	70		66		
	R1-35-08	78		76	✓	
	R1-35-09	65		64		
	R1-35-10	61		61		
	R1-35-11	68		68		
	R1-35-12	66		67		
	R1-35-13	66		59		
	R1-35-14	65		60		
1-36	R1-36-01	63		64		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R1-36-02	61		63		
	R1-36-03	65		67		
	R1-36-04	63		64		
	R1-36-05	67		69		
	R1-36-06	63		65		
	R1-36-07	58		60		
	R1-36-08	72	✓	73	✓	
	R1-36-09	60		61		
1-37	M1-37-01	68		70		✓
	M1-37-02	70	✓	71	✓	✓
	R1-37-01	67		69		
	R1-37-02	64		66		
	R1-37-03	63		65		
	R1-37-04	64		65		
	R1-37-05	59		60		
	R1-37-06	59		60		
	R1-37-07	64		63		
	R1-37-08	60		66		
	R1-37-09	57		58		
	R1-37-10	59		61		
	R1-37-11	62		64		
	R1-37-12	63		63		
	R1-37-13	66		67		
2-01	M2-01-01	67		73	✓	✓
	M2-01-02	67		72		✓
	M2-01-03	67		73		✓
	M2-01-04	66		67		✓
	M2-01-05	65		67		✓
	M2-01-06	71	✓	72		✓
	R2-01-01	65		66		
	R2-01-02	66		68		
	R2-01-03	65		66		
	R2-01-04	68		70		
	R2-01-05	64		69		
2-02	M2-02-01	71		79		✓
	M2-02-02	64		68		✓
	M2-02-03	78	✓	80		✓
	M2-02-04	71		81		✓
	M2-02-05	64		67		✓
	M2-02-06	61		67		✓
	M2-02-07	65		80		✓
	M2-02-08	75		82	✓	✓
	M2-02-09	70		81		✓
	M2-02-10	63		76		✓
	R2-02-01	66		69		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R2-02-02	71		72		
	R2-02-03	74		76		
	R2-02-04	72		73		
	R2-02-05	65		65		
	R2-02-06	64		73		
	R2-02-07	60		65		
	R2-02-08	67		71		
	R2-02-09	63		67		
	R2-02-10	66		81		
	R2-02-11	58		62		
	R2-02-12	65		70		
	R2-02-13	73		82		
	R2-02-14	59		60		
	R2-02-15	62		63		
	R2-02-16	57		59		
	R2-02-17	57		58		
	R2-02-18	56		58		
	R2-02-19	59		63		
	R2-02-20	59		61		
	R2-02-21	57		58		
	R2-02-22	59		61		
	R2-02-23	57		57		
	R2-02-24	57		57		
	R2-02-25	57		60		
	R2-02-26	58		60		
	R2-02-27	59		65		
2-03	M2-03-01	59		60		✓
	M2-03-02	76	✓	77	✓	✓
	M2-03-03	66		67		✓
	M2-03-04	60		61		✓
	M2-03-05	65		65		✓
	R2-03-01	57		58		
	R2-03-02	58		58		
	R2-03-03	61		61		
	R2-03-04	62		64		
	R2-03-05	62		63		
	R2-03-06	61		62		
2-04	M2-04-01	76		77		✓
	M2-04-02	66		68		✓
	M2-04-03	74		76		✓
	M2-04-04	66		67		✓
	M2-04-05	68		70		✓
	M2-04-06	77		79		✓
	M2-04-07	64		66		✓
	M2-04-08	70		79		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	M2-04-09	67		69		✓
	M2-04-10	68		71		✓
	M2-04-11	69		71		✓
	M2-04-12	78	✓	81	✓	✓
	R2-04-01	58		59		
	R2-04-02	57		58		
	R2-04-03	57		58		
	R2-04-04	64		66		
	R2-04-05	57		57		
	R2-04-06	57		58		
	R2-04-07	57		58		
	R2-04-08	58		58		
	R2-04-09	61		61		
	R2-04-10	62		64		
	R2-04-11	62		63		
	R2-04-12	61		62		
	R2-04-13	66		67		
	R2-04-14	67		68		
	R2-04-15	62		62		
	R2-04-16	58		59		
	R2-04-17	62		63		
2-05	M2-05-01	61		63		✓
	M2-05-02	63		65		✓
	M2-05-03	63		65		✓
	M2-05-04	60		61		✓
	M2-05-05	62		65		✓
	M2-05-06	64		66		✓
	M2-05-07	68		73		✓
	M2-05-08	69	✓	78	✓	✓
	M2-05-09	69	✓	67		✓
	M2-05-10	66		68		✓
	M2-05-11	62		65		✓
	M2-05-12	62		65		✓
	R2-05-01	58		62		
	R2-05-02	57		58		
	R2-05-03	58		58		
	R2-05-04	56		57		
	R2-05-05	59		63		
	R2-05-06	61		63		
	R2-05-07	66		69		
	R2-05-08	60		61		
	R2-05-09	65		68		
	R2-05-10	60		62		
	R2-05-11	60		63		
	R2-05-12	63		63		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R2-05-13	58		60		
	R2-05-14	58		59		
	R2-05-15	57		57		
	R2-05-16	59		60		
	R2-05-17	59		61		
2-06	M2-06-01	64		65		✓
	M2-06-02	72		74		✓
	M2-06-03	66		68		✓
	M2-06-04	71		73		✓
	M2-06-05	69		70		✓
	M2-06-06	74	✓	75	✓	✓
	R2-06-01	59		60		
	R2-06-02	65		66		
	R2-06-03	63		64		
	R2-06-04	57		58		
	R2-06-05	63		64		
	R2-06-06	58		58		
2-07	M2-07-02	68		67		✓
	M2-07-03	63		63		✓
	M2-07-04	73		73		✓
	M2-07-05	65		64		✓
	M2-07-06	74	✓	76	✓	✓
	R2-07-01	62		62		
	R2-07-02	63		63		
	R2-07-03	59		59		
	R2-07-04	61		60		
	R2-07-05	61		61		
	R2-07-06	61		61		
	R2-07-07	63		64		
	R2-07-08	71		69		
2-08	M2-08-01	68		69		✓
	M2-08-02	71	✓	77	✓	✓
	M2-08-03	67		67		✓
	M2-08-04	68		67		✓
	M2-08-05	64		62		✓
	M2-08-06	68		64		✓
	R2-08-01	65		66		
	R2-08-02	63		63		
	R2-08-03	58		59		
	R2-08-04	59		58		
	R2-08-05	63		62		
	R2-08-06	57		56		
2-09	M2-09-01	63		63		✓
	M2-09-02	61		62		✓
	M2-09-03	62		62		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	M2-09-04	64		62		✓
	M2-09-05	69		64		✓
	M2-09-06	70	✓	62		✓
	R2-09-01	66		67	✓	
	R2-09-02	61		61		
	R2-09-03	61		62		
	R2-09-04	58		58		
	R2-09-05	60		59		
	R2-09-06	56		56		
	R2-09-07	64		60		
	R2-09-08	65		60		
	R2-09-09	61		59		
	R2-09-10	66		60		
	R2-09-11	67		63		
	R2-09-12	60		57		
	R2-09-13	57		56		
	R2-09-14	55		55		
2-10	M2-10-01	75		76		✓
	M2-10-02	71		72		✓
	M2-10-03	72		72		✓
	M2-10-04	72		78		✓
	M2-10-05	78	✓	81	✓	✓
	R2-10-01	72		73		
	R2-10-02	66		66		
	R2-10-03	66		68		
	R2-10-04	71		72		
	R2-10-05	63		63		
	R2-10-06	69		69		
	R2-10-07	72		74		
	R2-10-08	66		66		
	R2-10-09	65		67		
	R2-10-10	67		70		
	R2-10-11	63		63		
	R2-10-12	66		66		
	R2-10-13	68		69		
2-11	M2-11-01	66		72		✓
	M2-11-02	71		77	✓	✓
	M2-11-05	77	✓	77	✓	✓
	M2-11-07	70		70		✓
	R2-11-01	59		59		
	R2-11-02	62		65		
	R2-11-03	69		73		
	R2-11-04	58		58		
	R2-11-05	71		73		
	R2-11-06	63		64		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R2-11-07	59		59		
	R2-11-08	66		67		
	R2-11-09	56		56		
2-13	M2-13-02	73	✓	74		✓
	M2-13-03	72		72		✓
	M2-13-04	70		71		✓
	M2-13-05	69		70		✓
	M2-13-06	67		67		✓
	M2-13-08	64		66		✓
	M2-13-09	67		68		✓
	M2-13-10	70		72		✓
	M2-13-11	68		78	✓	✓
	M2-13-12	69		72		✓
	R2-13-01	70		71		
	R2-13-02	70		71		
	R2-13-03	70		71		
	R2-13-04	60		60		
	R2-13-05	66		67		
	R2-13-06	59		60		
2-14	M2-14-01	60		64		✓
	M2-14-02	65		73		✓
	M2-14-03	62		66		✓
	M2-14-04	71		74		✓
	M2-14-05	66		70		✓
	M2-14-06	62		67		✓
	M2-14-07	65		70		✓
	M2-14-08	70		80	✓	✓
	M2-14-09	63		66		✓
	M2-14-10	60		62		✓
	R2-14-01	59		62		
	R2-14-02	58		58		
	R2-14-03	74	✓	80	✓	
	R2-14-04	62		65		
	R2-14-05	60		61		
	R2-14-06	60		62		
	R2-14-07	58		59		
	R2-14-08	57		58		
	R2-14-09	68		70		
	R2-14-10	57		58		
	R2-14-11	64		65		
	R2-14-12	57		58		
	R2-14-13	56		56		
2-15	M2-15-01	66		67		✓
	M2-15-02	63		63		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	M2-15-04	69		70		✓
	M2-15-05	71		72		✓
	M2-15-06	73		74		✓
	M2-15-07	63		64		✓
	M2-15-08	68		68		✓
	M2-15-09	74	✓	75	✓	✓
	M2-15-10	68		69		✓
	R2-15-01	67		69		
	R2-15-02	63		64		
	R2-15-03	63		64		
	R2-15-04	61		62		
	R2-15-05	60		61		
	R2-15-06	63		64		
	R2-15-07	65		66		
	R2-15-08	64		65		
	R2-15-09	62		63		
	R2-15-10	65		66		
2-16	M2-16-01	64		64		✓
	M2-16-02	63		63		✓
	M2-16-03	67		68		✓
	M2-16-04	69		69		✓
	M2-16-05	66		66		✓
	M2-16-06	66		67		✓
	M2-16-07	68		68		✓
	M2-16-08	71	✓	72	✓	✓
	M2-16-09	63		63		✓
	R2-16-01	59		59		
	R2-16-02	58		58		
	R2-16-03	57		57		
	R2-16-04	59		59		
	R2-16-05	63		64		
	R2-16-06	63		64		
	R2-16-07	67		68		
2-17	M2-17-01	74	✓	75	✓	✓
	M2-17-02	67		68		✓
	M2-17-03	65		65		✓
	M2-17-04	59		59		✓
	M2-17-05	69		70		✓
	R2-17-01	68		69		
	R2-17-02	63		64		
	R2-17-03	58		59		
	R2-17-04	58		58		
	R2-17-05	58		58		
	R2-17-06	65		65		
	R2-17-07	67		68		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R2-17-08	66		60		
	R2-17-09	65		62		
	R2-17-10	69		69		
2-18	M2-18-01	68		68		✓
	M2-18-02	66		66		✓
	M2-18-03	63		64		✓
	M2-18-04	72		73		✓
	M2-18-05	71		68		✓
	R2-18-01	77	✓	78	✓	
	R2-18-02	61		61		
	R2-18-03	66		66		
	R2-18-04	71		71		
	R2-18-05	76		77		
	R2-18-06	59		59		
	R2-18-07	59		59		
	R2-18-08	68		69		
2-19	M2-19-01	73		72		✓
	M2-19-02	74	✓	74	✓	✓
	M2-19-03	68		65		✓
	M2-19-04	70		69		✓
	R2-19-01	71		72		
	R2-19-02	68		68		
	R2-19-03	73		73		
	R2-19-04	70		70		
	R2-19-05	70		70		
	R2-19-06	69		69		
	R2-19-07	66		66		
2-20						
2-21	M2-21-01	65		66		✓
	M2-21-02	67		69		✓
	M2-21-03	68		68		✓
	M2-21-04	73	✓	73	✓	✓
	M2-21-05	72		72		✓
	M2-21-06	67		68		✓
	R2-21-01	64		65		
	R2-21-02	64		64		
	R2-21-03	62		63		
	R2-21-04	60		60		
	R2-21-05	62		63		
	R2-21-06	67		68		
	R2-21-07	73	✓	70		
2-22	M2-22-01	75	✓	76		✓
	M2-22-02	69		70		✓
	M2-22-03	73		79	✓	✓
	M2-22-04	69		71		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	M2-22-05	74		75		✓
	M2-22-06	71		72		✓
	R2-22-01	65		66		
	R2-22-02	63		64		
	R2-22-03	65		67		
2-23	M2-23-01	73		74		✓
	M2-23-02	69		70		✓
	M2-23-03	80		82	✓	✓
	M2-23-04	70		73		✓
	M2-23-05	81	✓	81		✓
	M2-23-06	78		79		✓
	M2-23-07	70		73		✓
	M2-23-08	79		80		✓
	M2-23-09	77		78		✓
	M2-23-10	67		69		✓
	M2-23-11	73		74		✓
	R2-23-01	72		73		
	R2-23-02	63		64		
	R2-23-03	63		63		
	R2-23-04	71		72		
	R2-23-05	61		62		
	R2-23-06	68		69		
	R2-23-07	66		67		
	R2-23-08	63		64		
	R2-23-09	68		69		
	R2-23-10	71		71		
	R2-23-11	67		67		
2-24	M2-24-01	76		77		✓
	M2-24-02	70		69		✓
	M2-24-03	67		66		✓
	M2-24-04	69		68		✓
	M2-24-05	69		69		✓
	M2-24-06	74		74		✓
	M2-24-07	68		67		✓
	M2-24-08	66		65		✓
	M2-24-09	72		71		✓
	M2-24-10	70		70		✓
	M2-24-11	69		69		✓
	M2-24-12	79	✓	80	✓	✓
	R2-24-01	65		63		
	R2-24-02	69		67		
	R2-24-03	65		63		
	R2-24-04	58		58		
	R2-24-05	59		60		
2-25	M2-25-01	61		66		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	M2-25-02	62		68		✓
	M2-25-03	62		72		✓
	M2-25-04	64		73		✓
	M2-25-05	63		74	✓	✓
	M2-25-06	65	✓	74	✓	✓
	M2-25-07	62		65		✓
	R2-25-01	65	✓	68		
	R2-25-02	62		65		
	R2-25-03	60		67		
	R2-25-04	59		65		
	R2-25-05	60		67		
	R2-25-06	58		61		
2-26	M2-26-01	62		69		✓
	M2-26-02	64		72		✓
	M2-26-03	61		65		✓
	M2-26-04	66		69		✓
	M2-26-05	63		64		✓
	M2-26-06	76	✓	76	✓	✓
	M2-26-07	65		66		✓
	M2-26-08	67		68		✓
	M2-26-09	65		72		✓
	M2-26-10	63		67		✓
	M2-26-11	67		70		✓
	M2-26-12	72		72		✓
	M2-26-13	67		68		✓
	M2-26-15	62		69		✓
	M2-26-17	64		70		✓
	R2-26-01	62		63		
	R2-26-02	59		65		
	R2-26-03	60		63		
	R2-26-04	60		61		
	R2-26-05	62		65		
	R2-26-06	65		66		
	R2-26-07	56		57		
	R2-26-08	64		66		
	R2-26-09	62		66		
	R2-26-10	70		71		
	R2-26-11	66		67		
	R2-26-12	63		68		
	R2-26-13	67		76		
	R2-26-14	63		65		
	R2-26-15	63		65		
	R2-26-16	62		64		
	R2-26-17	68		70		
2-27	M2-27-01	68		69		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	M2-27-02	67		68		✓
	M2-27-03	63		65		✓
	M2-27-04	70		71		✓
	M2-27-05	69		69		✓
	M2-27-06	71		72		✓
	M2-27-07	73	✓	79	✓	✓
	M2-27-08	67		69		✓
	M2-27-09	66		67		✓
	M2-27-10	64		65		✓
	M2-27-11	68		70		✓
	M2-27-12	68		78		✓
	R2-27-01	72		74		
	R2-27-02	62		63		
	R2-27-03	64		64		
	R2-27-04	59		59		
	R2-27-05	57		58		
	R2-27-06	67		69		
	R2-27-07	72		74		
2-28	M2-28-01	66	✓	66		✓
	M2-28-02	66	✓	66		✓
	R2-28-01	59		59		
	R2-28-02	62		63		
	R2-28-03	57		57		
	R2-28-04	57		57		
	R2-28-05	56		56		
	R2-28-06	65		67	✓	
2-29	M2-29-01	79		80	✓	✓
	M2-29-02	81	✓	80	✓	✓
	M2-29-03	68		67		✓
	M2-29-04	69		66		✓
	R2-29-01	65		65		
	R2-29-02	63		63		
	R2-29-03	63		63		
	R2-29-04	63		63		
	R2-29-05	57		57		
2-30	M2-30-01	63		67		✓
	M2-30-02	65		66		✓
	M2-30-03	64		66		✓
	M2-30-04	61		61		✓
	M2-30-05	65		67		✓
	M2-30-06	66	✓	75	✓	✓
	M2-30-07	62		64		✓
	M2-30-08	66	✓	67		✓
	M2-30-09	62		61		✓
	M2-30-10	61		72		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R2-30-01	57		57		
	R2-30-02	57		58		
	R2-30-03	57		58		
	R2-30-04	56		56		
	R2-30-05	61		65		
	R2-30-06	62		67		
	R2-30-07	60		61		
	R2-30-08	57		58		
	R2-30-09	56		57		
2-31	M2-31-01	68		69		✓
	M2-31-02	64		66		✓
	M2-31-03	61		66		✓
	M2-31-04	60		68		✓
	M2-31-05	63		72		✓
	M2-31-06	64		74		✓
	M2-31-07	65		66		✓
	M2-31-08	62		63		✓
	M2-31-09	64		69		✓
	M2-31-10	62		75		✓
	M2-31-11	63		78	✓	✓
	M2-31-12	62		66		✓
	M2-31-13	65		68		✓
	M2-31-14	69	✓	72		✓
	R2-31-01	62		64		
	R2-31-02	61		64		
	R2-31-03	56		56		
	R2-31-04	59		63		
	R2-31-05	63		66		
	R2-31-06	61		65		
	R2-31-07	57		58		
	R2-31-08	58		64		
	R2-31-09	56		59		
	R2-31-10	59		63		
	R2-31-11	58		60		
2-32	M2-32-01	66		79		✓
	M2-32-02	61		70		✓
	M2-32-03	63		77	✓	✓
	M2-32-04	67		67		✓
	M2-32-05	63		65		✓
	M2-32-06	68	✓	68		✓
	M2-32-07	67		68		✓
	R2-32-01	59		62		
	R2-32-02	59		63		
	R2-32-03	59		67		
	R2-32-04	58		65		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R2-32-05	59		68		
	R2-32-06	59		61		
	R2-32-07	63		65		
	R2-32-08	59		60		
	R2-32-09	65		64		
3-01	M3-01-01	71		72		✓
	M3-01-02	71		72		✓
	M3-01-03	74		76		✓
	M3-01-06	77		79	✓	✓
	M3-01-07	79	✓	79	✓	✓
	M3-01-08	76		77		✓
	M3-01-09	58		59		✓
	M3-01-10	75		76		✓
	M3-01-11	79	✓	79	✓	✓
	M3-01-12	62		64		✓
	M3-01-13	75		76		✓
	M3-01-14	64		64		✓
	M3-01-15	68		69		✓
	M3-01-16	68		69		✓
	M3-01-17	61		63		✓
	M3-01-18	66		73		✓
	M3-01-19	65		67		✓
	M3-01-20	63		74		✓
	M3-01-21	65		70		✓
	M3-01-22	65		66		✓
	M3-01-23	64		66		✓
	M3-01-24	66		67		✓
	M3-01-25	70		73		✓
	M3-01-26	67		69		✓
	M3-01-27	66		68		✓
	M3-01-28	64		65		✓
	M3-01-29	71		71		✓
	R3-01-01	57		58		
	R3-01-02	56		56		
	R3-01-03	59		59		
	R3-01-04	59		59		
	R3-01-05	63		64		
	R3-01-06	59		60		
	R3-01-07	56		56		
	R3-01-08	59		60		
	R3-01-09	57		58		
	R3-01-10	59		60		
	R3-01-11	56		57		
	R3-01-12	56		57		
	R3-01-13	56		56		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R3-01-14	56		56		
	R3-01-15	56		56		
	R3-01-16	56		56		
	R3-01-17	58		60		
	R3-01-18	56		57		
	R3-01-19	56		57		
	R3-01-20	59		60		
3-02	M3-02-01	78	✓	83	✓	✓
	M3-02-02	60		64		✓
	M3-02-06	67		68		✓
	M3-02-07	74		75		✓
	M3-02-08	75		76		✓
	R3-02-01	59		61		
	R3-02-02	58		62		
	R3-02-03	57		59		
	R3-02-04	60		60		
3-03						
3-04	M3-04-01	63	✓	64	✓	✓
	M3-04-02	59		59		✓
	M3-04-03	62		63		✓
	M3-04-04	59		59		✓
	M3-04-05	60		60		✓
	M3-04-06	60		61		✓
	R3-04-01	57		58		
	R3-04-02	59		59		
	R3-04-03	58		58		
	R3-04-04	56		56		
	R3-04-05	62		62		
	R3-04-06	56		56		
	R3-04-07	56		56		
	R3-04-08	57		57		
	R3-04-09	56		57		
3-05	M3-05-01	61		61		✓
	M3-05-02	61		62		✓
	M3-05-03	61		61		✓
	M3-05-04	64		65		✓
	R3-05-01	61		62		
	R3-05-02	58		58		
	R3-05-03	58		59		
	R3-05-04	63		65		
	R3-05-05	73	✓	73	✓	
	R3-05-06	59		59		
3-06	M3-06-01	69		72		✓
	M3-06-02	69		73		✓
	M3-06-03	63		69		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	M3-06-04	65		74		✓
	M3-06-05	59		68		✓
	M3-06-06	67		78		✓
	M3-06-07	67		75		✓
	M3-06-08	67		78		✓
	M3-06-09	65		69		✓
	M3-06-10	66		74		✓
	M3-06-11	71		75		✓
	M3-06-12	67		68		✓
	M3-06-13	70		71		✓
	M3-06-14	62		65		✓
	M3-06-15	78	✓	79	✓	✓
	M3-06-16	67		77		✓
	M3-06-17	71		72		✓
	M3-06-18	65		67		✓
	M3-06-19	67		69		✓
	M3-06-20	71		75		✓
	R3-06-01	56		56		
	R3-06-02	67		74		
	R3-06-03	60		63		
	R3-06-04	62		63		
	R3-06-05	56		57		
	R3-06-06	56		57		
	R3-06-07	61		62		
	R3-06-08	67		70		
	R3-06-09	68		69		
	R3-06-10	65		68		
3-07	M3-07-01	61		65		✓
	M3-07-02	60		64		✓
	M3-07-03	63		67		✓
	M3-07-04	70	✓	81	✓	✓
	R3-07-01	55		56		
3-08	M3-08-01	67		66		✓
	M3-08-02	68		67		✓
	M3-08-03	69		67		✓
	M3-08-04	78	✓	79	✓	✓
	M3-08-05	71		72		✓
	R3-08-01	61		61		
	R3-08-02	64		64		
	R3-08-03	57		57		
	R3-08-04	69		67		
	R3-08-05	65		65		
	R3-08-06	62		63		
	R3-08-07	70		70		
	R3-08-08	63		64		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R3-08-09	60		60		
3-09	M3-09-01	74	✓	75	✓	✓
	M3-09-04	67		72		✓
	M3-09-05	64		65		✓
	M3-09-06	63		65		✓
	R3-09-01	63		63		
	R3-09-02	65		65		
	R3-09-03	66		67		
	R3-09-04	69		70		
	R3-09-05	65		67		
	R3-09-06	63		66		
	R3-09-07	63		64		
	R3-09-08	63		65		
	R3-09-09	66		67		
	R3-09-10	71		71		
3-10	M3-10-01	67		68		✓
	M3-10-02	77		77		✓
	M3-10-03	70		70		✓
	M3-10-04	77		77		✓
	M3-10-05	75		74		✓
	M3-10-06	65		66		✓
	M3-10-07	79	✓	82	✓	✓
	M3-10-08	65		68		✓
	R3-10-01	65		66		
	R3-10-02	68		69		
	R3-10-03	61		61		
	R3-10-04	59		60		
3-11	M3-11-01	73	✓	78	✓	✓
	M3-11-02	70		73		✓
	M3-11-03	70		71		✓
	M3-11-04	65		66		✓
	M3-11-05	70		73		✓
	M3-11-06	65		66		✓
	M3-11-07	67		74		✓
	M3-11-08	63		68		✓
	R3-11-01	60		61		
	R3-11-02	66		75		
	R3-11-03	72		74		
	R3-11-04	62		63		
	R3-11-05	62		62		
3-12	M3-12-01	63		63		✓
	M3-12-02	63		64		✓
	M3-12-03	59		59		✓
	M3-12-04	61		62		✓
	M3-12-05	63		64		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R3-12-01	57		57		
	R3-12-02	58		58		
	R3-12-03	57		57		
	R3-12-04	65	✓	66	✓	
3-13	M3-13-01	72		73		✓
	M3-13-02	64		65		✓
	M3-13-03	61		62		✓
	M3-13-04	62		63		✓
	M3-13-05	67		77	✓	✓
	M3-13-06	71		76		✓
	R3-13-01	65		66		
	R3-13-02	57		57		
	R3-13-03	57		57		
	R3-13-04	58		60		
	R3-13-05	57		60		
	R3-13-06	59		61		
	R3-13-07	59		61		
	R3-13-08	59		60		
	R3-13-09	60		61		
	R3-13-10	60		61		
	R3-13-11	61		62		
	R3-13-12	62		64		
	R3-13-13	74	✓	74		
3-14	M3-14-01	62		68	✓	✓
	M3-14-02	62		68	✓	✓
	M3-14-03	62		64		✓
	M3-14-04	63		64		✓
	M3-14-05	63		64		✓
	M3-14-06	65	✓	66		✓
	M3-14-07	64		65		✓
	M3-14-08	60		62		✓
	R3-14-01	63		65		
	R3-14-02	58		58		
	R3-14-03	60		61		
	R3-14-04	62		63		
	R3-14-05	56		56		
3-15	M3-15-01	63		65	✓	✓
	M3-15-02	63		65	✓	✓
	M3-15-03	63		64		✓
	M3-15-04	61		62		✓
	M3-15-05	62		62		✓
	M3-15-06	61		61		✓
	M3-15-07	63		63		✓
	M3-15-08	64	✓	64		✓
	M3-15-09	59		59		✓

