Statewide Type II Noise Barrier Screening Analysis

March 29, 2017

Memorandum

To: Jon Evans, Air & Noise Program Manager

Date: March 29, 2017

Project #: 52390.04

From: Jason Ross, Director of Noise and Vibration
Mark Arnoldy, Noise Planner
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Re: NHDOT Type II Noise Program Development - State-wide Evaluation of Feasibility and Reasonableness of Type II Noise Barriers

Introduction

VHB has conducted a state-wide evaluation of the feasibility and reasonableness of potential Type II noise barriers. The purpose of this evaluation is to provide information on the number, length, cost and locations of noise barriers that are likely to be feasible and reasonable under NHDOT's draft Type II Noise Barrier policy.

This memorandum includes a summary of results, information on the draft Type II noise barrier eligibility criteria, a description of the methodologies used to identify and locate residential receptors, calculate highway noise levels at all receptors within 1500 feet of Tier 1 highways, calculate insertion losses for 10 to 25-foot tall barriers, and calculate the Dimensional Effectiveness Index (DEI) of potential barriers. Barriers that are likely to be feasible and reasonable based on this methodology have been identified and detailed results of eligible barriers including tables and figures of all (298) study areas are presented. Upon further consideration of Type II barriers, NHDOT would require a detailed TNM study be completed.

In addition to the information presented in this technical memorandum, three electronic Google Earth files (kmz) have been provided which include all Type II noise barrier study areas, all receptors and noise barrier areas evaluated in prior studies. The files allow the user to view all study areas and their associated results (i.e. town/city, highway, distance to noise impact, number of impacts, number of benefits, DEI and eligibility) and receptors and their associated results (i.e. number of dwelling units, noise level and insertion loss for barriers 10 to 25 feet tall).

Summary of Results

The total number of Type II eligible noise barrier areas, the length of the barriers and the approximate cost of the barriers, based on a $30 per square foot unit cost is summarized in Table 1. This table breaks down the barriers according to those on the NH Turnpike system and those on non-turnpike highways. The barrier cost is based on the tallest barrier (up to 25 feet) that was found to meet the Dimensional Effectiveness Index (DEI) criteria.

Table 1. Total Noise Barriers Likely to Be Eligible for Type II Program

Highway	Number of Feasible and Reasonable Barriers	Total Barrier Length (miles)	Barrier Cost ($30/SF)
Blue Star Turnpike	*10*	*7.5*	*$21,901,500*
Spaulding Turnpike	*9*	*6.8*	*$26,697,000*
FE Everett Turnpike	*7*	*4.7*	*$15,858,000*
Total Turnpike System	26	19.0	$64,456,500
Non-Turnpike Highways	23	18.2	$60,025,500
State-wide Total	**49**	**37.2**	**$124,482,000**

Source: VHB, 2017.

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It should be noted that the extent of the study areas - how far away from the highway receptors are included – has a significant effect on the number of benefits a barrier can provide and consequentially on the DEI of the barrier. The total findings in Table 1 are based on including receptors out to 1500 feet from the median. If receptors only out to 750 feet from the highway median are included, the total number of Type II eligible barriers would be reduced to 38, with a total length of 24.7 miles and a total cost of $76,161,000. Limiting the distance that receptors are included in the analysis may provide a more realistic determination of barrier insertion loss and potential benefit because background ambient noise becomes a more important factor at farther distances from the highway. Some DOT's such as North Carolina DOT actually limit the distance of receptors to 800 feet for Tier 1 highways and do not allow additional receptors to be included for the purposes of determining benefit.

Including receptors out to 1500 feet, the total number, length and cost of eligible barriers ranked by municipality are shown in Table 2.

Table 2. Noise Barriers Potentially Eligible for Type II Program (by Municipality)