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	M3-15-10	60		60		✓
	R3-15-01	60		60		
	R3-15-02	58		58		
	R3-15-03	59		59		
3-16	M3-16-01	63		63		✓
	M3-16-02	59		58		✓
	M3-16-03	60		61		✓
	M3-16-04	60		60		✓
	M3-16-05	60		60		✓
	M3-16-06	61		61		✓
	M3-16-07	63		63		✓
	M3-16-08	63		63		✓
	M3-16-09	59		59		✓
	M3-16-10	57		57		✓
	M3-16-11	63		63		✓
	M3-16-12	62		62		✓
	M3-16-13	61		61		✓
	M3-16-14	61		62		✓
	M3-16-15	66		66		✓
	M3-16-16	64		64		✓
	M3-16-17	64		64		✓
	M3-16-18	62		61		✓
	M3-16-19	62		62		✓
	M3-16-20	65		64		✓
	M3-16-21	60		60		✓
	M3-16-22	63		63		✓
	M3-16-23	62		62		✓
	M3-16-24	60		59		✓
	M3-16-25	59		59		✓
	M3-16-26	63		62		✓
	M3-16-27	61		60		✓
	R3-16-01	59		58		
	R3-16-02	60		60		
	R3-16-03	58		58		
	R3-16-04	60		60		
	R3-16-05	57		57		
	R3-16-06	61		62		
	R3-16-07	60		61		
	R3-16-08	61		61		
	R3-16-09	62		62		
	R3-16-10	62		62		
	R3-16-11	68	✓	68	✓	
	R3-16-12	66		66		
	R3-16-13	64		64		
	R3-16-14	65		65		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R3-16-15	60		60		
3-17	M3-17-01	73		74		✓
	M3-17-02	74	✓	75	✓	✓
	M3-17-03	72		73		✓
	M3-17-04	70		72		✓
	M3-17-05	67		68		✓
	M3-17-06	66		67		✓
	M3-17-07	62		62		✓
	M3-17-08	70		70		✓
	M3-17-09	74		74		✓
	M3-17-10	62		62		✓
	M3-17-11	63		64		✓
	M3-17-12	60		61		✓
	M3-17-13	60		62		✓
	M3-17-14	63		64		✓
	M3-17-15	63		64		✓
	M3-17-16	65		66		✓
	M3-17-17	66		67		✓
	M3-17-18	66		67		✓
	M3-17-19	67		67		✓
	M3-17-20	66		67		✓
	M3-17-21	61		61		✓
	M3-17-22	59		60		✓
	M3-17-23	60		60		✓
	R3-17-01	67		67		
3-18	M3-18-01	68		72		✓
	M3-18-02	68		70		✓
	M3-18-03	71	✓	73	✓	✓
	M3-18-04	64		66		✓
	M3-18-05	61		63		✓
	M3-18-06	60		62		✓
	M3-18-07	58		58		✓
	M3-18-08	64		66		✓
	M3-18-09	66		67		✓
	M3-18-10	61		63		✓
	M3-18-11	59		61		✓
	M3-18-12	66		67		✓
	M3-18-13	62		63		✓
	M3-18-14	58		59		✓
	M3-18-15	67		68		✓
	M3-18-16	67		68		✓
	R3-18-01	68		72		
	R3-18-02	60		62		
	R3-18-03	58		59		
	R3-18-04	56		57		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R3-18-05	56		56		
4-01[6]	M4-01-01	63		64		✓
	M4-01-02	69		70		✓
	M4-01-03	74	✓	75	✓	✓
	M4-01-04	73		74		✓
	M4-01-05	64		66		✓
	R1-01-01	61		62		
	R4-01-02	64		65		
	R4-01-03	65		67		
	R4-01-04	70		72		
	R4-01-05	66		68		
	R4-01-06	68		72		
	R4-01-07	65		66		
	R4-01-08	67		68		
	R4-01-09	68		69		
4-02[7]	M4-02-01	81 [46]		82 [47]		✓
	M4-02-02	79 [44]		80 [45]		✓
	R4-02-01	74 [39]		75 [40]		
	R4-02-02	72 [37]		72 [37]		
	R4-02-03	69	✓	69	✓	
	R4-02-04	67		68		
	R4-02-05	63		64		
4-03[8]	M4-03-01	74		75		✓
	M4-03-02	71		72		✓
	M4-03-03	77		77		✓
	R4-03-01	68		68		
	R4-03-02	78	✓	80	✓	
	R4-03-03	63		63		
4-04	M4-04-02	74		74		✓
	M4-04-03	78		79		✓
	M4-04-04	66		67		✓
	R4-04-01	74		75		
	R4-04-02	68		69		
	R4-04-03	64		61		
	R4-04-04	67		68		
	R4-04-05	79	✓	80	✓	

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site

1. *Build noise levels in bold and colored red are impacted for the specific land use category.*
2. *Build noise levels highlighted are greater than or equal to 75 dB(A)*
3. *A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.*
4. *A minimum noise level of 55 dB(A) was used because TNM does not account for background noise.*
5. *This NSA has been redesignated as a Phase 3 area. Noise barrier analysis is presented in relevant sections of this report as NSA 3-18.*
6. *This NSA is Burning Tree Country Club.*
7. *This NSA is Holy Cross Hospital.*
8. *This NSA is Sligo Creek Golf Course.*

3 I-270 (DWIGHT D. EISENHOWER MEMORIAL HIGHWAY)

Table D-1a: Predicted Noise Levels, I-270 NSAs 5-1 to 5-28

NSA	Receptor Number[3]	2040 No Build, Build Alt 5, and 13B [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, and 13C[1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 10	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
5-1	R 5-01-1	65		**66**		**66**		
	R 5-01-2	61		61		62		✓
	R 5-01-4	62		62		63		
	R 5-01-13	64		64		65		
	R 5-01-18	62		63		64		
	R 5-01-21	64		65		**66**		
	R 5-01-24	62		63		64		✓
	R 5-01-26	64		64		65		
	R 5-01-42	**66**		**66**		**67**		
	R 5-01-52	**67**		**67**		**68**		
	R 5-01-54	64		64		65		
	R 5-01-77	65		**66**		**67**		
	R 5-01-82	64		64		65		
	R 5-01-87	65		**66**		**67**		
	R 5-01-92	**69**		**70**		**70**		
	R 5-01-94	**70**		**71**		**72**		
	R 5-01-101	**66**		**66**		**67**		
	R 5-01-103	**73**		**72**		**73**		
	R 5-01-105	**69**		**70**		**71**		
	R 5-01-110	**76**		**77**		**78**		
	R 5-01-113	**73**		**74**		**75**		
	R 5-01-115	**68**		**69**		**69**		

NSA	Receptor Number[3]	2040 No Build, Build Alt 5, and 13B [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, and 13C[1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 10	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R 5-01-116	76		76		77		
	R 5-01-119	77	✓	77	✓	78	✓	
5-2	R 5-02-1	53		54		55		
	R 5-02-3	61		62		63		
	R 5-02-16	63		64		65		
	R 5-02-18	56		56		57		
	R 5-02-21	56		56		57		
	R 5-02-23	61		63		64		
	R 5-02-38	63		64		65		
	R 5-02-40	61		61		62		
	R 5-02-42	65		65		66		✓
	R 5-02-43	66		66		67		
	R 5-02-44	64		65		66		
	R 5-02-46	63		64		65		
	R 5-02-49	64		65		66		
	R 5-02-50	62		63		64		
	R 5-02-51	65	✓	65	✓	66	✓	
	R 5-02-52	63		64		65		
~~5-3~~	-	-	-	-	—	—	—	—
5-4	R 5-04-1	58	✓	58	✓	59	✓	
~~5-5~~	-	-	-	-	—	—	—	—
5-6	R 5-06-1	61		62		63		
	R 5-06-2	63		64		64		
	R 5-06-4	67		67		68		✓
	R 5-06-5	64		64		65		
	R 5-06-6	67		67		68		
	R 5-06-8	69		69		70		
	R 5-06-14	61		62		63		
	R 5-06-15	67		68		69		
	R 5-06-19	69		70		70		
	R 5-06-20	70	✓	70		71		
	R 5-06-24	69		69		70		
	R 5-06-25	69		69		70		
	R 5-06-28	70	✓	71	✓	72	✓	
	R 5-06-29	70	✓	71	✓	72	✓	
5-7	R 5-07-1	65		66		67		✓

NSA	Receptor Number[3]	2040 No Build, Build Alt 5, and 13B [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, and 13C[1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 10	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R 5-07-2	68		68		69		
	R 5-07-3	75	✓	75	✓	76	✓	
	R 5-07-5	65		66		67		
	R 5-07-8	64		65		66		
	R 5-07-12	63		63		64		
	R 5-07-15	62		63		63		
	R 5-07-16	69		69		70		
	R 5-07-17	70		70		71		
	R 5-07-19	67		67		68		
	R 5-07-21	69		69		70		
	R 5-07-22	65		65		66		
	R 5-07-25	68		69		70		
	R 5-07-26	65		66		67		
	R 5-07-27	68		68		69		
5-8	R 5-08-1	64		64		65		
	R 5-08-2	67		67		68		
	R 5-08-3	69		69		70		
	R 5-08-5	70		70		71		
	R 5-08-12	64		65		65		✓
	R 5-08-16	70	✓	70		71		
	R 5-08-17	66		66		67		
	R 5-08-19	68		68		69		
	R 5-08-22	70	✓	70		71		
	R 5-08-23	70	✓	71	✓	71	✓	
5-9	R 5-09-1	65		65		66		
	R 5-09-2	61		61		62		
	R 5-09-5	58		58		59		
	R 5-09-6	65		65		66		
	R 5-09-9	61		61		62		
	R 5-09-10	66		66		67		
	R 5-09-11	69	✓	70	✓	71	✓	✓
5-10	R 5-10-1	73		73		74		✓
	R 5-10-2	75	✓	75	✓	76	✓	
	R 5-10-3	70		70		71		
5-11	R 5-11-1	55	✓	55	✓	56	✓	✓
5-12	R 5-12-1	63		63		64		

NSA	Receptor Number[3]	2040 No Build, Build Alt 5, and 13B [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, and 13C[1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 10	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R 5-12-4	61		61		62		✓
	R 5-12-10	63	✓	64	✓	65	✓	
	R 5-12-11	63		63		64		
	R 5-12-14	62		63		63		
	R 5-12-18	60		60		61		
	R 5-12-20	60		60		61		
	R 5-12-33	62		62		63		
	R 5-12-38	63		64		64		✓
	R 5-12-44	57		57		58		
	R 5-12-46	63		63		64		
	R 5-12-47	61		62		63		
	R 5-12-53	60		60		61		
	R 5-12-61	60		60		61		✓
	R 5-12-69	65		65		**66**		
	R 5-12-83	60		60		61		
5-13	R 5-13-1	**66**	✓	**66**	✓	**67**	✓	
	R 5-13-2	64		65		65		
	R 5-13-3	57		58		59		
5-14	R 5-14-1	61		62		63		
	R 5-14-2	**67**		**67**		**68**		
	R 5-14-3	**68**		**68**		**69**		
	R 5-14-4	**69**	✓	**70**	✓	**71**	✓	✓
5-15	R 5-15-1	47	✓	47	✓	48	✓	
	R 5-15-2	**68**		**68**		**69**		
	R 5-15-3	**68**		**68**		**69**		
	R 5-15-4	**66**		**67**		**67**		
	R 5-15-9	60		61		62		
	R 5-15-10	**66**		**66**		**67**		
	R 5-15-12	**66**		**67**		**68**		
	R 5-15-13	62		63		64		
	R 5-15-17	37		37		38		
	R 5-15-19	59		60		61		
5-16	R 5-16-1	60		61		62		
	R 5-16-2	62	✓	63	✓	64	✓	
5-17	R 5-17-4	**66**		**67**		**67**		
	R 5-17-7	**67**		**67**		**68**		

NSA	Receptor Number[3]	2040 No Build, Build Alt 5, and 13B [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, and 13C[1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 10	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R 5-17-8	69		69		70		
	R 5-17-9	64		65		66		
	R 5-17-10	63		63		64		
	R 5-17-18	63		63		64		
	R 5-17-19	63		63		64		
	R 5-17-20	62		63		64		
	R 5-17-21	62		62		63		
	R 5-17-25	59		60		60		
	R 5-17-32	62		62		63		
	R 5-17-33	63		63		64		
	R 5-17-34	62		62		63		
	R 5-17-45	63		63		64		
	R 5-17-47	56		57		58		
	R 5-17-53	66	✓	66	✓	67	✓	
	R 5-17-68	59		60		61		
	R 5-17-70	60		61		62		
	R 5-17-71	57		58		59		
5-18	R 5-18-1	64		66		67		
	R 5-18-2	68		69		70		✓
	R 5-18-3	69	✓	70	✓	71	✓	✓
	R 5-18-4	60		61		62		✓
	R 5-18-7	62		63		64		✓
	R 5-18-9	64		65		66		✓
5-19	R 5-19-1	60		61		62		
	R 5-19-6	61		62		63		✓
	R 5-19-10	63		65		65		
	R 5-19-21	60		61		62		✓
	R 5-19-26	62		63		64		✓
	R 5-19-46	64		66		67		
	R 5-19-51	69	✓	71	✓	72	✓	
	R 5-19-59	62		64		65		
	R 5-19-60	65		67		68		✓
	R 5-19-69	61		63		64		
5-20	R 5-20-3	62		63		64		✓
	R 5-20-4	63		63		64		
	R 5-20-7	66		67		67		

NSA	Receptor Number[3]	2040 No Build, Build Alt 5, and 13B [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, and 13C[1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 10	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R 5-20-8	67		68		69		
	R 5-20-10	69		70		71		
	R 5-20-12	67	✓	68	✓	69	✓	
	R 5-20-13	65		66		67		✓
	R 5-20-15	58		59		60		
	R 5-20-23	62		62		63		✓
	R 5-20-27	60		60		61		
	R 5-20-29	59		59		60		
5-21	R 5-21-1	59		63		64		
	R 5-21-4	64		68		69		✓
	R 5-21-6	67		74		75		
	R 5-21-7	70	✓	78	✓	79	✓	
	R 5-21-8	72		78	✓	79	✓	
	R 5-21-9	75		77		78		✓
	R 5-21-11	69		70		71		
	R 5-21-12	75		76		77		✓
	R 5-21-13	65		66		67		
	R 5-21-15	59		60		61		✓
	R 5-21-16	61		65		66		
	R 5-21-17	61		64		65		
	R 5-21-25	56		57		58		
5-22	R 5-22-1	66	✓	67	✓	68	✓	✓
	R 5-22-3	63		64		65		✓
	R 5-22-4	64		66		67		
	R 5-22-6	63		64		65		
	R 5-22-8	60		61		62		
	R 5-22-10	62		63		64		✓
5-23	R 5-23-1	54		54		55		
	R 5-23-5	61		62		63		✓
	R 5-23-8	61		62		63		✓
	R 5-23-9	61		62		63		✓
	R 5-23-12	56		57		58		
	R 5-23-13	38	✓	40	✓	40	✓	
5-24	R 5-24-2	60		61		62		✓
	R 5-24-4	64	✓	65	✓	66	✓	✓
	R 5-24-5	63		64	✓	65	✓	

NSA	Receptor Number[3]	2040 No Build, Build Alt 5, and 13B [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, and 13C[1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 10	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R 5-24-8	62		63		64		✓
	R 5-24-14	63	✓	65	✓	65	✓	✓
	R 5-24-18	62		63		64		
	R 5-24-20	61		63		63		
5-25	R 5-25-1	57		59		60		
	R 5-25-2	47	✓	49	✓	49	✓	
	R 5-25-3	58		58		59		
5-26	R 5-26-1	51		52		53		
	R 5-26-2	59	✓	60	✓	61	✓	
	R 5-26-5	60	✓	60	✓	61	✓	
	R 5-26-7	59		59		60		
5-27	R-5-27-1	58	✓	59	✓	59	✓	
	R-5-27-3	58	✓	59	✓	60	✓	
	R-5-27-5	57		57		58		
5-28	R 5-28-1	63	✓	64	✓	65	✓	
	R 5-28-3	62		63		64		
	R 5-28-7	55		56		57		
	R 5-28-11	55		55		56		
	R 5-28-15	55		56		57		
	R 5-28-19	56		56		57		

Table D-2b: Predicted Noise Levels, I-270 NSA 5-29

NSA	Receptor Number[3]	2040 No Build	Maximum Noise Level within NSA	2040 Build Alt 5, 8, and 9	Maximum Noise Level within NSA	2040 Build Alt 10	Maximum Noise Level within NSA	2040 Build Alt 13B	Maximum Noise Level within NSA	2040 Build Alt 13C	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
5-29	R 5-29-1	63		63		63		61		62		
	R 5-29-5	64		65		65		63		64		
	R 5-29-7	63		64		64		62		63		
	R 5-29-9	68		68		68		66		67		✓
	R 5-29-11	63		63		64		62		62		
	R 5-29-15	68		69		69		67		68		
	R 5-29-16	76		77		77		75		76		✓
	R 5-29-18	77		78	✓	78	✓	76	✓	77	✓	
	R 5-29-19	78	✓	78	✓	78	✓	76	✓	77	✓	✓
	R 5-29-23	77		77		77		75		76		
	R 5-29-24	72		73		73		71		71		
	R 5-29-25	70		71		71		69		70		✓
	R 5-29-28	68		68		69		67		67		✓
	R 5-29-31	72		72		72		70		71		
	R 5-29-32	75		75		75		73		74		✓
	R 5-29-36	72		73		73		71		72		
	R 5-29-42	74		75		75		73		74		✓
	R 5-29-44	66		67		67		65		66		
	R 5-29-51	64		65		65		63		64		
	R 5-29-60	69		69		69		67		68		
	R 5-29-61	62		62		62		60		61		
	R 5-29-79	69		70		70		68		69		
	R 5-29-81	73		73		73		71		72		✓

	R 5-29-87	**72**		**73**		**73**		**71**		**72**		
	R 5-29-91	**68**		**68**		**68**		**66**		**67**		✓
	R 5-29-104	59		60		60		58		58		
	R 5-29-107	**68**		**69**		**69**		**67**		**68**		
	R 5-29-116	**66**		**67**		**67**		**65**		**66**		✓
	R 5-29-117	**65**		**66**		**66**		**64**		**65**		✓
	R 5-29-119	64		65		65		63		63		
	R 5-29-121	61		62		62		60		61		
	R 5-29-123	63		63		63		61		62		✓

Table D-2c: Predicted Noise Levels, I-270 NSAs 5-30 to 5-37

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
5-30	R 5-30-2	60		60		✓
	R 5-30-5	62		62		✓
	R 5-30-6	65		65		
	R 5-30-10	64		64		
	R 5-30-12	67		67		
	R 5-30-14	71		71		
	R 5-30-15	73	✓	73	✓	
	R 5-30-17	71		71		
	R 5-30-21	69		70		
	R 5-30-23	64		65		
	R 5-30-27	63		63		
	R 5-30-31	63		64		
	R 5-30-32	64		64		
	R 5-30-34	64		65		
5-31	R 5-31-01	62		62		
	R 5-31-02	59		59		
	R 5-31-03	58		58		
	R 5-31-04	60		61		
	R 5-31-05	65		66		
	R 5-31-06	63		65		
	R 5-31-07	58		59		
	R 5-31-08	59		60		
	R 5-31-09	65		67		
	R 5-31-10	69	✓	75	✓	
	R 5-31-11	59		60		
	R 5-31-12	65		68		
	R 5-31-13	68		73		
	R 5-31-14	65		66		
	R 5-31-15	66		67		
	R 5-31-16	58		59		
	R 5-31-17	61		62		
5-32	R 5-32-01	66		68		
	R 5-32-02	68	✓	70	✓	
	R 5-32-03	66		67		
5-33	R 5-33-01	72		75		
	R 5-33-02	71		75		
	R 5-33-03	71		72		
	R 5-33-04	65		65		
	R 5-33-05	68		68		
	R 5-33-06	68		69		
	R 5-33-07	65		65		
	R 5-33-08	76	✓	76	✓	
	R 5-33-09	71		71		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R 5-33-10	75		75		
	R 5-33-11	72		72		
	R 5-33-12	65		65		
	R 5-33-13	68		69		
	R 5-33-14	65		65		
	R 5-33-15	71		71		
	R 5-33-16	69		70		
	R 5-33-17	65		66		
	R 5-33-18	67		67		
	R 5-33-19	64		64		
	R 5-33-20	66		66		
	R 5-33-21	72		72		
	R 5-33-22	65		65		
	R 5-33-23	66		67		
	R 5-33-24	70		71		
	R 5-33-25	63		63		
	R 5-33-26	66		67		
	R 5-33-27	62		62		
5-34	R 5-34-01	66		67		
	R 5-34-02	64		65		
	R 5-34-03	62		72		
	R 5-34-04	58		60		
	R 5-34-05	61		71		
	R 5-34-06	62		63		
	R 5-34-07	67		72		
	R 5-34-08	68		68		
	R 5-34-09	71		71		
	R 5-34-10	66		67		
	R 5-34-11	64		64		
	R 5-34-12	69		69		
	R 5-34-13	72		73		
	R 5-34-14	62		62		
	R 5-34-15	73	✓	73	✓	
	R 5-34-16	67		68		
5-35	R 5-35-01	66	✓	66	✓	
	R 5-35-02	64		64		
	R 5-35-03	63		63		
	R 5-35-04	64		64		
	R 5-35-05	58		58		
5-36	R 5-36-01	63		64		
	R 5-36-02	66		67		
	R 5-36-03	73		74		
	R 5-36-04	76	✓	78	✓	
	R 5-36-05	70		71		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R 5-36-06	64		65		
	R 5-36-07	**68**		**68**		
	R 5-36-08	64		64		
	R 5-36-09	**66**		**67**		
	R 5-36-10	**70**		**71**		
	R 5-36-11	**68**		**69**		
	R 5-36-12	**71**		**72**		
	R 5-36-13	**74**		**74**		
	R 5-36-14	**74**		**75**		
	R 5-36-15	**68**		**69**		
	R 5-36-16	64		65		
	R 5-36-17	**70**		**71**		
	R 5-36-18	**67**		**68**		
	R 5-36-19	65		65		
	R 5-36-20	65		**66**		
	R 5-36-21	**66**		**67**		
5-37	R 5-37-01	**73**		**73**		
	R 5-37-02	**71**		**72**		
	R 5-37-03	**69**		**70**		
	R 5-37-04	**75**	✓	**75**	✓	
	R 5-37-05	61		61		
	R 5-37-06	**73**		**74**		
	R 5-37-07	**72**		**73**		
	R 5-37-08	**70**		**70**		
	R 5-37-09	**67**		**68**		
	R 5-37-10	64		65		
	R 5-37-11	62		62		

1. *Build noise levels in bold and colored red are impacted for the specific land use category.*
2. *Build noise levels highlighted are greater than or equal to 75 dB(A)*
3. *A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.*
4. *A minimum noise level of 55 dB(A) was used because TNM does not account for background noise.*

4 I-95 (NORTH OF CAPITAL BELTWAY)

Table D-1: Predicted Noise Levels, I-95 (North of Capital Beltway)

NSA	Receptor Number[3]	2040 No Build [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 5, 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
I95-N	R-I95-N-1	68		70		
	R-I95-N-2	63		65		
	R-I95-N-3	59		60		
	R-I95-N-4	61		61		
	R-I95-N-5	70		71		
	R-I95-N-6	58		58		
	R-I95-N-7	70		71		
	R-I95-N-8	68		69		
	R-I95-N-9	68		69		
	R-I95-N-10	62		63		
	R-I95-N-11	71		72		
	R-I95-N-12	67		69		
	R-I95-N-13	63		65		
	R-I95-N-14	68		70		
	R-I95-N-15	69		71		
	R-I95-N-16	73		74		
	R-I95-N-17	71		72		
	R-I95-N-18	60		60		
	R-I95-N-19	61		63		
	R-I95-N-20	58		59		
	R-I95-N-21	61		61		
	R-I95-N-22	58		59		
	R-I95-N-23	58		59		
	R-I95-N-24	60		60		
	R-I95-N-25	57		58		
	R-I95-N-26	59		60		
	R-I95-N-27	76	✓	77	✓	
BW-S	R-I95-S-1	60		61		
	R-I95-S-2	61		61		
	R-I95-S-3	59		59		
	R-I95-S-4	59		60		
	R-I95-S-5	68	✓	70	✓	
	R-I95-S-6	66		66		
	R-I95-S-7	65		66		
	R-I95-S-8	59		59		
	R-I95-S-9	58		59		
	R-I95-S-10	60		60		
	R-I95-S-11	58		58		

NSA	Receptor Number[3]	2040 No Build [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 5, 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R-I95-S-12	60		61		

1. *Build noise levels in bold and colored red are impacted for the specific land use category.*
2. *Build noise levels highlighted are greater than or equal to 75 dB(A)*
3. *A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.*
4. *A minimum noise level of 55 dB(A) was used because TNM does not account for background noise.*

5 MD 295 (BALTIMORE-WASHINGTON PARKWAY)

Table D-1: Predicted Noise Levels, MD 295 (Baltimore-Washington Parkway)

NSA	Receptor Number[3]	2040 No Build [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 5, 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
BW-N	R-BW-N-1	55		56		
	R-BW-N-2	56		57		
	R-BW-N-3	60		60		
	R-BW-N-4	55		55		
	R-BW-N-5	55		55		
	R-BW-N-6	**67**		**70**	✓	
	R-BW-N-7	59		60		
	R-BW-N-8	57		58		
	R-BW-N-9	64		**68**		
	R-BW-N-10	**69**	✓	**70**	✓	
	R-BW-N-11	62		65		
	R-BW-N-12	61		64		
	R-BW-N-13	56		56		
	R-BW-N-14	61		63		
	R-BW-N-15	60		63		
	R-BW-N-16	56		56		
	R-BW-N-17	58		60		
BW-S	R-BW-N-1	**66**		**71**	✓	
	R-BW-N-2	62		64		
	R-BW-N-3	57		60		
	R-BW-N-4	61		62		
	R-BW-N-5	56		56		
	R-BW-N-6	59		62		
	R-BW-N-7	**67**	✓	**70**		
	R-BW-N-8	59		60		
	R-BW-N-9	56		58		
	R-BW-N-10	56		57		
	R-BW-N-11	56		57		
	R-BW-N-12	56		57		
	R-BW-N-13	56		57		
	R-BW-N-14	56		57		

NSA	Receptor Number[3]	2040 No Build [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 5, 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R-BW-N-15	56		57		
	R-BW-N-16	59		60		
	R-BW-N-17	**66**		**69**		
	R-BW-N-18	57		58		
	R-BW-N-19	64		**66**		
	R-BW-N-20	59		61		
	R-BW-N-21	65		**67**		
	R-BW-N-22	65		**67**		
	R-BW-N-23	63		64		
	R-BW-N-24	57		59		
	R-BW-N-25	61		63		
	R-BW-N-26	62		63		
	R-BW-N-27	58		59		
	R-BW-N-28	55		55		
	R-BW-N-29	55		55		

1. *Build noise levels in bold and colored red are impacted for the specific land use category.*
2. *Build noise levels highlighted are greater than or equal to 75 dB(A)*
3. *A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.*
4. *A minimum noise level of 55 dB(A) was used because TNM does not account for background noise.*

6 I-495 (CAPITAL BELTWAY - VIRGINIA)

Table D-5: Predicted Noise Levels, I-495 in Virginia

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
VA-1	M-MON5	**66**		**66**		✓
	R-E1	61		61		
	R-E2	65		**66**		
	R-E3	63		63		
	R-E4	62		63		
	R-E5	62		62		
	R-E6	63		63		
	R-E7	**66**		**67**		
	R-E8	65		65		
	R-E9	58		58		
	R-E10	**68**		**69**		
	R-E11	63		63		
	R-E12	60		60		
	R-E13	**68**		**68**		
	R-E14	**66**		**67**		
	R-E15	61		61		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R-E16	62		63		
	R-E17	64		64		
	R-E18	63		63		
	R-E19	68		68		
	R-E20	68		68		
	R-E21	68		68		
	R-E24	72	✓	72	✓	
VA-2	M-MON1	80		81	✓	✓
	M-MON2	65		65		✓
	R-B2	62		61		
	R-B3	64		63		
	R-B4	70		69		
	R-B6	80		81	✓	
	R-B7	81	✓	81	✓	
	R-B8	74		74		
	R-B9	67		68		
	R-B10	74		74		
	R-B11	77		75		
	R-B12	74		73		
	R-B13	70		71		
	R-B14	65		65		
	R-B15	59		59		
	R-B16	69		70		
	R-B17	69		69		
	R-B18	65		66		
	R-B19	67		67		
	R-B20	63		64		
	R-C1	57		57		
	R-C2	56		56		
	R-C3	56		56		
	R-C4	56		56		
	R-C5	59		60		
	R-C6	56		56		
	R-C7	55		55		
	R-C8	57		57		
	R-C9	57		57		
	R-C10	61		61		
	R-C11	59		59		
	R-C12	56		56		
	R-C13	62		63		
	R-C14	59		59		
	R-C15	65		65		
	R-C16	61		61		
	R-C17	69	✓	69	✓	

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R-C19	61		61		
	R-C20	59		59		
	R-C22	60		60		
	R-C23	64		65		
	R-C24	68		68		
	R-C26	67		67		
VA-3	M-MON3	63		63		✓
	R-D1	62		62		
	R-D2	64		64		
	R-D3	60		60		
	R-D4	57		57		
	R-D5	66	✓	66		
	R-D6	66	✓	67	✓	
	R-D7	64		64		
	R-D8	64		64		
	R-D9	65		66		
	R-D10	65		66		
	R-D11	61		62		
	R-D12	59		59		
	R-D13	60		61		
	R-D14	61		61		
	R-D15	61		61		
	R-D16	59		60		
	R-D17	57		57		
	R-D18	58		58		
	R-D19	59		60		
	R-D20	60		61		
	M-MON4	77	✓	77	✓	✓
	M-MON6	63		64		
	R-F1	64		66		
	R-F2	63		66		
	R-F3	62		64		
	R-F4	64		67		
	R-F5	57		58		
	R-F6	58		61		
	R-F7	70		73		
	R-F8	67		69		
	R-F9	63		64		
	R-F10	66		67		
	R-F11	71		72		
	R-F12	69		70		
	R-F13	70		71		
	R-F14	65		66		
	R-F15	66		66		

NSA	Receptor Number[3]	2040 Build Alt 5 [1,2,4]	Maximum Noise Level within NSA	2040 Build Alt 8, 9, 10, 13B, and 13C[1,2,4]	Maximum Noise Level within NSA	Ambient Measurement Receptor Site
	R-F16	**74**		**74**		
	R-F17	**69**		**69**		
	R-F18	64		65		
	R-F19	**72**		**72**		
	R-F20	**67**		**68**		
	R-F21	**68**		**69**		
	R-F22	**68**		**69**		
	R-F23	63		64		
	R-F24	65		**66**		
	R-F25	65		**66**		
	R-F26	**66**		**66**		
	R-F27	**70**		**70**		
	R-F28	62		62		
	R-F29	63		63		
	R-F30	59		60		
	R-F31	60		61		
	R-F32	62		62		
VA-4	R-A1	62	✓	62	✓	
	R-A2	62	✓	62	✓	
	R-A3	60		60		
	R-A4	60		60		

1. *Build noise levels in bold and colored red are impacted for the specific land use category.*
2. *Build noise levels highlighted are greater than or equal to 75 dB(A)*
3. *A Receptor Number beginning with "M" represents a measured location and a Receptor Number beginning with "R" represents a modeled receptor only.*
4. *A minimum noise level of 55 dB(A) was used because TNM does not account for background noise.*

APP E

APPENDIX E

TRAFFIC NOISE MONITORING SESSIONS

I-495 AND I-270 MANAGED LANES STUDY
March 2020

U.S. Department of Transportation
Federal Highway Administration

and

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

1 TRAFFIC NOISE MONITORING SESSIONS

1.1 Introduction

This appendix documents the noise measurements and traffic data collected during field monitoring for sections of the project that are outside of the project limits of the previous completed noise studies as discussed in section 1.7 Noise Technical Analysis Approach of the report, specifically along I-95 and MD 295 north of the Capital Beltway. Included are illustrations of each noise measurement location. The illustrations include both photographic images and site sketches of the measurement sites using available topography and/or imagery. The receptors are listed sequentially by their M xx designation regardless of the date and time of the actual measurement.

2 I-95 (NORTH OF CAPITAL BELTWAY)

RECEPTOR M1-17-05 – 3676 SELLMAN ROAD

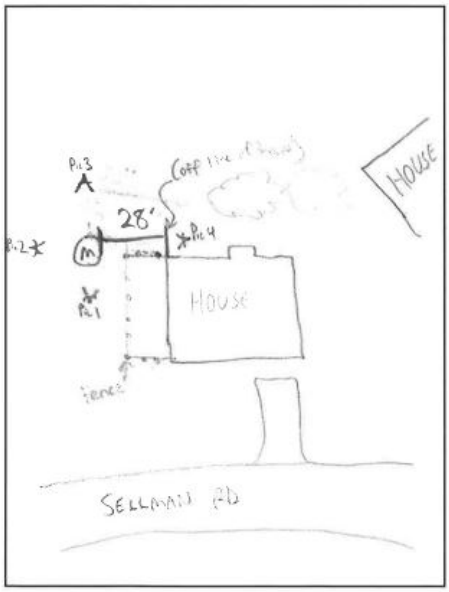
One 20-minute noise measurement was taken at this location on 2018-11-19 1330-1350 Hrs.