Municipality	Highway(s)	Number of Feasible and Reasonable Barriers	Total Barrier Length (miles)	Barrier Cost ($30/SF)
Dover	Spaulding	7	5.2	$20,269,500
Manchester	FE Everett, I-93 & Route 101	6	3.7	$14,344,500
Greenland	I-95	4	3.5	$11,004,000
Raymond	Route 101	4	3.5	$7,812,000
Nashua	FE Everett	4	3.2	$12,577,500
Portsmouth	I-95	5	2.8	$10,347,000
Lebanon	I-89	4	2.4	$8,710,500
Northfield	I-93	2	1.8	$5,515,500
Warner	I-89	1	1.8	$4,176,000
Concord	I-93 & I-393	2	1.6	$6,360,000
Hampton Falls	I-95	1	1.2	$1,962,000
Exeter	Route 101	1	1.1	$4,500,000
Seabrook	I-95	1	0.9	$2,106,000
Lincoln	I-93	1	0.9	$3,495,000
Bow	I-93	1	0.8	$1,296,000
Hopkinton	I-89	1	0.8	$2,544,000
Rochester	Spaulding	1	0.7	$2,910,000
Bedford	Route 101	1	0.6	$2,392,500
Hooksett	I-89	1	0.4	$1,260,000
Auburn	Route 101	1	0.4	$900,000

Source: VHB, 2017.

Type II Barrier Eligibility Criteria

According to the draft NHDOT Type II Noise Barrier Policy (Version 4), the following criteria shall be considered to determine whether a noise barrier is eligible for the Type II program:

1) The barrier shall be along existing Tier I highway.
2) The barrier shall not be along a section of highway for which a Type I eligible project is programmed in the 10-year Transportation Improvement Plan (TIP).
3) The barrier shall not be along a section of highway where a barrier was previously determined not to be feasible and reasonable for a Type I or Type II project, regardless of subsequent development
4) At least one benefiting receptor must have been permitted for development prior to the original opening date of the highway or prior to November 28, 1995.
5) No modification of the highway alignment shall be required.
6) Any property acquisition necessary to construct the barrier, including that needed for barrier maintenance or utility relocation must be donated to the Department.
7) The base DEI criteria of 1500 SF/receptor shall be adjusted negatively based on the percentage of receptors that have been developed in a study area after November 28, 1995 and adjusted positively based on the percentage of receptors that existed in a study area prior to the opening date of the highway according to Table 3.
8) Only receptors permitted before November 30, 2017 may be included in the evaluation of feasibility and reasonableness.
9) Municipalities must meet requirements associated with funding and noise compatible land use planning as outlined in the draft NHDOT policy.

Table 3. DEI Adjustments Based on Land Use

Percentage	Adjustment for % of Receptors That Were Permitted or Constructed Prior to Opening Date of Highway	Adjustment for % of Receptors That Were Permitted After November 28, 1995
1 to 25%	+100	-100
25 to 50%	+200	-200
50 to 75%	+300	-300
75 to 100%	+400	-400

Source: NHDOT, 2016.

This evaluation includes a total of 298 study areas along the following Tier 1 highways where there are a relatively dense groups of residential receptors:

- FE Everett Turnpike from the MA state line in Nashua to Exit 14 in Concord (39.5 miles)
- Spaulding Turnpike from Portsmouth to Exit 18 in Milton (33.2 miles)
- Blue Star Turnpike (I-95) from the MA state line in Seabrook to the ME state line in Portsmouth (16.2 miles)
- I-93 from the MA state line in Salem to FE Everett Turnpike north of Manchester (26.1 miles)
- Route 101 from RT 114 in Bedford to I-93 in Manchester (5 miles)
- I-89 from Concord to the VT state line in Lebanon (61 miles)
- I-393 from Concord to Chichester (4.8 miles)
- I-93 from Exit 14 in Concord to the VT state line in Littleton (93 miles)
- Route 101 from Exit 1 in Manchester to Exit 13 in Hampton (31 miles)

This evaluation has included, but shown to be ineligible, study areas that would be considered under the following Type I projects programmed in the 10-year Transportation Improvement Plan:

Table 4. 10-year TIP Type I Projects

Project Number	Tier 1 Highway	Project Description
16100	FEET	Bedford Mainline Toll Open Road Tolling
13742	I-93	Widening from I-89 to Between Exit 15 and 16
13065	I-93	Exit 4A New Interchange and connecting roadway
29440	Spaulding	Open road tolling conversion at Dover and Rochester Toll Plazas - P/E
40599	Spaulding	Feasibility (Planning) study for Exit 10 & Easterly construction along NH 16
16148	I-89	Rehab and Widening for TCP, Over CT river
16099	FEET	Reconstruct Exit 6 & 7
13761	FEET	Widen 2-lane sections from Exit 8 in Nashua to I-293 in Bedford
11238	Spaulding	Widen Turnpike Including Little Bay Bridges from Gosling RD to Dover Toll
10418X	I-93	Final Design for Salem to Manchester

Source: NHDOT, 2016.