Figure A.1 Receptor M1-17-05 Site Sketch

Straughan Environmental, Inc
Noise Measurement Data Sheet

Date: 11/19/18	Meter Serial Number: PKK-3
Noise Measurement Site Number: M1-17-05	Calibration Start/End: 7/14/18
Traffic Monitoring Session (TMS): 02	File Number (on Meter): 3034
Location/Address: 3676 Sellman Rd	Weather:
Project: I-495/I-270	Temperature (°F): 57°
Start Time: 1:30 pm	Wind Speed/Direction: 0
End Time: 1:50 pm	Relative Humidity: 60%
	Source: weather underground

Site Sketch:



Events and Notes:
Loud Truck braking at 1:48

Name of Meter Operator: Mike Freyman

View 1, Receptor M1-17-05



View 2, Receptor M1-17-05

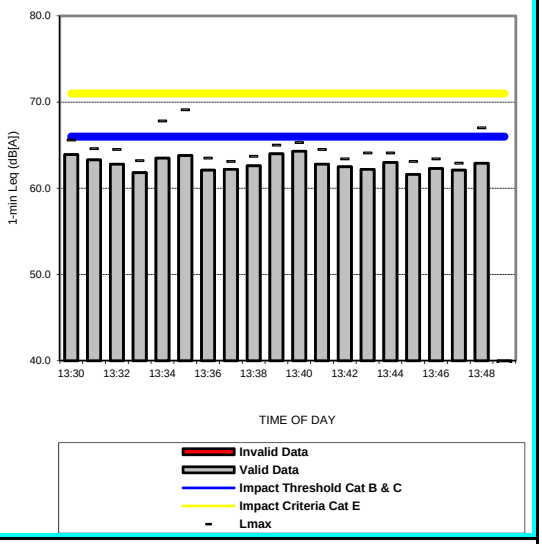


TABLE A.1 Receptor M1-17-05 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS02: 2018-11-19 1330-1350 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
13:30	63.9	65.6		65.1	62.9	63.1	62.9	**63**
13:31	63.3	64.6		64.2	62.3			
13:32	62.8	64.5		63.7	61.9			
13:33	61.8	63.2		62.6	61.0			
13:34	63.5	67.8		65.8	61.8			
13:35	63.8	69.1		66.7	62.2	63.0		
13:36	62.1	63.5		63.0	61.6			
13:37	62.2	63.1		62.7	61.8			
13:38	62.6	63.7		63.4	61.8			
13:39	64.0	65.0		64.9	63.2			
13:40	64.3	65.3		65.0	63.6	63.0		
13:41	62.8	64.5		63.7	62.0			
13:42	62.5	63.4		63.1	62.0			
13:43	62.2	64.1		63.7	61.0			
13:44	63.0	64.1		63.8	62.1			
13:45	61.6	63.1		62.7	60.2	62.3		
13:46	62.3	63.4		62.9	61.4			
13:47	62.1	62.9		62.5	61.6			
13:48	62.9	67.0		63.8	61.1			
13:49	-	-	-	-	-			

13:49 - 1-min Leq despiked for no data.

Valid Data Histogram



RECEPTOR M1-17-06 – 3680 SELLMAN ROAD

One 20-minute noise measurement was taken at this location on 2018-11-19 1330-1350 Hrs.

Figure A.2 Receptor M1-17-06 Site Sketch

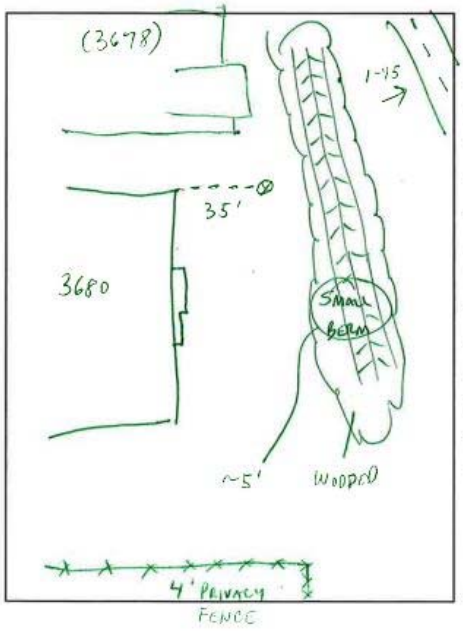
Straughan Environmental, Inc
Noise Measurement Data Sheet

Date: 11/19/18
Noise Measurement Site Number: M1-17-06
Traffic Monitoring Session (TMS): TMS 02
Location/Address: 3680 SELLMAN ROAD
Project: I-495 & I-270 MANAGED LANES STUDY
Start Time: 1:30 PM
End Time: 1:50 PM

Meter Serial Number: R&K #4
Calibration Start/End: 7/14/18
File Number (on Meter): 4022

Weather:
Temperature (°F): 57°
Wind Speed/Direction: 0
Relative Humidity: 60%
Source: weather underground

Site Sketch:



Events and Notes:

Name of Meter Operator: GWT

View 1, Receptor M1-17-06



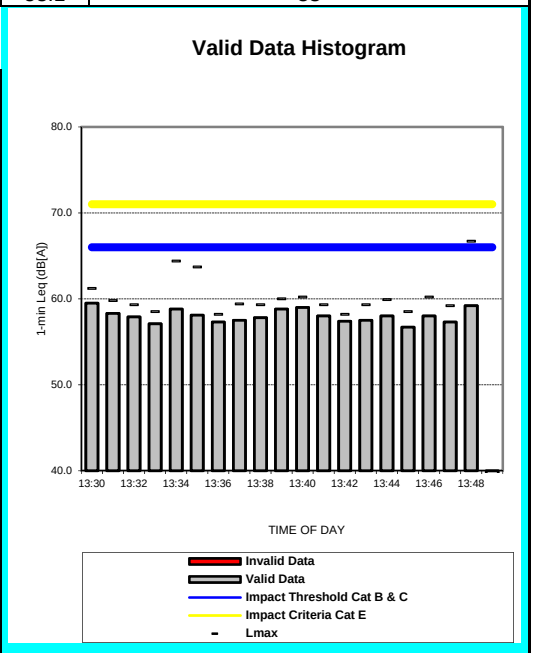
View 2, Receptor M1-17-06



TABLE A.2 Receptor M1-17-06 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS02: 2018-11-19 1330-1350 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
13:30	59.5	61.2	-.-	61.0	57.9	58.4	58.1	**58**
13:31	58.3	59.8	-.-	59.5	57.2			
13:32	57.9	59.3	-.-	58.5	57.1			
13:33	57.1	58.5	-.-	58.0	56.0			
13:34	58.8	64.4	-.-	61.1	56.5			
13:35	58.1	63.7	-.-	60.8	56.9	57.9		
13:36	57.3	58.2	-.-	58.0	56.7			
13:37	57.5	59.4	-.-	58.2	56.6			
13:38	57.8	59.3	-.-	58.4	57.2			
13:39	58.8	60.0	-.-	59.8	57.4			
13:40	59.0	60.2	-.-	59.9	58.2	58.0		
13:41	58.0	59.3	-.-	58.7	57.3			
13:42	57.4	58.2	-.-	58.1	56.6			
13:43	57.5	59.3	-.-	58.8	56.1			
13:44	58.0	59.9	-.-	59.0	56.6			
13:45	56.7	58.5	-.-	57.5	55.3	57.9		
13:46	58.0	60.2	-.-	59.7	56.9			
13:47	57.3	59.2	-.-	58.3	56.7			
13:48	59.2	66.7	-.-	60.3	55.9			
13:49	-	-	-	-	-			

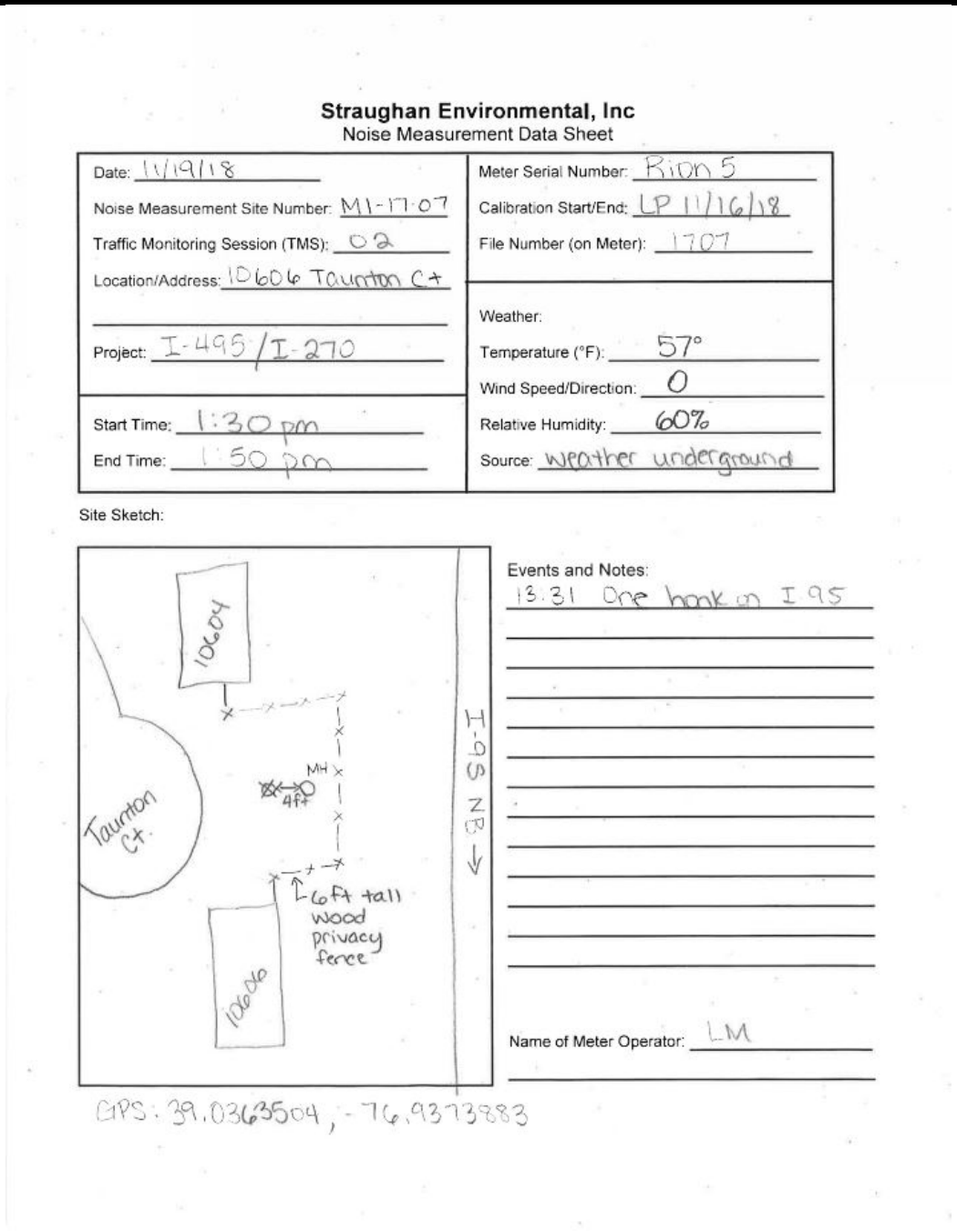
13:49 - 1-min Leq despiked for no data.



RECEPTOR M1-17-07 – 10606 TAUNTON COURT

One 20-minute noise measurement was taken at this location on 2018-11-19 1330-1350 Hrs.

Figure A.3 Receptor M1-17-07 Site Sketch



Straughan Environmental, Inc
Noise Measurement Data Sheet

Date: 11/19/18
Noise Measurement Site Number: M1-17-07
Traffic Monitoring Session (TMS): 02
Location/Address: 10606 Taunton Ct
Project: I-495/I-270
Start Time: 1:30 pm
End Time: 1:50 pm

Meter Serial Number: Rion 5
Calibration Start/End: LP 11/16/18
File Number (on Meter): 1707

Weather:
Temperature (°F): 57°
Wind Speed/Direction: 0
Relative Humidity: 60%
Source: weather underground

Site Sketch:

Events and Notes:
13:31 One honk on I 95

Name of Meter Operator: LM

GPS: 39.03635504, -76.9373883

View 1, Receptor M1-17-07



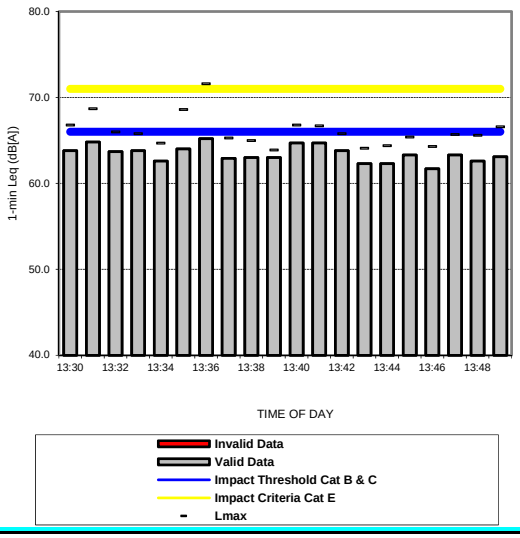
View 2, Receptor M1-17-07



TABLE A.3 Receptor M1-17-07 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS02: 2018-11-19 1330-1350 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
13:30	63.8	66.8	88.1	65.1	62.5	63.8	63.5	**64**
13:31	64.8	68.7	90.8	66.5	63.2			
13:32	63.7	66.0	86.9	65.2	62.4			
13:33	63.8	65.8	90.3	64.9	62.4			
13:34	62.6	64.7	87.2	64.1	60.9			
13:35	64.0	68.6	91.0	66.3	61.2	63.7		
13:36	65.2	71.6	92.1	70.1	62.4			
13:37	62.9	65.3	85.9	63.8	61.8			
13:38	63.0	65.0	88.9	64.1	62.0			
13:39	63.0	63.9	89.1	63.6	62.4			
13:40	64.7	66.8	90.0	66.1	62.6	63.7		
13:41	64.7	66.7	89.0	66.0	63.4			
13:42	63.8	65.8	86.8	65.0	62.4			
13:43	62.3	64.1	86.9	63.0	61.5			
13:44	62.3	64.4	87.3	64.0	61.1			
13:45	63.3	65.4	90.1	64.4	61.5	62.8		
13:46	61.7	64.3	85.0	63.1	59.6			
13:47	63.3	65.7	90.3	64.7	61.9			
13:48	62.6	65.6	87.2	64.2	61.5			
13:49	63.1	66.6	91.9	64.7	60.7			

Valid Data Histogram



RECEPTOR M3-17-24 – 3304 SELLMAN ROAD

One 20-minute noise measurement was taken at this location on 2018-11-19 1330-1350 Hrs.

Figure A.4 Receptor M3-17-24 Site Sketch

Normally a lot louder.

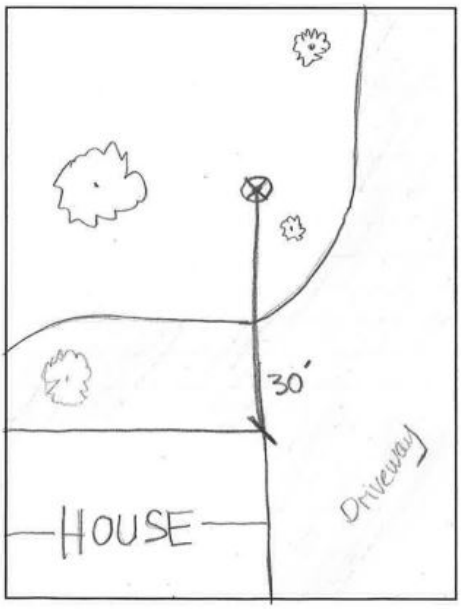
Property Owner not previously contacted.

Straughan Environmental, Inc
Noise Measurement Data Sheet

Date: 11/19/18
Noise Measurement Site Number: M3-17-24
Traffic Monitoring Session (TMS): 02
Location/Address: 3304 Sellman Rd
Project: I-495/I-270
Start Time: 1:30 pm
End Time: 1:50 pm

Meter Serial Number: R1ON 7
Calibration Start/End: LP 11/16/18
File Number (on Meter): 1724
Weather:
Temperature (°F): 57°
Wind Speed/Direction: 0
Relative Humidity: 60%
Source: Weather Underground

Site Sketch:



Events and Notes:

Name of Meter Operator: AD

View 1, Receptor M3-17-24



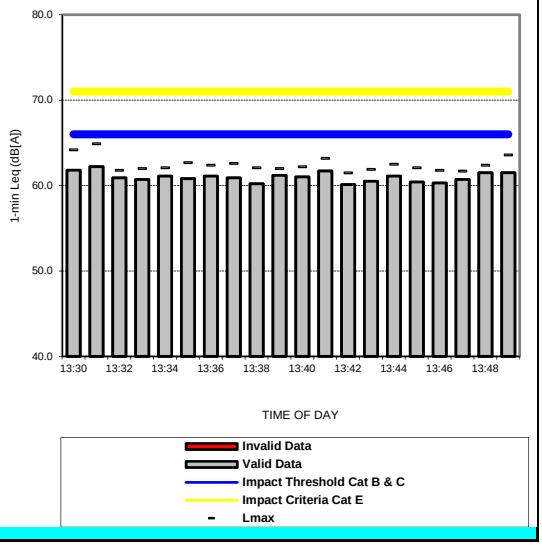
View 2, Receptor M3-17-24



TABLE A.4 Receptor M3-17-24 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS02: 2018-11-19 1330-1350 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
13:30	61.8	64.2	87.4	63.3	60.3	61.4	61.0	**61**
13:31	62.2	64.9	87.9	63.6	61.0			
13:32	60.9	61.8	84.5	61.6	60.1			
13:33	60.7	62.0	83.6	61.6	59.6			
13:34	61.1	62.1	84.5	61.6	60.6			
13:35	60.8	62.7	84.9	62.3	59.7	60.9		
13:36	61.1	62.4	84.7	62.2	60.0			
13:37	60.9	62.6	83.3	61.8	60.0			
13:38	60.2	62.1	83.9	61.4	59.1			
13:39	61.2	62.0	82.6	61.8	60.7			
13:40	61.0	62.2	83.6	61.8	59.8	60.9		
13:41	61.7	63.2	84.9	62.6	60.9			
13:42	60.1	61.5	83.3	61.3	58.8			
13:43	60.5	61.9	82.9	61.5	59.5			
13:44	61.1	62.5	84.1	62.0	60.1			
13:45	60.4	62.1	83.9	60.9	59.9	60.9		
13:46	60.3	61.8	84.2	61.1	59.2			
13:47	60.7	61.7	83.9	61.3	60.1			
13:48	61.5	62.4	85.3	62.0	60.9			
13:49	61.5	63.6	87.6	63.1	59.8			

Valid Data Histogram



RECEPTOR M3-17-25 – 3610 COLLIER ROAD

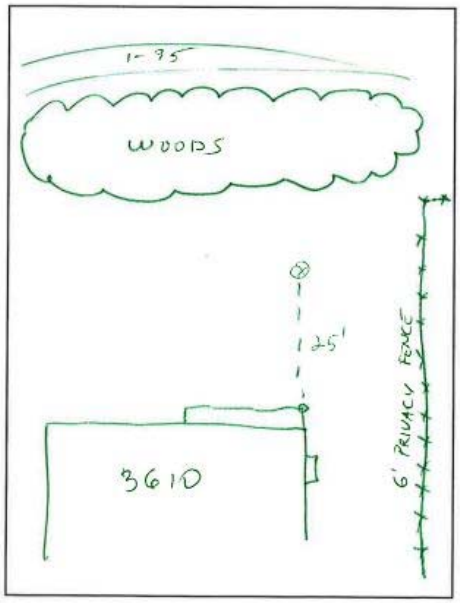
One 20-minute noise measurement was taken at this location on 2018-11-19 1410-1430 Hrs.

Figure A.5 Receptor M3-17-25 Site Sketch

Straughan Environmental, Inc
Noise Measurement Data Sheet

Date: 11/19/18	Meter Serial Number: RK&K #4
Noise Measurement Site Number: M3-17-25	Calibration Start/End: 7/14/18
Traffic Monitoring Session (TMS): TMS01	File Number (on Meter): 4023
Location/Address: 3610 COLLIER RD	
	Weather:
Project: I-495 + I-270 MANAGED LANES STUDY	Temperature (°F): 58°
	Wind Speed/Direction: 0
Start Time: 2:10 PM	Relative Humidity: 58%
End Time: 2:30 PM	Source: Weather Underground

Site Sketch:



Events and Notes:

Name of Meter Operator: Cent

View 1, Receptor M3-17-25



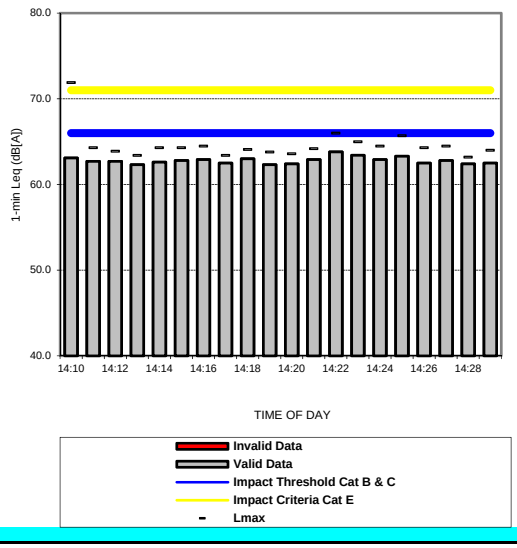
View 2, Receptor M3-17-25



TABLE A.5 Receptor M3-17-25 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS01: 2018-11-19 1410-1430 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
14:10	63.1	71.9		64.7	62.0	62.7	62.8	**63**
14:11	62.7	64.3		63.8	61.8			
14:12	62.7	63.9		63.6	62.0			
14:13	62.3	63.4		63.0	61.7			
14:14	62.6	64.3		63.7	61.7			
14:15	62.8	64.3		64.1	61.8	62.7		
14:16	62.9	64.5		64.0	62.2			
14:17	62.5	63.4		63.2	61.8			
14:18	63.0	64.1		63.8	62.2			
14:19	62.3	63.8		63.5	61.2			
14:20	62.4	63.6		63.3	61.5	63.1		
14:21	62.9	64.2		63.5	62.4			
14:22	63.8	66.0		65.5	62.6			
14:23	63.4	65.0		64.3	62.6			
14:24	62.9	64.5		64.3	61.1			
14:25	63.3	65.7		64.7	62.1	62.7		
14:26	62.5	64.3		63.9	60.9			
14:27	62.8	64.5		64.3	61.9			
14:28	62.4	63.2		63.0	61.8			
14:29	62.5	64.0		63.6	61.3			

Valid Data Histogram



RECEPTOR M3-17-26 – 3713 GREEN ASH COURT

One 20-minute noise measurement was taken at this location on 2018-11-19 1410-1430 Hrs.

Figure A.6 Receptor M3-17-26 Site Sketch

Straughan Environmental, Inc
Noise Measurement Data Sheet

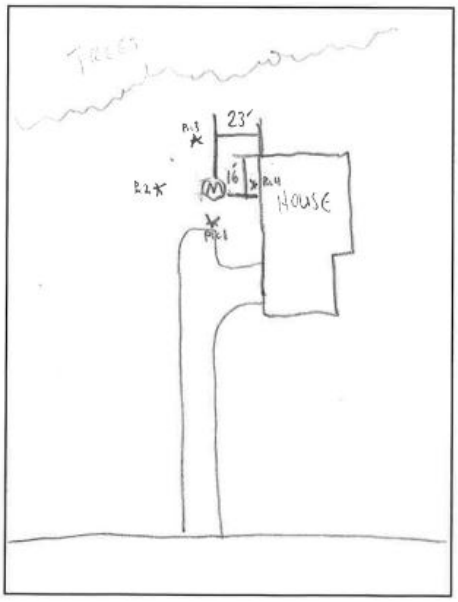
Date: 11/19/18
Noise Measurement Site Number: M3-17-26
Traffic Monitoring Session (TMS): 01
Location/Address: 3713 Green Ash Ct.
Project: I-495 / I-270

Start Time: 2:10 pm
End Time: 2:30 pm

Meter Serial Number: RTA-3
Calibration Start/End: 7/14/18
File Number (on Meter): 3035

Weather:
Temperature (°F): 58°
Wind Speed/Direction: 0
Relative Humidity: 58%
Source: Weather Underground

Site Sketch:



Events and Notes:
Loud Heavy truck braking at 2:25.
" at 2:26.

Name of Meter Operator: Mike Freyman

View 1, Receptor M3-17-26

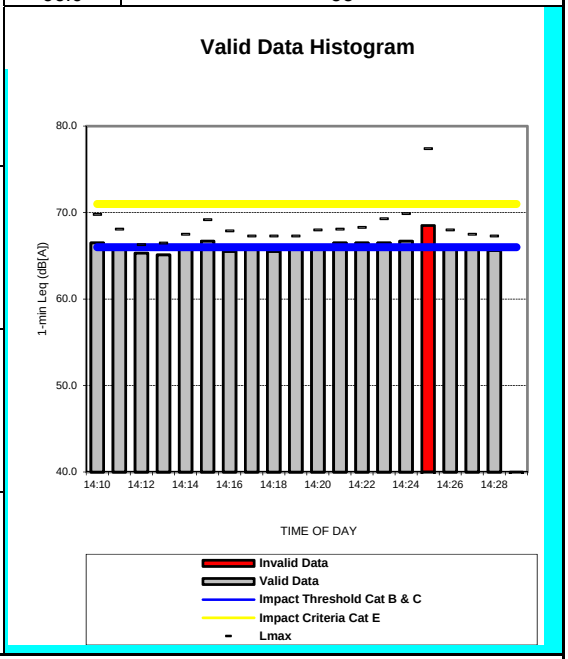


View 2, Receptor M3-17-26



TABLE A.6 Receptor M3-17-26 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS01: 2018-11-19 1410-1430 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
14:10	66.5	69.8		67.4	65.4	65.8	66.0	**66**
14:11	66.1	68.1		67.7	65.0			
14:12	65.3	66.3		66.1	64.5			
14:13	65.1	66.5		66.3	64.1			
14:14	66.0	67.5		66.9	65.1			
14:15	66.7	69.2		68.6	65.2	65.9		
14:16	65.5	67.9		66.9	64.3			
14:17	65.8	67.3		66.8	64.9			
14:18	65.5	67.3		66.8	64.5			
14:19	66.0	67.3		66.9	64.7			
14:20	66.2	68.0		67.3	64.5	66.5		
14:21	66.5	68.1		67.9	65.5			
14:22	66.5	68.3		67.7	65.6			
14:23	66.5	69.3		67.9	65.0			
14:24	66.7	69.9		68.1	65.6			
14:25	~~68.5~~	~~77.4~~	-	~~72.8~~	~~64.4~~	65.8		
14:26	66.0	68.0		66.8	64.8			
14:27	65.9	67.5		67.1	64.9			
14:28	65.6	67.3		66.9	63.7			
14:29	-				-			



14:25 - 1-min Leq despiked for heavy truck braking.14:29 - 1-min Leq despiked for no data.

RECEPTOR M3-17-27 – 11208 EVANS TRAIL

One 20-minute noise measurement was taken at this location on 2018-11-19 1410-1430 Hrs.

Figure A.7 Receptor M3-17-27 Site Sketch

Straughan Environmental, Inc
Noise Measurement Data Sheet

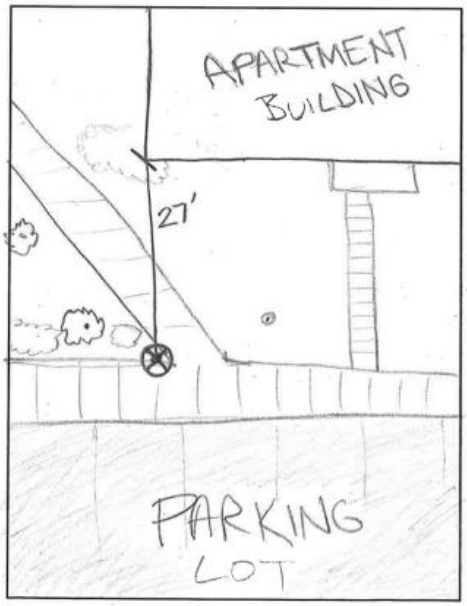
Date: 11/19/18
Noise Measurement Site Number: M3-17-27
Traffic Monitoring Session (TMS): 01
Location/Address: 11208 Evans Trail
Project: I-495/I-270

Start Time: 2:10 pm
End Time: 2:30 pm

Meter Serial Number: RION 1
Calibration Start/End: LP 11/16/18
File Number (on Meter): 1727

Weather:
Temperature (°F): 58°
Wind Speed/Direction: 0
Relative Humidity: 58%
Source: Weather Underground

Site Sketch:



Events and Notes:

Name of Meter Operator: AD

View 1, Receptor M3-17-27



View 2, Receptor M3-17-27

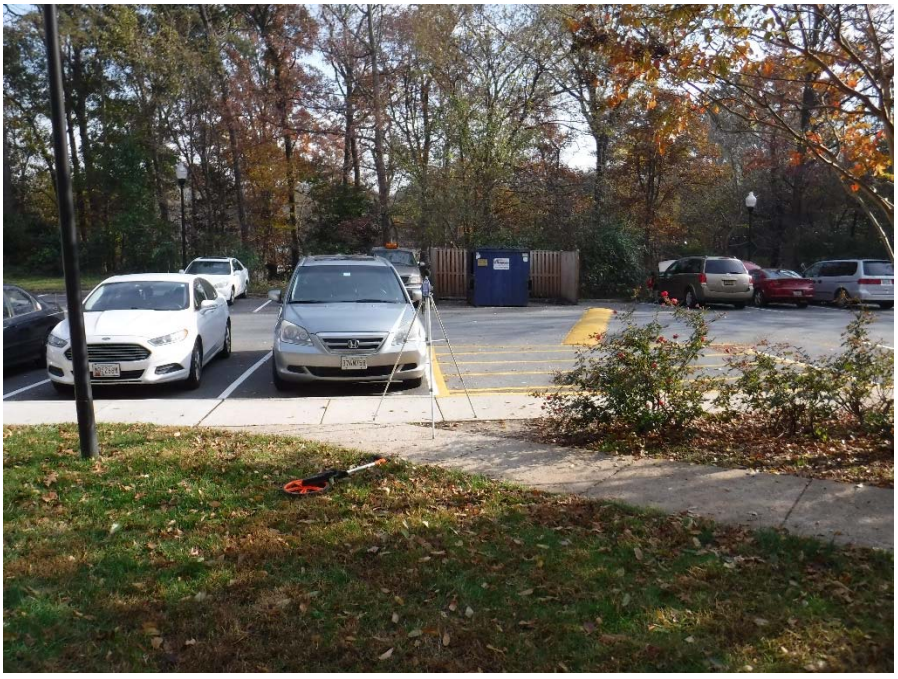
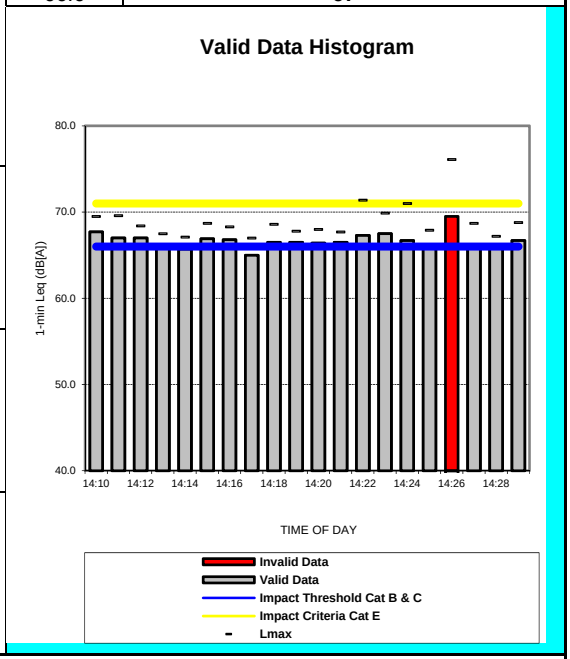


TABLE A.7 Receptor M3-17-27 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS01: 2018-11-19 1410-1430 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
14:10	67.7	69.5	93.1	68.4	66.9	66.7	66.6	**67**
14:11	67.0	69.6	88.9	68.5	66.1			
14:12	67.0	68.4	89.5	67.9	66.0			
14:13	65.8	67.5	89.7	66.8	65.1			
14:14	65.7	67.1	88.1	66.6	64.4			
14:15	66.9	68.7	94.0	68.3	65.5	66.4		
14:16	66.8	68.3	95.3	67.4	66.2			
14:17	65.0	67.0	89.0	66.6	63.9			
14:18	66.5	68.6	90.8	67.4	65.4			
14:19	66.5	67.8	90.0	67.5	65.2			
14:20	66.4	68.0	90.0	67.6	65.3	66.9		
14:21	66.5	67.7	91.3	67.4	65.6			
14:22	67.3	71.4	91.4	68.8	66.1			
14:23	67.5	69.9	91.1	68.9	66.2			
14:24	66.7	71.0	92.1	69.0	64.7			
14:25	66.2	67.9	86.1	66.9	65.4	66.2		
14:26	~~69.5~~	~~76.1~~	~~96.1~~	~~75.0~~	~~64.7~~			
14:27	65.9	68.7	94.5	67.8	65.1			
14:28	66.0	67.2	90.3	67.0	65.0			
14:29	66.7	68.8	91.6	68.2	65.3			



14:26 - 1-min Leq despiked for heavy truck braking.

RECEPTOR M3-17-28 – 11201 EVANS TRAIL

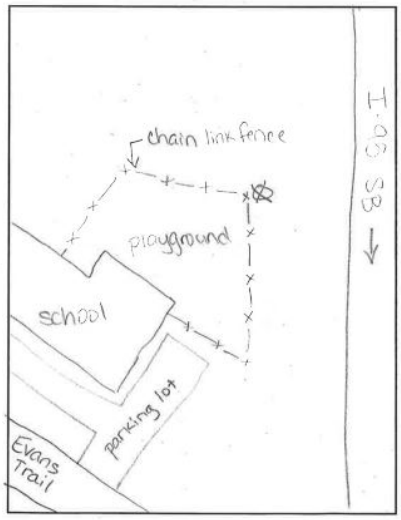
One 20-minute noise measurement was taken at this location on 2018-11-19 1410-1430 Hrs.

Figure A.8 Receptor M3-17-28 Site Sketch

Straughan Environmental, Inc
Noise Measurement Data Sheet

Date: 11/19/18	Meter Serial Number: Rion 5
Noise Measurement Site Number: M3-17-28	Calibration Start/End: LP 11/16/18
Traffic Monitoring Session (TMS): 01	File Number (on Meter): 1728
Location/Address: 11201 Evans Trail (James E. Duckworth Regional School)	Weather:
Project: I-495 / I-270	Temperature (°F): 58°
	Wind Speed/Direction: O
Start Time: 2:10 pm	Relative Humidity: 58%
End Time: 2:30 pm	Source: Weather Underground

Site Sketch:



Events and Notes:
14:13 Jake brakes (I-95 SB)
14:15 mild rattling noise from car on I-95 SB
14:16 Tractor trailer compressing brakes on I-95 SB
Brief jake brakes on I-95 NB
14:17 Car pulled over by police on I-95 SB
14:18 jake brakes (NB + SB)
14:19 Horn, rattling on vehicle
* Brief slowdown on I-95 after police pulled car over. Then back to free-flow speeds a few min later.

Name of Meter Operator: LM

GPS: 39.0420920, -76.9364294
(meter placed at corner of fence)

Events and Notes Continued:
14:23 Jake brakes on I-95 NB (spike up to ~73 dB)
14:24 Slow down (mild) for less than 1 min. on I-95 SB
Jake brakes on I-95 SB
14:26 Extended jake brakes
14:27 Police officer left (no change in traffic flow)
14:28 Mild slow down on I-95 SB (≤ 20 sec)

View 1, Receptor M3-17-28

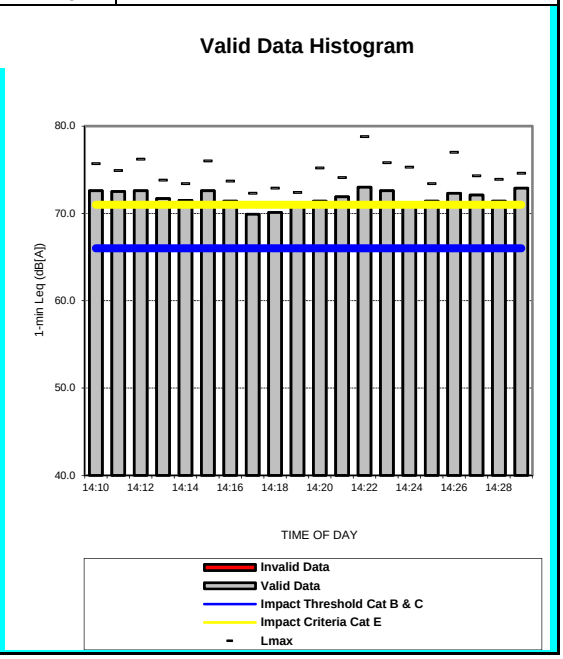


View 2, Receptor M3-17-28



TABLE A.8 Receptor M3-17-28 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS01: 2018-11-19 1410-1430 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
14:10	72.6	75.7	95.8	74.8	71.4	72.2	71.9	**72**
14:11	72.5	74.9	93.1	73.4	70.7			
14:12	72.6	76.2	92.8	74.1	71.0			
14:13	71.7	73.8	91.2	72.7	70.6			
14:14	71.5	73.4	94.4	72.4	70.0			
14:15	72.6	76.0	95.5	73.9	71.2	71.1		
14:16	71.4	73.7	98.7	72.3	70.3			
14:17	69.9	72.3	91.1	70.7	68.9			
14:18	70.1	72.9	94.6	71.2	69.1			
14:19	70.9	72.4	93.5	71.9	69.8			
14:20	71.4	75.2	93.0	73.3	69.4	72.1		
14:21	71.9	74.1	92.4	73.2	70.6			
14:22	73.0	78.8	95.3	74.8	70.7			
14:23	72.6	75.8	95.1	74.3	70.7			
14:24	71.1	75.3	97.9	72.9	69.3			
14:25	71.4	73.4	90.2	72.8	69.9	72.1		
14:26	72.3	77.0	98.9	74.5	69.2			
14:27	72.1	74.3	96.6	73.2	70.4			
14:28	71.4	73.9	92.6	73.2	70.0			
14:29	72.9	74.6	94.4	74.0	71.7			



3 MD 295 (BALTIMORE-WASHINGTON PARKWAY)

RECEPTOR M1-21-04 – 11 E. SOUTHWAY

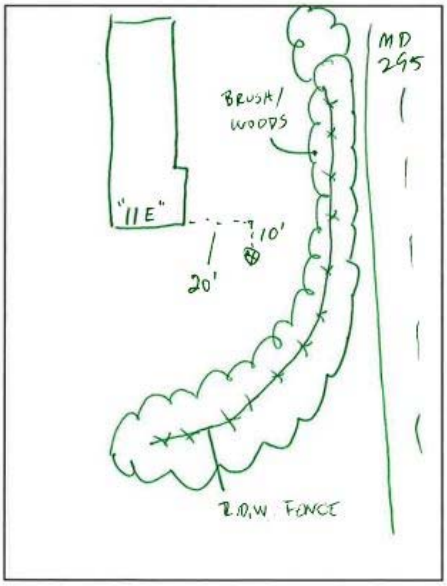
One 20-minute noise measurement was taken at this location on 2018-11-19 1110-1130 Hrs.