This evaluation has included study areas that were previously considered under the following Type I projects. Areas where mitigation was previously determined to be not feasible and reasonable have been shown to be ineligible for Type II. Areas where mitigation was not assessed because there was no impact have been included.

Table 5. Prior Type I Projects

Tier 1 Highway	Prior Type I Project
I-93	Rebuilding I-93: Salem to Manchester
Airport Access Road	Manchester Airport Access Road Bedford-Manchester-Londonderry-Litchfield-Merrimack
I-93	I-93 Corridor Improvement Bow to Concord
Route 101/51	Epping to Hampton
I-95	Hampton Toll Plaza
FE Everett	Hookset Toll Plaza
I-293	Manchester, IM-X-T-293
I-293	I-293 Exit 4 Manchester Five Bridges
Route 101	Manchester-Auburn, 12609
FE Everett*	FE Everett Turnpike MA State Line to Exit 7 in Nashua
Spaulding	Spaulding Turnpike Improvements Newington to Dover
I-95	Rockingham Ave Portsmouth
Spaulding	Spaulding Turnpike Exit 11 to Exit 16 NHS-027-1(36), 10620 D
*Project not considered to be Type I noise study since it was conducted prior to NHDOT Noise Policy.	

Source: NHDOT, 2016.

Methodology

The following section describes the methodology used to identify residential receptors within 1500 feet of the highway median, compute highway noise levels at all receptors, compute the insertion loss of 10, 15, 20, or 25-foot noise barriers and evaluate the DEI to determine eligibility of barriers in accordance with the draft NHDOT Type II Noise Barrier Program.

Identifying Receptors

Parcel land use data have been used to identify receptors according to residential state land use codes. For land use codes indicating 2 to 4 dwelling units, the higher number of dwelling units has been assumed to provide a slightly conservative estimate of the DEI. Land use information was reviewed along with aerial photography to further identify residential land uses. In some areas with multi-family buildings and condominiums, it was necessary to estimate the number of dwelling units based on reviewing Google Streetview™ images of buildings and/or parking lots (assuming that each dwelling unit would have 2 to 3 parking spaces). Receptors were located in the geometric center of the parcels. These locations were generally representative of outdoor areas with frequent human use, as prescribed by the Federal Highway Administration (FHWA) for defining receptor locations.

U.S. Census data for housing units within "census tracts" were analyzed between 1950 and 2015. The percentage of housing units built after 1995 was calculated for each census tract. Similarly, the percentage of housing units built prior to the highway opening date (typically late-1950's to mid-1960's) were calculated. The results were applied to each barrier study area. Based on these values, the DEI criteria were adjusted according to factors in Table 3. On average, 25% of the housing units were built after 1995 and 35% were built prior to the highway opening. The average DEI criteria is 1575. Figure 1 shows a typical aerial location (left) and the identification of residential land use and receptors (right). Each colored block indicates a tax parcel and its respective land use code, while each dot is the receptor location used for sound level analysis.

Figure 1. Parcel Data, Land Use and Receptors

Highway Noise Calculations

Highway noise levels have been calculated using FHWA's Traffic Noise Model (TNM) version 2.5 using a straight and flat highway geometry accounting for the number of travel lanes and traffic data for each segment of highway. The most recent 3 to 5 years of traffic data provided by NHDOT Bureau of Traffic (via Robert E. Bollinger, PE, PTOE on July 15, 2016) were used in the analysis. These data included average annual daily traffic volumes (AADT), peak-hour factors (K-factor), posted and measured speeds and percentages of medium and heavy trucks. For highway segments where one or more of these traffic variables were not available, the nearest segment with the required data was assigned. Highway noise levels at distances every 10 feet up to 1500 feet of the median were computed for all 137 exit-to-exit highway segments. The following summarizes the range of traffic data across Tier 1 highways.

- Highways ranged from one to five lanes per direction and were typically composed of 12 foot travel lanes with approximately a 45-foot median and 5 to 10-foot shoulders.
- AADT ranged from 3,100 to 120,828 vehicles per day across all Tier 1 highway segments. This large variation in AADT corresponds to a 16 dBA difference between the minimum and maximum highway noise levels.
- K-Factors across all the roadways varied from 8.5 percent to 15.9 percent. Multiplying the AADT by the K-Factor results in the Peak Hour Volume (PHV). The minimum PHV of 491 vehicles per hour (vph) occurs on I-93 between Exits 37 and 38 and the maximum of 12,445 vph is on the Everett Turnpike between Exit 5 and 6.
- Medium Truck percentages ranged from 2 to 6 percent of total volumes and Heavy Truck percentages ranged from 2 to 10 percent. The range of Medium Truck percentages correspond to only a 0.3 dBA variation in noise levels. The range of Heavy Truck percentages correspond to a 2 dBA variation in noise levels.
- Average speeds ranged from 59 to 73 mph which corresponds to a 4 dBA variation in noise level.