Figure A.9 Receptor M1-21-04 Site Sketch

Straughan Environmental, Inc
Noise Measurement Data Sheet

Date: 11/19/18	Meter Serial Number: RIGH # 4
Noise Measurement Site Number: M1-21-04	Calibration Start/End: 7/14/18
Traffic Monitoring Session (TMS): TMS 03	File Number (on Meter): 4021
Location/Address: 11 E. SOUTHWAY	
	Weather:
Project: I-495 & I-270 MANAGED LANES STUDY	Temperature (°F): 49°
	Wind Speed/Direction: 0
Start Time: 11:10	Relative Humidity: 73%
End Time: 11:30	Source: Weather Underground

Site Sketch:



Events and Notes:
11:16:30 → 11:18:10
– SIREN

Name of Meter Operator: GWT

View 1, Receptor M1-21-04

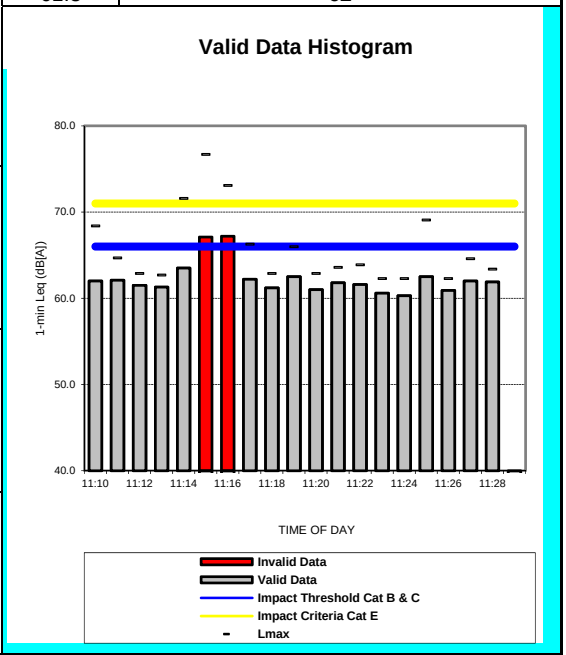


View 2, Receptor M1-21-04



TABLE A.9 Receptor M1-21-04 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS03: 2018-11-19 1110-1130 Hrs.

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
11:10	62.0	68.4	-.-	64.5	59.1	62.2	61.8	**62**
11:11	62.1	64.7	-.-	63.3	60.9			
11:12	61.5	62.9	-.-	62.4	60.3			
11:13	61.3	62.7	-.-	62.2	59.9			
11:14	63.5	71.6	-.-	65.9	59.6			
11:15	~~67.1~~	~~76.7~~	~~-.-~~	~~70.4~~	~~61.3~~	62.0		
11:16	~~67.2~~	~~73.1~~	~~-.-~~	~~71.3~~	~~62.7~~			
11:17	62.2	66.3	-.-	64.0	60.3			
11:18	61.2	62.9	-.-	62.7	59.5			
11:19	62.5	66.0	-.-	65.0	60.2			
11:20	61.0	62.9	-.-	62.3	59.6	61.1		
11:21	61.8	63.6	-.-	63.2	60.5			
11:22	61.6	63.9	-.-	63.1	60.2			
11:23	60.6	62.3	-.-	61.9	59.4			
11:24	60.3	62.3	-.-	61.7	59.0			
11:25	62.5	69.1	-.-	64.9	60.4	61.9		
11:26	60.9	62.3	-.-	61.7	60.0			
11:27	62.0	64.6	-.-	63.7	59.9			
11:28	61.9	63.4	-.-	63.0	60.8			
11:29	-				-			



11:15 - 1-min Leq despiked for siren.11:16 - 1-min Leq despiked for siren.11:29 - 1-min Leq despiked for no data.

RECEPTOR M1-21-05 – 7 COURT SOUTHWAY, MCDONALD FIELD & PLAYGROUND

One 20-minute noise measurement was taken at this location on 2018-11-19 1110-1130 Hrs.

Figure A.10 Receptor M1-21-05 Site Sketch

Straughan Environmental, Inc
Noise Measurement Data Sheet

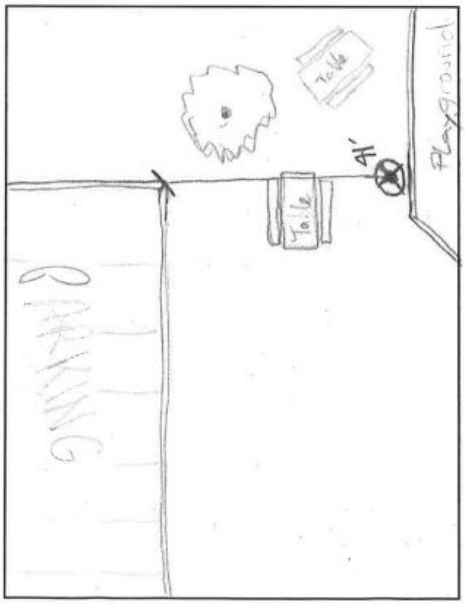
Date: 11/19/18
Noise Measurement Site Number: M1-21-05
Traffic Monitoring Session (TMS): 03
Location/Address: McDonald Field & Playground, 7 Court Southway
Project: I-495/I-270

Start Time: 11:10 am
End Time: 11:30 am

Meter Serial Number: [illegible] 7
Calibration Start/End: LP 11/16/18
File Number (on Meter): 0105

Weather:
Temperature (°F): 49°
Wind Speed/Direction: 0
Relative Humidity: 73%
Source: Weather Underground

Site Sketch:



Events and Notes:
11:16 - 11:17 siren

Name of Meter Operator: AD

GPS: 38.9973978, -76.8773045

View 1, Receptor M1-21-05



View 2, Receptor M1-21-05

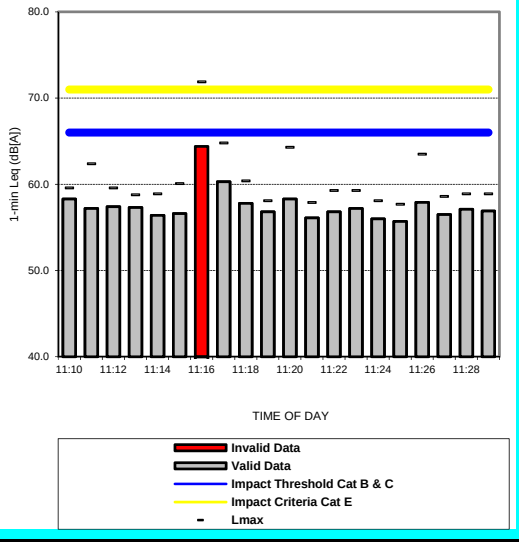


TABLE A.10 **Receptor M1-21-05 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS03: 2018-11-19 1110-1130 Hrs.**

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
11:10	58.3	59.6	83.9	59.2	57.6	57.4	57.4	**57**
11:11	57.2	62.4	84.0	60.9	53.8			
11:12	57.4	59.6	81.8	59.2	55.6			
11:13	57.3	58.8	81.2	58.2	56.1			
11:14	56.4	58.9	81.4	58.6	53.1			
11:15	56.6	60.1	81.6	57.7	54.8	58.1		
11:16	~~64.4~~	~~71.9~~	~~85.8~~	~~70.2~~	~~56.3~~			
11:17	60.3	64.8	84.0	62.3	57.4			
11:18	57.8	60.4	84.2	60.0	55.7			
11:19	56.8	58.1	82.5	57.7	55.2			
11:20	58.3	64.3	86.6	61.0	54.7	57.0		
11:21	56.1	57.9	83.6	57.5	53.9			
11:22	56.8	59.3	82.8	58.8	55.3			
11:23	57.2	59.3	81.1	58.6	54.9			
11:24	56.0	58.1	80.9	57.4	54.2			
11:25	55.7	57.7	82.2	57.1	54.0	56.9		
11:26	57.9	63.5	81.3	60.5	55.5			
11:27	56.5	58.6	80.5	58.2	54.7			
11:28	57.1	58.9	85.3	58.7	54.8			
11:29	56.9	58.9	82.0	58.3	54.7			

11:16 - 1-min Leq despiked for siren.

Valid Data Histogram



RECEPTOR M1-21-06 – 20 CT RIDGE ROAD

One 20-minute noise measurement was taken at this location on 2018-11-19 1110-1130 Hrs.

Figure A.11 Receptor M1-21-06 Site Sketch

Straughan Environmental, Inc
Noise Measurement Data Sheet

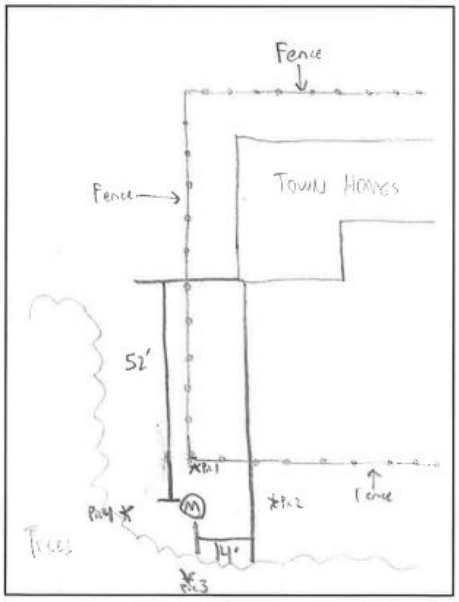
Date: 11/19/18
Noise Measurement Site Number: M1-21-06
Traffic Monitoring Session (TMS): 03
Location/Address: 20 CT Ridge Rd, meter placed off House 20H
Project: I-495/I-270

Start Time: 11:10 am
End Time: 11:30 am

Meter Serial Number: RKK - 3
Calibration Start/End: 7/14/18
File Number (on Meter): 3033

Weather:
Temperature (°F): 49°
Wind Speed/Direction: 0
Relative Humidity: 73%
Source: Weather Underground

Site Sketch:



Events and Notes:
Emergency vehicles passing by at 11:16 and again 11:18.

Name of Meter Operator: Mike Freyman

View 1, Receptor M1-21-06



View 2, Receptor M1-21-06

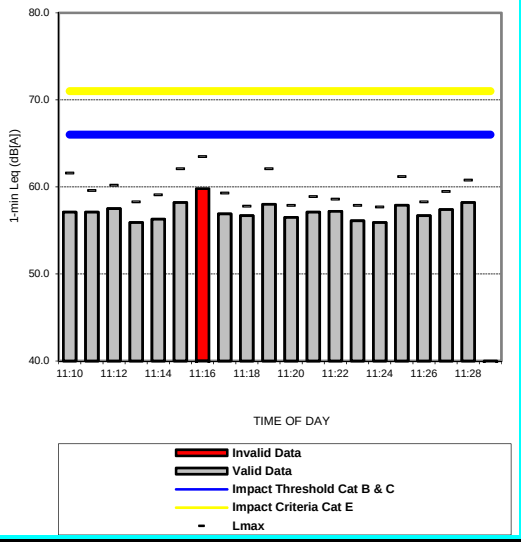


TABLE A.11 **Receptor M1-21-06 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS03: 2018-11-19 1110-1130 Hrs.**

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
11:10	57.1	61.6	-.-	61.0	53.9	56.8	57.1	**57**
11:11	57.1	59.6	-.-	59.0	55.1			
11:12	57.5	60.2	-.-	59.5	56.1			
11:13	55.9	58.3	-.-	58.0	53.2			
11:14	56.3	59.1	-.-	57.7	55.2			
11:15	58.2	62.1	-.-	60.2	56.0	57.5		
11:16	~~59.8~~	~~63.5~~	~~-.-~~	~~62.1~~	~~56.6~~			
11:17	56.9	59.3	-.-	58.6	55.5			
11:18	56.7	57.8	-.-	57.6	55.3			
11:19	58.0	62.1	-.-	61.3	55.2			
11:20	56.5	57.9	-.-	57.5	55.5	56.6		
11:21	57.1	58.9	-.-	58.4	55.7			
11:22	57.2	58.6	-.-	58.2	56.2			
11:23	56.1	57.9	-.-	57.0	55.4			
11:24	55.9	57.7	-.-	57.0	55.0			
11:25	57.9	61.2	-.-	60.8	56.1	57.6		
11:26	56.7	58.3	-.-	58.0	55.6			
11:27	57.4	59.5	-.-	58.7	56.0			
11:28	58.2	60.8	-.-	60.5	55.5			
11:29	-				-			

11:16 - 1-min Leq despiked for siren.11:29 - 1-min Leq despiked for no data.

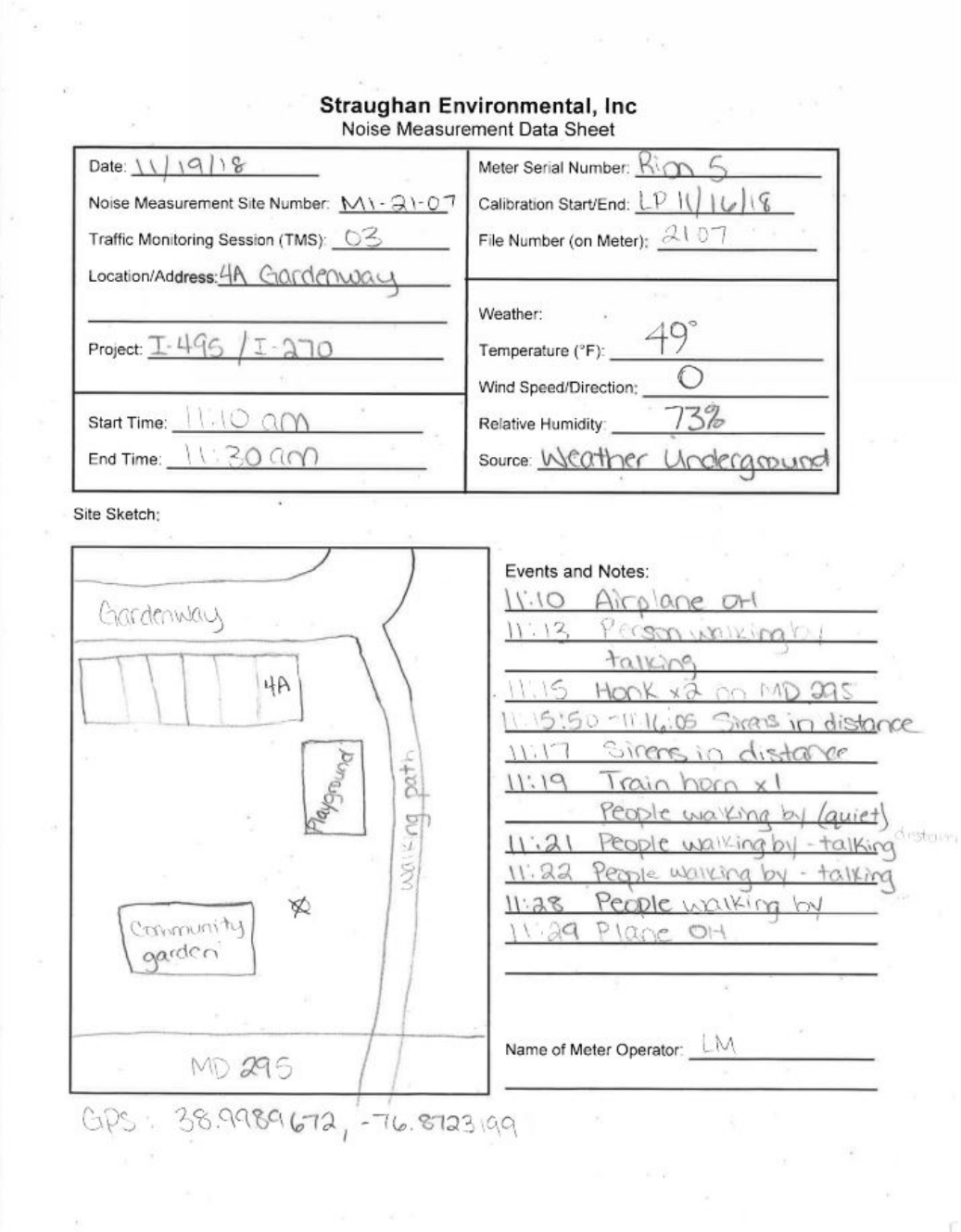
Valid Data Histogram



RECEPTOR M1-21-07 – 4A GARDENWAY

One 20-minute noise measurement was taken at this location on 2018-11-19 1110-1130 Hrs.

Figure A.12 Receptor M1-21-07 Site Sketch



Straughan Environmental, Inc
Noise Measurement Data Sheet

Date: 11/19/18
Noise Measurement Site Number: M1-21-07
Traffic Monitoring Session (TMS): 03
Location/Address: 4A Gardenway
Project: I-495 / I-270
Start Time: 11:10 am
End Time: 11:30 am

Meter Serial Number: Rion 5
Calibration Start/End: LP 11/16/18
File Number (on Meter): 2107
Weather:
Temperature (°F): 49°
Wind Speed/Direction: 0
Relative Humidity: 73%
Source: Weather Underground

Site Sketch:

GPS: 38.9989672, -76.8723199

Events and Notes:
11:10 Airplane OH
11:13 Person walking by talking
11:15 Honk x2 on MD 295
11:15:50 - 11:16:05 Sirens in distance
11:17 Sirens in distance
11:19 Train horn x1
People walking by (quiet)
11:21 People walking by - talking
11:22 People walking by - talking
11:28 People walking by
11:29 Plane OH

Name of Meter Operator: LM

View 1, Receptor M1-21-07



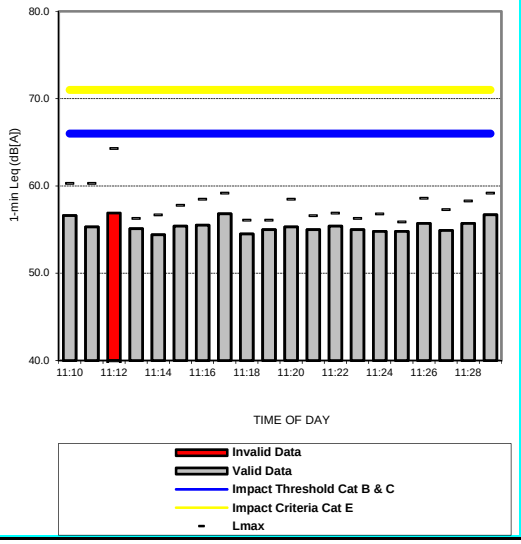
View 2, Receptor M1-21-07



TABLE A.12 **Receptor M1-21-07 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS03: 2018-11-19 1110-1130 Hrs.**

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
11:10	56.6	60.3	88.4	58.1	55.5	55.4	55.4	**55**
11:11	55.3	60.3	84.2	56.9	53.6			
11:12	~~56.9~~	~~64.3~~	~~81.9~~	~~58.7~~	~~54.9~~			
11:13	55.1	56.3	81.0	55.6	54.5			
11:14	54.4	56.7	79.8	56.0	53.2			
11:15	55.4	57.8	80.7	56.9	54.0	55.5		
11:16	55.5	58.5	82.4	57.0	54.1			
11:17	56.8	59.2	82.3	58.5	54.7			
11:18	54.5	56.1	80.5	55.4	53.4			
11:19	55.0	56.1	80.9	55.5	54.2			
11:20	55.3	58.5	85.8	57.7	53.3	55.1		
11:21	55.0	56.6	80.6	56.1	53.5			
11:22	55.4	56.9	80.1	56.1	54.5			
11:23	55.0	56.3	79.1	55.9	54.2			
11:24	54.8	56.8	83.0	55.7	53.5			
11:25	54.8	55.9	79.5	55.7	54.0	55.6		
11:26	55.7	58.6	80.4	57.9	54.4			
11:27	54.9	57.3	81.5	55.9	53.9			
11:28	55.7	58.3	83.5	57.1	53.9			
11:29	56.7	59.2	81.2	58.8	54.9			

Valid Data Histogram



11:12 - 1-min Leq despiked for person walking by talking.

RECEPTOR M1-23-09 – 7600 HANOVER PARKWAY

One 20-minute noise measurement was taken at this location on 2018-11-19 1110-1130 Hrs.

Figure A.13 Receptor M1-23-09 Site Sketch

Straughan Environmental, Inc
Noise Measurement Data Sheet

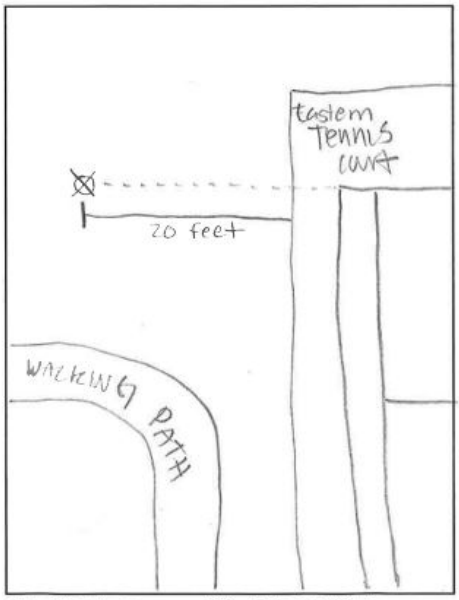
Date: 11/19/2018
Noise Measurement Site Number: M1-23-09
Traffic Monitoring Session (TMS): 03
Location/Address: GREENBRIAR COMMUNITY
7600 HANOVER PARKWAY
Project: 495/295 TESTING

Meter Serial Number: RION 6
Calibration Start/End: LP 11/16/18
File Number (on Meter): 2309

Weather:
Temperature (°F): 49°
Wind Speed/Direction: 0
Relative Humidity: 73%
Source: Weather Underground

Start Time: 11:10 AM
End Time: 11:30 AM

Site Sketch:



38.9957312, -76.8952744

Events and Notes:
11:18 - AMBULANCE
* meter is placed next to eastern court, along western court is a 10 foot wall

Name of Meter Operator: LUIS PANIAGUA

View 1, Receptor M1-23-09



View 2, Receptor M1-23-09

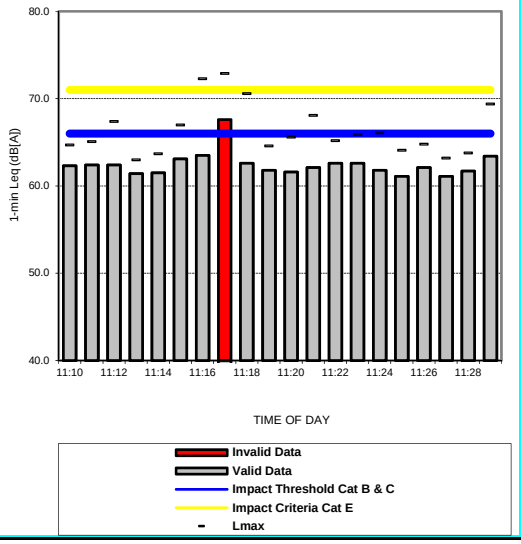


TABLE A.13 **Receptor M1-23-09 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS03: 2018-11-19 1110-1130 Hrs.**

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
11:10	62.3	64.7	89.0	64.0	60.7	62.0	62.2	**62**
11:11	62.4	65.1	87.9	63.9	60.1			
11:12	62.4	67.4	87.0	65.2	59.0			
11:13	61.4	63.0	85.1	62.2	60.2			
11:14	61.5	63.7	85.6	62.5	60.3			
11:15	63.1	67.0	89.5	65.1	60.6	62.8		
11:16	63.5	72.3	91.6	65.6	59.8			
11:17	~~67.6~~	~~72.9~~	~~88.9~~	~~71.9~~	~~60.6~~			
11:18	62.6	70.6	86.1	64.9	60.3			
11:19	61.8	64.6	85.4	63.4	59.3			
11:20	61.6	65.6	88.3	63.6	57.2	62.2		
11:21	62.1	68.1	96.2	63.2	60.6			
11:22	62.6	65.2	85.6	64.5	60.7			
11:23	62.6	65.9	86.9	65.0	59.4			
11:24	61.8	66.1	85.5	63.8	59.4			
11:25	61.1	64.1	85.4	62.3	60.0	62.0		
11:26	62.1	64.8	85.2	63.6	60.6			
11:27	61.1	63.2	85.2	62.3	59.4			
11:28	61.7	63.8	86.8	62.7	60.6			
11:29	63.4	69.4	87.7	66.3	60.8			

11:17 - 1-min Leq despiked for siren.

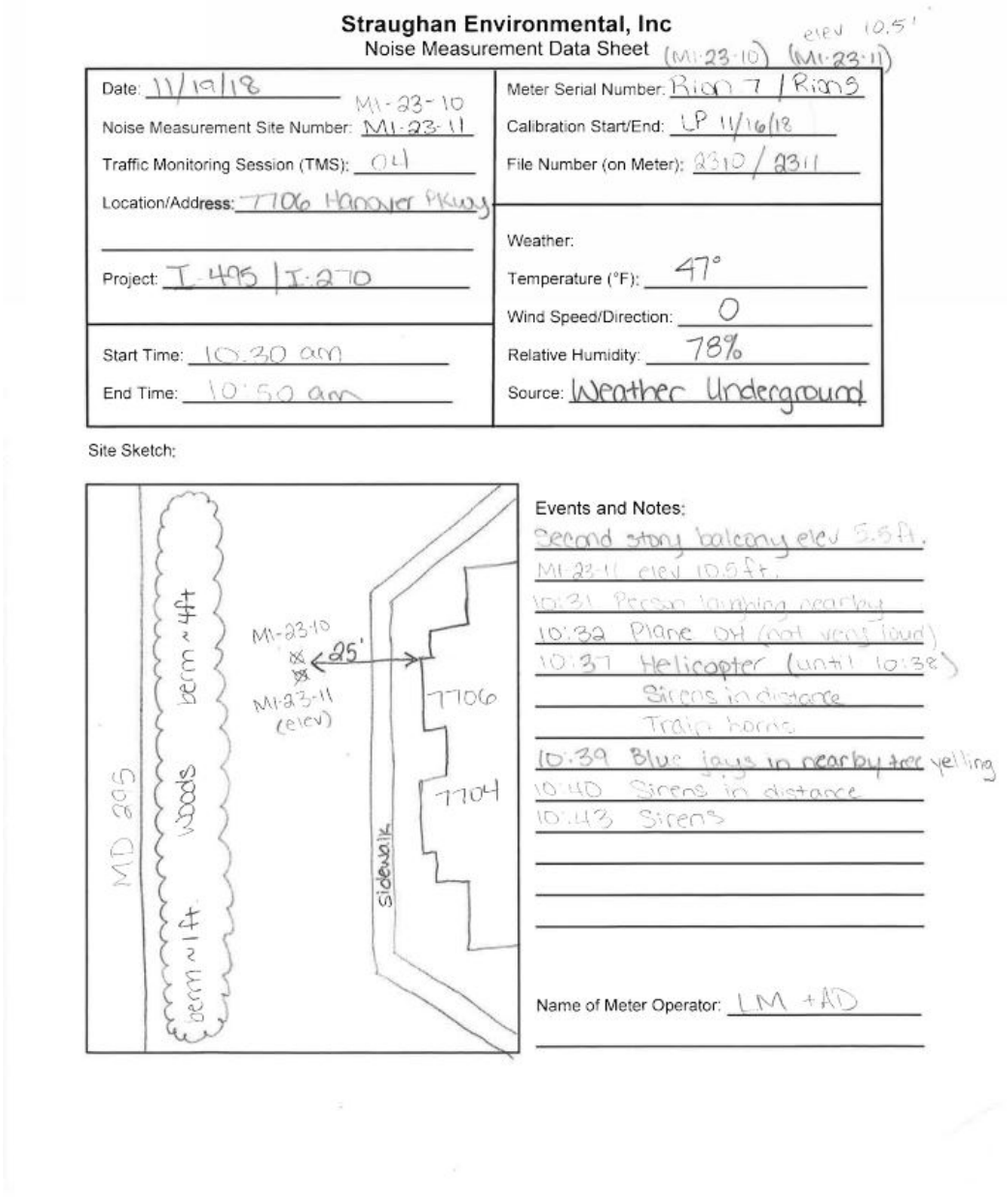
Valid Data Histogram



RECEPTORS M1-23-10, M1-23-11 – 7706 HANOVER PARKWAY

One 20-minute noise measurement was taken at this location on 2018-11-19 1030-1050 Hrs.

Figure A.14 Receptor M1-23-10, M1-23-11 Site Sketch



Straughan Environmental, Inc
Noise Measurement Data Sheet (M1-23-10) elev 10.5' (M1-23-11)

Date: 11/19/18
Noise Measurement Site Number: M1-23-10 M1-23-11
Traffic Monitoring Session (TMS): 04
Location/Address: 7706 Hanover Pkwy
Project: I-495 | I-270

Meter Serial Number: Rion 7 / Rion 5
Calibration Start/End: LP 11/16/18
File Number (on Meter): 2310 / 2311

Weather:
Temperature (°F): 47°
Wind Speed/Direction: 0
Relative Humidity: 78%
Source: Weather Underground

Start Time: 10:30 am
End Time: 10:50 am

Site Sketch:

Events and Notes:
Second story balcony elev 5.5ft.
M1-23-11 elev 10.5ft.
10:31 Person jumping nearby
10:32 Plane OH (not very loud)
10:37 Helicopter (until 10:38)
Sirens in distance
Train horns
10:39 Blue jays in nearby tree yelling
10:40 Sirens in distance
10:43 Sirens

Name of Meter Operator: LM + AD

View 1, Receptor M1-23-10, M1-23-11



View 2, Receptor M1-23-10, M1-23-11



TABLE A.14-1 **Receptor M1-23-10 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS04: 2018-11-19 1030-1050 Hrs.**

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
10:30	59.6	61.1	84.7	60.4	58.8	60.1	59.9	**60**
10:31	60.1	66.3	90.8	60.8	58.6			
10:32	60.7	64.5	85.8	62.5	59.1			
10:33	60.0	62.0	87.3	61.1	58.9			
10:34	59.8	61.5	84.8	61.1	58.1			
10:35	60.0	62.3	83.5	61.4	58.8	60.7		
10:36	59.9	62.0	89.9	61.3	58.2			
10:37	61.7	64.8	94.9	63.8	59.4			
10:38	61.2	63.4	91.8	62.7	59.7			
10:39	60.5	63.1	84.4	61.9	59.0			
10:40	59.7	61.7	82.4	61.2	57.7	59.5		
10:41	59.6	62.9	89.1	61.1	58.1			
10:42	60.3	64.4	90.2	61.8	57.9			
10:43	58.9	60.4	84.6	60.0	56.9			
10:44	58.7	60.2	82.4	60.0	55.8			
10:45	58.9	61.1	84.4	60.4	56.8	59.1		
10:46	60.2	64.6	87.2	64.3	56.4			
10:47	58.2	61.5	85.5	60.2	55.9			
10:48	59.0	60.8	83.4	60.5	57.4			
10:49	59.1	60.7	84.5	60.0	58.3			

Valid Data Histogram

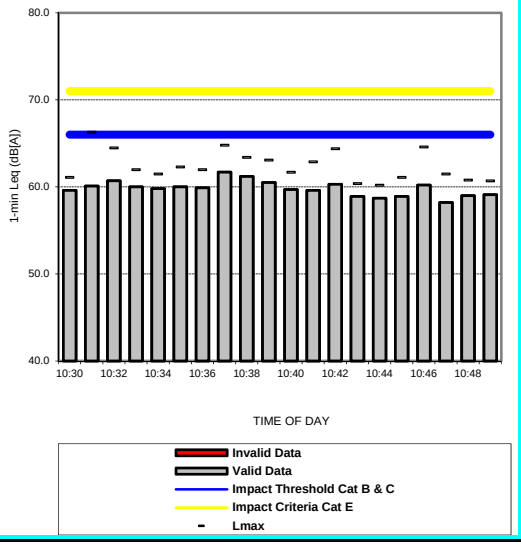
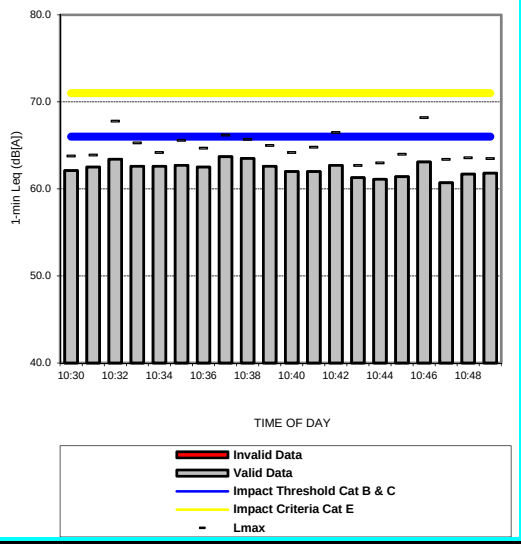


TABLE A.14-2 **Receptor M1-23-11 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS04: 2018-11-19 1030-1050 Hrs.**

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
10:30	62.1	63.8	84.7	62.9	61.4	62.7	62.4	**62**
10:31	62.5	63.9	84.0	63.6	61.3			
10:32	63.4	67.8	85.8	65.2	61.2			
10:33	62.6	65.3	84.8	63.7	61.4			
10:34	62.6	64.2	84.4	64.0	60.7			
10:35	62.7	65.6	82.9	64.3	61.3	63.0		
10:36	62.5	64.7	90.3	63.8	61.0			
10:37	63.7	66.2	94.6	65.4	61.4			
10:38	63.5	65.7	91.0	64.8	62.1			
10:39	62.6	65.0	84.5	63.9	61.2			
10:40	62.0	64.2	81.9	63.8	59.9	61.9		
10:41	62.0	64.8	89.1	63.1	60.4			
10:42	62.7	66.5	89.3	64.3	60.2			
10:43	61.3	62.7	84.0	62.3	59.2			
10:44	61.1	63.0	82.3	62.6	58.0			
10:45	61.4	64.0	90.5	63.0	59.2	61.8		
10:46	63.1	68.2	86.0	67.3	58.6			
10:47	60.7	63.4	84.3	62.5	58.6			
10:48	61.7	63.6	83.6	63.2	59.9			
10:49	61.8	63.5	84.1	62.9	60.8			

Valid Data Histogram



RECEPTOR M1-23-12 – 7601 HANOVER PARKWAY, NEAR ELEANOR ROOSEVELT HS

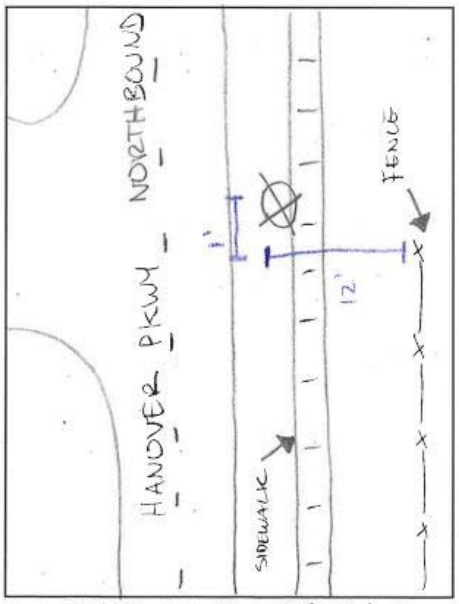
One 20-minute noise measurement was taken at this location on 2018-11-19 1030-1050 Hrs.

Figure A.15 Receptor M1-23-12 Site Sketch

Straughan Environmental, Inc
Noise Measurement Data Sheet

Date: 11/19/2018	Meter Serial Number: RION 6
Noise Measurement Site Number: M1-23-12	Calibration Start/End: LP 11/16/18
Traffic Monitoring Session (TMS): 04	File Number (on Meter): 2312
Location/Address: CLOSE TO ERHS HANOVER PARKWAY	Weather:
Project: I-495/I-270 TESTING	Temperature (°F): 47°
	Wind Speed/Direction: 0
Start Time: 10:30 AM	Relative Humidity: 78%
End Time: 10:50 AM	Source: Weather Underground

Site Sketch:



38.9957083, -76.8726103

Events and Notes:
10:31 - 10:32 - 2 GIRLS WALKING BY TALKING LOUDLY
10:37 - 10:38 - HELICOPTER IN DISTANCE
10:39 - TRAIN HORN - 2 HONKS
10:41 - LOUDER THAN USUAL CORVETTE
10:43 - PEOPLE WALKING BY WHILE ON CELL PHONE (2 FEET)
10:47 - ANOTHER PERSON WALKING CLOSE TO METER (2 FEET) GREETED BRIEFLY CLOSE TO MIC

Name of Meter Operator: LUIS DONCIANO

View 1, Receptor M1-23-12

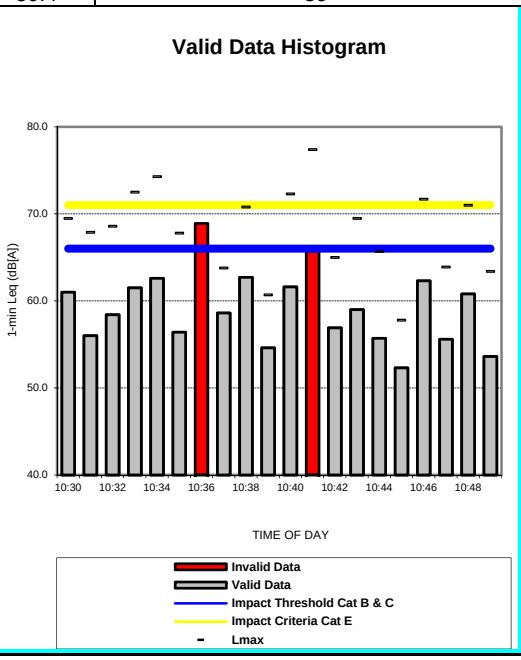


View 2, Receptor M1-23-12



TABLE A.15 **Receptor M1-23-12 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS04: 2018-11-19 1030-1050 Hrs.**

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
10:30	61.0	69.5	91.8	66.4	51.4	60.5	59.4	**59**
10:31	56.0	67.9	94.3	55.8	52.4			
10:32	58.4	68.6	86.9	60.8	52.9			
10:33	61.5	72.5	90.2	64.5	52.9			
10:34	62.6	74.3	95.3	66.8	51.1			
10:35	56.4	67.8	92.0	58.6	51.5	59.2		
10:36	~~68.9~~	~~80.4~~	~~102.3~~	~~74.1~~	~~52.4~~			
10:37	58.6	63.8	93.9	60.8	54.0			
10:38	62.7	70.8	91.6	67.5	56.9			
10:39	54.6	60.7	82.7	55.9	52.8			
10:40	61.6	72.3	94.5	65.1	53.0	58.9		
10:41	~~65.7~~	~~77.4~~	~~99.3~~	~~70.0~~	~~53.4~~			
10:42	56.9	65.0	84.2	60.0	52.1			
10:43	59.0	69.5	91.1	63.0	52.1			
10:44	55.7	65.7	86.0	58.8	50.5			
10:45	52.3	57.8	80.8	54.0	50.8	58.6		
10:46	62.3	71.7	91.3	67.6	51.4			
10:47	55.6	63.9	82.9	60.6	50.1			
10:48	60.8	71.0	89.4	66.8	51.5			
10:49	53.6	63.4	84.9	54.6	51.0			



10:36 - 1-min Leq despiked for helicopter.10:41 - 1-min Leq despiked for loud Corvette.

RECEPTOR M1-23-13 – 7722 HANOVER PARKWAY

One 20-minute noise measurement was taken at this location on 2018-11-19 1030-1050 Hrs.