Highway noise levels have been calculated at every receptor (23,102 total) within 1500 feet of the highway median. The distance to impact from the highway median (where noise levels approach or exceed the NHDOT Noise Abatement Criteria (NAC) for Category B (residential) land use) was determined for each exit-to-exit highway segment. Figure 2 presents the distance to impact for all highway segments for both flat ground and for when the highway is in a 10-foot cut. This figure shows that the distance to impact is typically 300 to 400 feet from the median for flat ground and 150 to 250 feet when the highway is in a 10-foot cut. Figure 10 presents a map of the state showing the distance to impact along all Tier 1 highways.

It should be noted that building rows were not included in the highway noise calculations. While this overestimates highway noise levels for receptors with intervening building rows, it does not affect the DEI calculations or the determination of Type II eligibility. This is because the criteria for eligibility only requires one or more receptors to exceed the NAC (which typically occurs at first row receptors with no intervening buildings) and the barrier must benefit a sufficient number of receptors. As discussed in the next section, the presence of building rows has been found to not affect barrier insertion loss since TNM does not compute double diffraction with building rows.

Detailed TNM models were developed in two locations; the Pannaway Manor Neighborhood south of the Spaulding Turnpike adjacent to I-95 in Portsmouth, NH (Study Area #252) and the Keating Avenue neighborhood in Dover (Study Area #268) along the Spaulding Turnpike. The detailed TNM models include terrain lines, building rows and the actual highway geometry along with site-specific traffic conditions. Additionally, results from previous detailed TNM studies conducted for I-93 Salem to Manchester and Spaulding Turnpike Newington to Dover have been included. Figure 3 compares the highway noise predictions of the detailed TNM models and the method described herein for receptors in relatively flat sections of study areas. This figure shows that noise level predictions for most receptors are within 3 dB for both computation methods.