Figure A.16 Receptor M1-23-13 Site Sketch

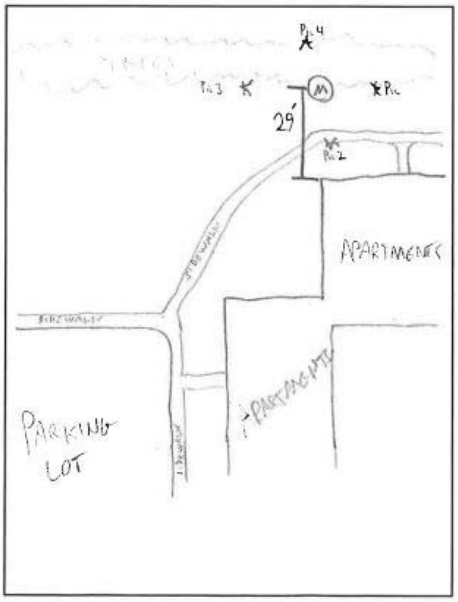
Straughan Environmental, Inc
Noise Measurement Data Sheet

Date: 11/19/18
Noise Measurement Site Number: M1-23-13
Traffic Monitoring Session (TMS): 04
Location/Address: 7722 Hanover Pkwy
Project: I-495/I-270
Start Time: 10:30
End Time: 10:50

Meter Serial Number: 3 RKK
Calibration Start/End: 7/14/18
File Number (on Meter): 3032

Weather:
Temperature (°F): 47°
Wind Speed/Direction: 0
Relative Humidity: 78%
Source: Weather Underground

Site Sketch:



Events and Notes:
Man sweeping sidewalk at 10:35.
Helicopter flying over at 10:38.
Train horn at 10:38.
Car horn at 10:40.
Train horn at 10:42.
People on path passing by meter at 10:48

Name of Meter Operator: Mike Freyman

View 1, Receptor M1-23-13

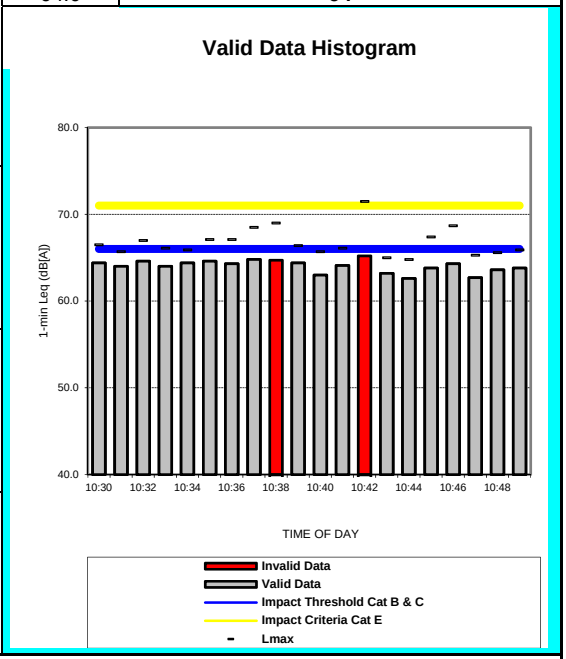


View 2, Receptor M1-23-13



TABLE A.16 **Receptor M1-23-13 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS04: 2018-11-19 1030-1050 Hrs.**

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
10:30	64.4	66.5	-.-	65.6	63.5	64.3	64.0	**64**
10:31	64.0	65.7	-.-	65.1	62.5			
10:32	64.6	67.0	-.-	66.3	63.1			
10:33	64.0	66.1	-.-	65.8	61.7			
10:34	64.4	65.9	-.-	65.3	63.0			
10:35	64.6	67.1	-.-	66.1	62.8	64.5		
10:36	64.3	67.1	-.-	66.5	62.7			
10:37	64.8	68.5	-.-	66.5	61.9			
10:38	~~64.7~~	~~69.0~~	~~-.-~~	~~66.0~~	~~62.9~~			
10:39	64.4	66.4	-.-	65.7	62.7			
10:40	63.0	65.7	-.-	65.4	60.4	63.3		
10:41	64.1	66.1	-.-	64.9	63.2			
10:42	~~65.2~~	~~71.5~~	~~-.-~~	~~68.4~~	~~62.2~~			
10:43	63.2	65.0	-.-	64.6	62.1			
10:44	62.6	64.8	-.-	64.5	57.9			
10:45	63.8	67.4	-.-	66.0	61.7	63.7		
10:46	64.3	68.7	-.-	67.5	60.7			
10:47	62.7	65.3	-.-	64.4	60.5			
10:48	63.6	65.6	-.-	65.0	60.9			
10:49	63.8	65.9	-.-	65.3	62.4			



10:38 - 1-min Leq despiked for helicopter and train horn.10:42 - 1-min Leq despiked for train horn.

RECEPTOR M1-23-14 – 7814 HANOVER PARKWAY

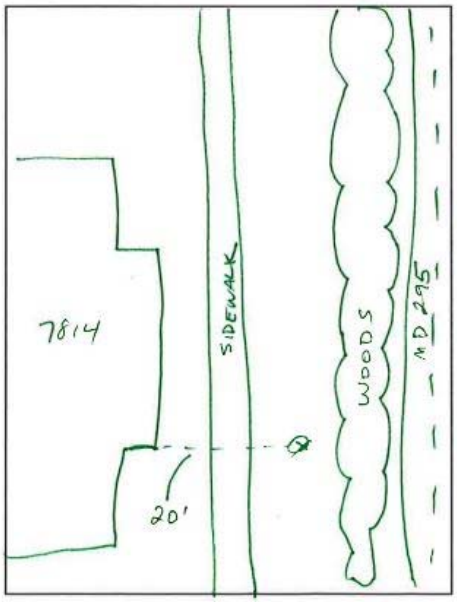
One 20-minute noise measurement was taken at this location on 2018-11-19 1030-1050 Hrs.

Figure A.17 Receptor M1-23-14 Site Sketch

Straughan Environmental, Inc
Noise Measurement Data Sheet

Date: 11/19/18	Meter Serial Number: R1C+1C #4
Noise Measurement Site Number: M1-23-14	Calibration Start/End: 7/14/18
Traffic Monitoring Session (TMS): TMS 04	File Number (on Meter): 4020
Location/Address: 7814 HANOVER PKWY	
	Weather:
Project: I-495 + I-270 MANAGED LANES STUDY	Temperature (°F): 47°
	Wind Speed/Direction: 0
Start Time: 10:30 AM	Relative Humidity: 78%
End Time: 10:50 AM	Source: Weather Underground

Site Sketch:



Events and Notes:

Name of Meter Operator: GWT

View 1, Receptor M1-23-14



View 2, Receptor M1-23-14

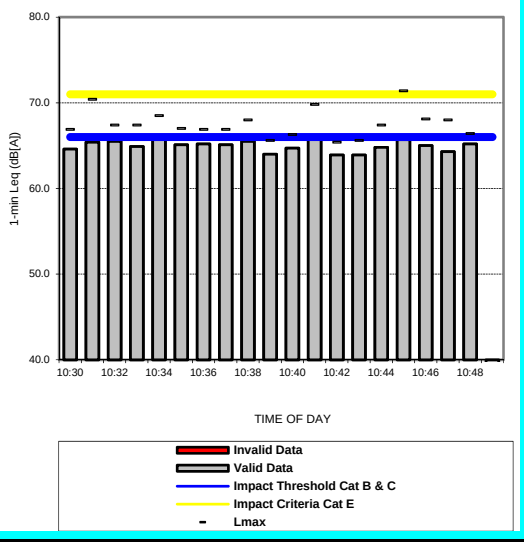


TABLE A.17 **Receptor M1-23-14 -- 20-Minute Equivalent Sound Level (20-min Leq) Calculation -- TMS04: 2018-11-19 1030-1050 Hrs.**

Noise Measurement Data						Calculated Data		Traffic Volume Noise Level
TIME	1-min Leq dB(A)	Lmax dB(A)	Lpk dB(C)	L(10.0) dB(A)	L(90.0) dB(A)	5-min Leq dB(A)	20-min Leq dB(A)	
10:30	64.6	66.9	-.-	65.9	63.0	65.3	65.0	**65**
10:31	65.4	70.4	-.-	67.2	63.1			
10:32	65.5	67.4	-.-	67.1	63.9			
10:33	64.9	67.4	-.-	66.6	63.5			
10:34	65.9	68.5	-.-	67.5	64.6			
10:35	65.1	67.0	-.-	66.3	63.9	65.0		
10:36	65.2	66.9	-.-	66.5	63.5			
10:37	65.1	66.9	-.-	66.1	64.2			
10:38	65.5	68.0	-.-	67.0	63.4			
10:39	64.0	65.6	-.-	65.4	61.6			
10:40	64.7	66.3	-.-	66.1	63.0	64.7		
10:41	65.9	69.8	-.-	68.5	64.0			
10:42	63.9	65.4	-.-	65.0	62.1			
10:43	63.9	65.6	-.-	65.5	60.8			
10:44	64.8	67.4	-.-	66.3	62.0			
10:45	65.7	71.4	-.-	70.4	61.9	65.1		
10:46	65.0	68.1	-.-	66.9	63.1			
10:47	64.3	68.0	-.-	65.7	62.4			
10:48	65.2	66.4	-.-	66.3	63.6			
10:49	-				-			

10:49 - 1-min Leq despiked for no data.

Valid Data Histogram



4 TRAFFIC DATA

TMS01 traffic counts from video

Site	Video	Location Description	Vehicle Counts				Duration (min)
			Autos	MT	HT	Total	
TMS01	**V1**	Cherry Hill Rd. Overpass overlooking I-95 NB	2,129	182	137	**2,448**	20:00
TMS01	**V2**	Cherry Hill Rd. Overpass overlooking I-95 SB	1,636	78	120	**1,834**	20:00

TMS02 traffic counts from video

Site	Video	Location Description	Vehicle Counts				Duration (min)
			Autos	MT	HT	Total	
TMS02	**V1**	Cherry Hill Rd. Overpass overlooking I-95 NB	1,860	164	128	**2,152**	20:00
TMS02	**V2**	Cherry Hill Rd. Overpass overlooking I-95 SB	1,426	88	153	**1,667**	20:00

TMS03 traffic counts from video

Site	Video	Location Description	Vehicle Counts				Duration (min)
			Autos	MT	HT	Total	
TMS03	**V3**	Greenbelt Rd. Overpass overlooking MD-295					
		Northbound Mainline	1,128	6	2	**1,136**	21:00
		Southbound Mainline	813	11	7	**831**	
		Merging on to 295 SB at Southway on-ramp	215	2	0	**217**	

Site	Video	Location Description	Vehicle Counts				Duration (min)
			Autos	MT	HT	Total	
TMS03	**V4**	Greenbelt Rd. Overpass overlooking MD-295					
Direction of Travel	**Northerly**	***Northbound Mainline***	826	7	2	**835**	20:00
		Exiting at Greenbelt off-ramp	199	3	0	**202**	
		Merging on to 295 NB at Greenbelt on-ramp	83	0	0	**83**	
	Southerly	***Southbound Mainline***	823	8	7	**838**	
		Exiting at Southway off-ramp	118	2	0	**120**	

TMS04 traffic counts from video

Site	Video	Location Description	Vehicle Counts				Duration (min)
			Autos	MT	HT	Total	
TMS04	**V3**	Greenbelt Rd. Overpass overlooking MD-295					
		Northbound Mainline	1,095	10	2	**1,107**	21:00
		Southbound Mainline	811	12	4	**827**	
		Merging on to 295 SB at Southway on-ramp	234	4	1	**239**	

Site	Video	Location Description	Vehicle Counts				Duration (min)
			Autos	MT	HT	Total	
TMS04	**V4**	Greenbelt Rd. Overpass overlooking MD-295					
Direction of Travel	**Northerly**	***Northbound Mainline***	880	7	2	**889**	20:00
		Exiting at Greenbelt off-ramp	194	3	0	**197**	
		Merging on to 295 NB at Greenbelt on-ramp	111	0	0	**111**	
	Southerly	***Southbound Mainline***	793	11	4	**808**	
		Exiting at Southway off-ramp	111	0	0	**111**	

TMS01 traffic speeds from radar

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
1	I-95 NB (North of Cherry Hill Rd) - Inside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	62	68	60	68	61	66	66	65	70	66	**65**
		68	67	63								
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**65**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
2	I-95 NB (North of Cherry Hill Rd) - Inside Middle Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	67	67	65	64	69	67	67	67			**67**
	Medium Truck:	65	59	59								**61**
	Heavy Truck:	52	59									**56**
	Bus:											
	Motorcycle:											
	Overall Average:											**64**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
3	I-95 NB (North of Cherry Hill Rd) - Outside Middle Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	66	72	65	68	63	63	65	61			**65**
	Medium Truck:	62	70									**66**
	Heavy Truck:	58	59	57								**58**
	Bus:											
	Motorcycle:											
	Overall Average:											**64**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS01 traffic speeds from radar (continued)

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	I-95 NB (North of Cherry Hill Rd) - Outside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	59	65	57	63	63	55	51	49	61		**58**
	Medium Truck:	62	55	58								**58**
	Heavy Truck:											
	Bus:	63										**63**
	Motorcycle:											
	Overall Average:											**59**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
1	I-95 SB (North of Cherry Hill Rd) - Inside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	70	68	64	63	65	63	68	64	65	64	**65**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**65**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
2	I-95 SB (North of Cherry Hill Rd) - Inside Middle Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	66	64	63	57	64	61	63	64			**63**
	Medium Truck:											
	Heavy Truck:	64	70									**67**
	Bus:											
	Motorcycle:											
	Overall Average:											**64**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS01 traffic speeds from radar (continued)

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
3	I-95 SB (North of Cherry Hill Rd) - Outside Middle Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	58	65	65	63	62	63	56	64	68		**63**
	Medium Truck:											
	Heavy Truck:	61										**61**
	Bus:											
	Motorcycle:											
	Overall Average:											**63**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	I-95 SB (North of Cherry Hill Rd) - Outside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	64	68	63	61	61	63	60	65	58	63	**63**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**63**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS02 traffic speeds from radar

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
1	I-95 NB (North of Cherry Hill Rd) - Inside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	64	66	64	71	61	70	64	69	66	65	**66**
		64	71	64	65	68	64	71	65	67	68	
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**66**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
2	I-95 NB (North of Cherry Hill Rd) - Inside Middle Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	66	67	65	54	73	65	68	65	61	66	**66**
		65	65	70	69							
	Medium Truck:	55	58	64	58							**59**
	Heavy Truck:	66	55									**61**
	Bus:											
	Motorcycle:											
	Overall Average:											**64**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
3	I-95 NB (North of Cherry Hill Rd) - Outside Middle Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	67	66	66	66	62	56	62	66	58	64	**62**
		54										
	Medium Truck:	60	62	55	60							**59**
	Heavy Truck:	53	51									**52**
	Bus:	66	64	53								**61**
	Motorcycle:											
	Overall Average:											**61**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS02 traffic speeds from radar (continued)

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	I-95 NB (North of Cherry Hill Rd) - Outside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	61	66	48	65	64	60	53	56	60	56	**58**
		56	50	55								
	Medium Truck:	56	51									**54**
	Heavy Truck:	56	63	56								**58**
	Bus:	64	59									**62**
	Motorcycle:											
	Overall Average:											**58**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
1	I-95 SB (North of Cherry Hill Rd) - Inside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	68	70	70	63	64	66	61	62	67		**66**
	Medium Truck:											
	Heavy Truck:	66										**66**
	Bus:	63										**63**
	Motorcycle:											
	Overall Average:											**65**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
2	I-95 SB (North of Cherry Hill Rd) - Inside Middle Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	51	62	67	58	63	61	64	61	68	61	**62**
	Medium Truck:											
	Heavy Truck:	70										**70**
	Bus:											
	Motorcycle:											
	Overall Average:											**62**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS02 traffic speeds from radar (continued)

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
3	I-95 SB (North of Cherry Hill Rd) - Outside Middle Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	53	65	63	60	65	59	60	64	63		**61**
	Medium Truck:	61										**61**
	Heavy Truck:											
	Bus:	52										**52**
	Motorcycle:											
	Overall Average:											**60**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	I-95 SB (North of Cherry Hill Rd) - Outside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	58	62	62	64	48	59	56	58	59		**58**
	Medium Truck:	64										**64**
	Heavy Truck:	58										**58**
	Bus:											
	Motorcycle:											
	Overall Average:											**59**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS03 traffic speeds from radar

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
1	MD 295 SB (North of Greenbelt Rd) - Inside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	62	58	58	60	72	61	63	66	55	64	**62**
		66										
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**62**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
2	MD 295 SB (North of Greenbelt Rd) - Outside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	65	51	52	59	62	61	62	58	58	63	**59**
		60										
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**59**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
3	Ramp, Southway/Greenbelt Rd to MD 295 SB	1	2	3	4	5	6	7	8	9	10	
	Autos:	36	35	31	30	33	33	40	42	41	38	**36**
	Medium Truck:	35										**35**
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**36**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS03 traffic speeds from radar (continued)

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	Ramp, MD 295 SB to Southway (deceleration lane)	1	2	3	4	5	6	7	8	9	10	
	Autos:	50	50									**50**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**50**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	Ramp, MD 295 SB to Southway (around curve)	1	2	3	4	5	6	7	8	9	10	
	Autos:	40	35									**38**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**38**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
1	MD 295 NB (North of Greenbelt Rd) - Inside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	61	65	53	66	68	66	57	70	63	64	**64**
		66										
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**64**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS03 traffic speeds from radar (continued)

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
2	MD 295 NB (North of Greenbelt Rd) - Outside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	61	59	51	53	64	51	57	71	53	59	**58**
		63										
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**58**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
3	Ramp, MD 295 NB to Greenbelt Rd	1	2	3	4	5	6	7	8	9	10	
	Autos:	49	53	50	56	52	44	40	53	50	58	**51**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:	53										**53**
	Overall Average:											**51**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	Ramp, Greenbelt Rd to MD 295 NB (around curve)	1	2	3	4	5	6	7	8	9	10	
	Autos:	35										**35**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**35**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS03 traffic speeds from radar (continued)

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	Ramp, Greenbelt Rd to MD 295 NB (acceleration lane)	1	2	3	4	5	6	7	8	9	10	
	Autos:	50										**50**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**50**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS04 traffic speeds from radar

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
1	MD 295 SB (North of Greenbelt Rd) - Inside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	66	63	58	64	62	71	61	63	67	60	**64**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**64**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
2	MD 295 SB (North of Greenbelt Rd) - Outside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	60	62	70	57	66	55	60	61			**61**
	Medium Truck:	50	51									**51**
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**59**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS04 traffic speeds from radar (continued)

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
3	Ramp, Southway/Greenbelt Rd to MD 295 SB	1	2	3	4	5	6	7	8	9	10	
	Autos:	30	33	40	34	39	37	36	36	37	42	**36**
	Medium Truck:											
	Heavy Truck:	31										**31**
	Bus:											
	Motorcycle:											
	Overall Average:											**36**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	Ramp, MD 295 SB to Southway (deceleration lane)	1	2	3	4	5	6	7	8	9	10	
	Autos:	50	50									**50**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**50**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	Ramp, MD 295 SB to Southway (around curve)	1	2	3	4	5	6	7	8	9	10	
	Autos:	40	35									**38**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**38**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS04 traffic speeds from radar (continued)

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
1	MD 295 NB (North of Greenbelt Rd) - Inside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	66	63	63	62	68	59	63	62	62	64	**63**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**63**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
2	MD 295 NB (North of Greenbelt Rd) - Outside Thru Lane	1	2	3	4	5	6	7	8	9	10	
	Autos:	62	52	64	60	60	61	54				**59**
	Medium Truck:	45										**45**
	Heavy Truck:											
	Bus:	54	61									**58**
	Motorcycle:											
	Overall Average:											**57**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
3	Ramp, MD 295 NB to Greenbelt Rd	1	2	3	4	5	6	7	8	9	10	
	Autos:	59	54	50	54	47	51	44	54			**52**
	Medium Truck:	46	53									**50**
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**51**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

TMS04 traffic speeds from radar (continued)

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	Ramp, Greenbelt Rd to MD 295 NB (around curve)	1	2	3	4	5	6	7	8	9	10	
	Autos:	35										**35**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**35**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.

Lane #	Description	Radar Samples by Vehicle Type										Hourly Average
4	Ramp, Greenbelt Rd to MD 295 NB (acceleration lane)	1	2	3	4	5	6	7	8	9	10	
	Autos:	50										**50**
	Medium Truck:											
	Heavy Truck:											
	Bus:											
	Motorcycle:											
	Overall Average:											**50**

Note: If no other speed samples are taken for vehicles other than cars, assume speeds were combined for all vehicle types.