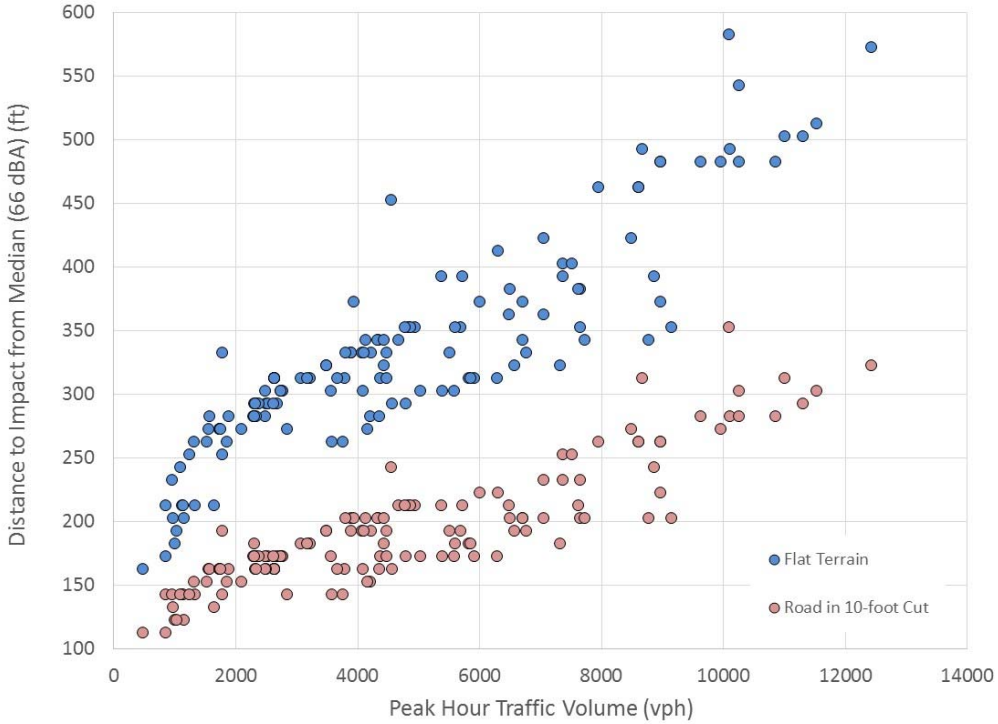

Figure 2. Distance to Impact for Each Exit-to-Exit Highway Segment

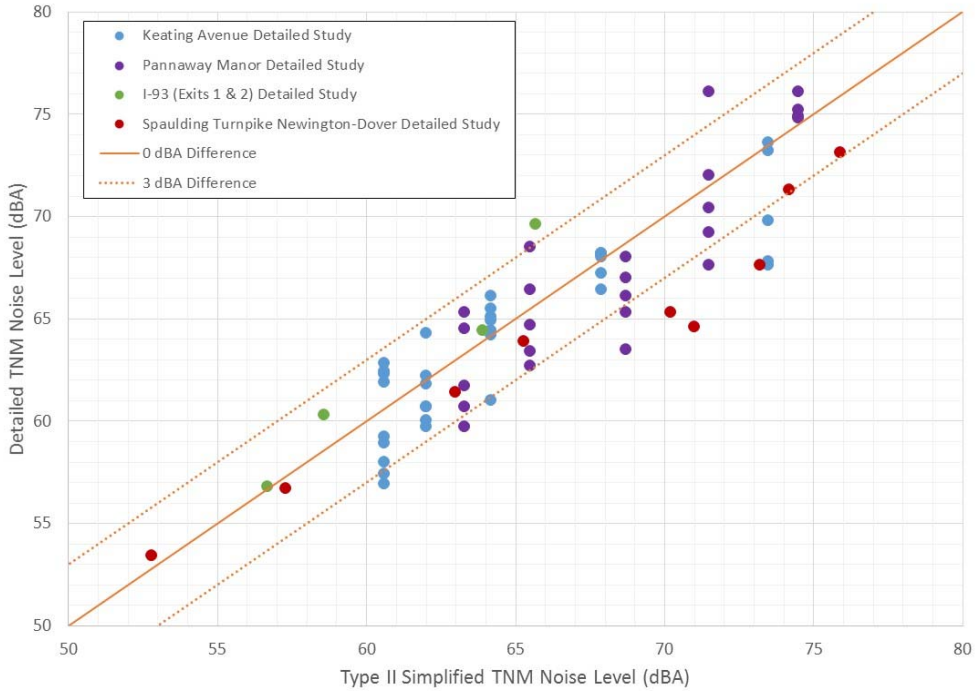

Figure 3. Detailed TNM vs. Simplified TNM Noise Levels

Insertion Loss Calculations

Type II noise barrier study areas were defined by reviewing all highway segments and grouping locations of relatively dense receptors. A total of 298 noise barrier study areas were evaluated. The acoustical effectiveness or insertion loss of noise barriers was evaluated based on a grid analysis which included a matrix of receptors behind a noise barrier along a straight segment of highway. The grid analysis computed the insertion loss of receptors behind 5, 10, 15, 20 and 25-foot barriers at distances out to 1500 feet. **This analysis showed that the insertion loss provided by a certain height barrier can be predicted with high accuracy based solely on the angle of shielding that the barrier would provide.** The barrier shielding angle is computed as shown in Figure 5. This relationship allows us to estimate the insertion loss of various height barriers based only on the geometry of the receptors and the barriers which can be calculated in the Geographic Information System (GIS) program.

As shown in Figure 4, the insertion loss of a 1,200 foot long and 20-foot tall barrier depends on the proximity of the receptor to the barrier and where along the barrier the receptor is. This figure shows that 5 dB of insertion loss, which is the minimum needed to be considered a benefited receptor, extends out up to approximately 500 feet from the highway median in the center of the barrier. Figure 5 shows this same information, although the insertion loss of the barrier is plotted against the angle of shielding which the barrier provides. This curve shows that there is a high correlation between the barrier shielding angle and insertion loss and, in fact, that this relationship is not dependent on the distance of the receptor to the barrier. This relationship was found to be the same for shorter and longer barriers from 300 to 3,600 feet. Additionally, this relationship was shown to be the same for receptors whether or not there were intervening building rows. This is because TNM does not include double diffraction for building rows and therefore computes the sound reduction due to building row shielding equally whether there is a noise barrier or not.

This grid analysis was conducted for 1,200 foot long barriers with heights of 5 to 25 feet. Figure 6 shows the relationships of insertion loss to barrier angle for 5, 10, 15, 20 and 25-foot barriers assuming flat ground.

The only factors that have been shown to substantially affect this relationship (other than noise barrier height) is whether there are already intervening terrain lines (i.e. if the highway is in a cut) or large intervening buildings that are modeled as barriers. Figure 7 shows the change in these relationships and the significant degradation of insertion loss when the highway is in a 5 to 20-foot cut.

This evaluation assumes that the terrain of each study area is relatively flat ground and the highway is not in a significant cut (i.e. 10-foot or greater) or on embankment. As shown in Figure 2 presenting the distance to noise impact and Figure 7 showing the insertion loss when the highway is in a cut, if the existing terrain already breaks the line of sight between the receptors and the pavement, the potential for impact, subsequent need for mitigation and the acoustical effectiveness and associated DEI of a noise barrier is substantially reduced. Therefore, detailed TNM noise modeling to further evaluate the eligibility of Type II barriers should include these terrain effects. Without any terrain effects, the results of this study conservatively assume there is a greater potential for feasible and reasonable barriers.

Figure 8 and Figure 9 compare the insertion loss calculated in the detailed TNM studies at Pannaway Manor, Keating Avenue and I-93 with the grid analysis calculations. This figure shows that the insertion loss results are typically within 3 dB for receptors in a flat terrain.

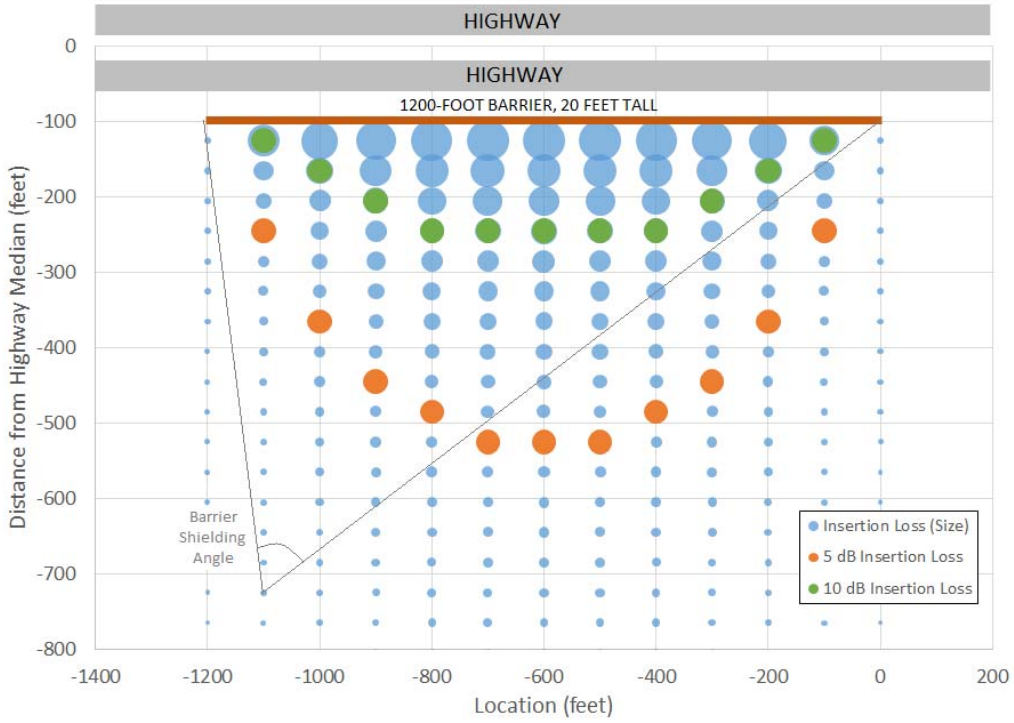

Figure 4. Noise Barrier Insertion Loss Grid Analysis

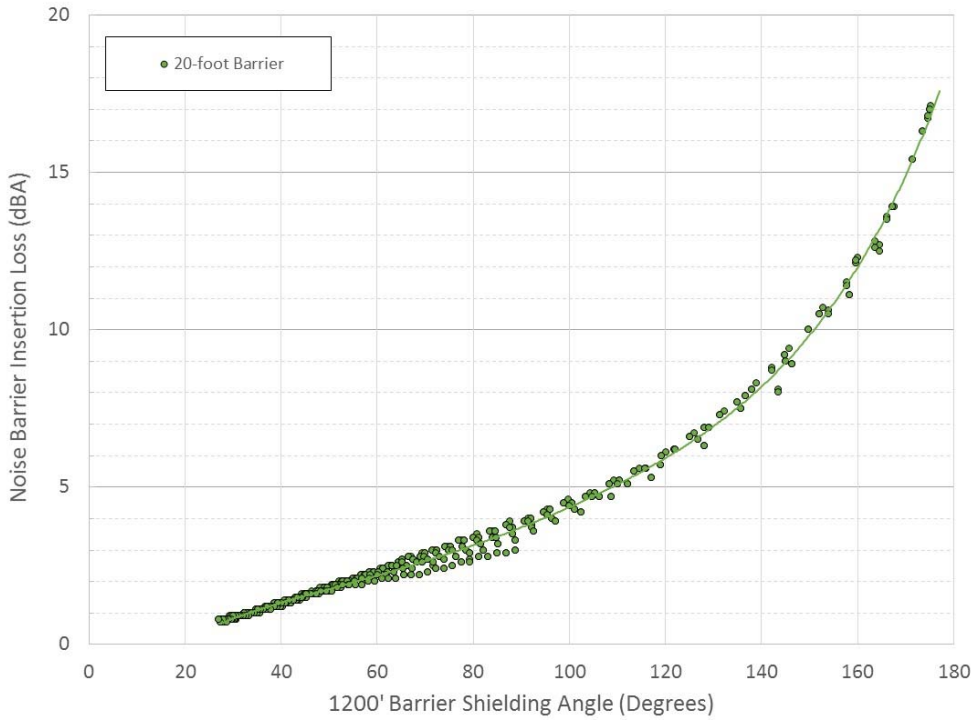

Figure 5. Noise Barrier Insertion Loss vs. Shielding Angle

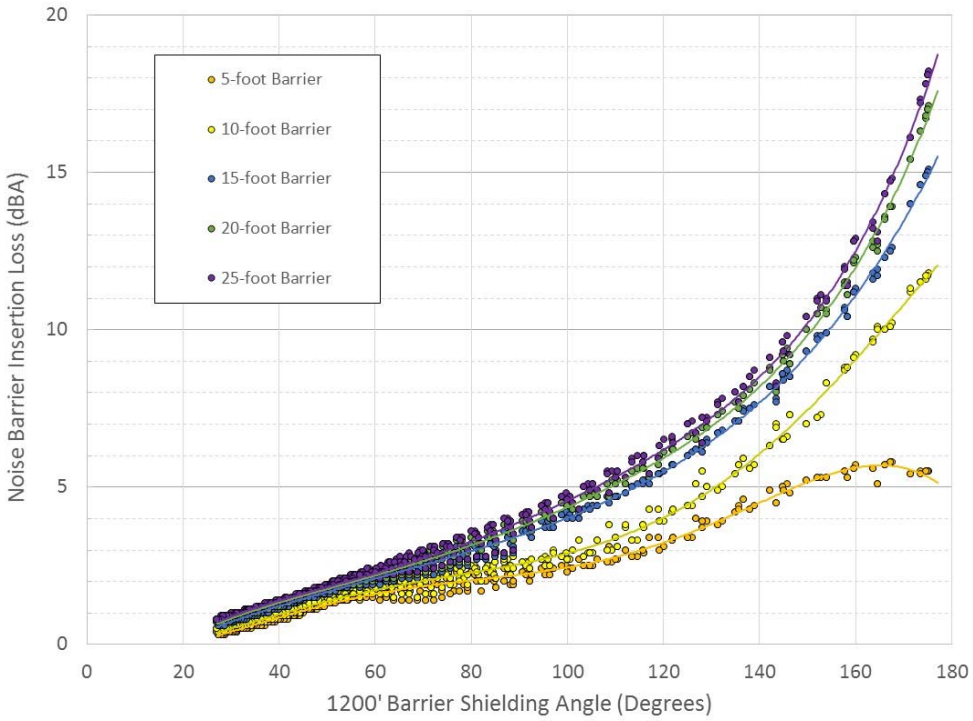

Figure 6. Noise Barrier Insertion Loss vs. Shielding Angle (Barrier Heights 5 to 25 feet)

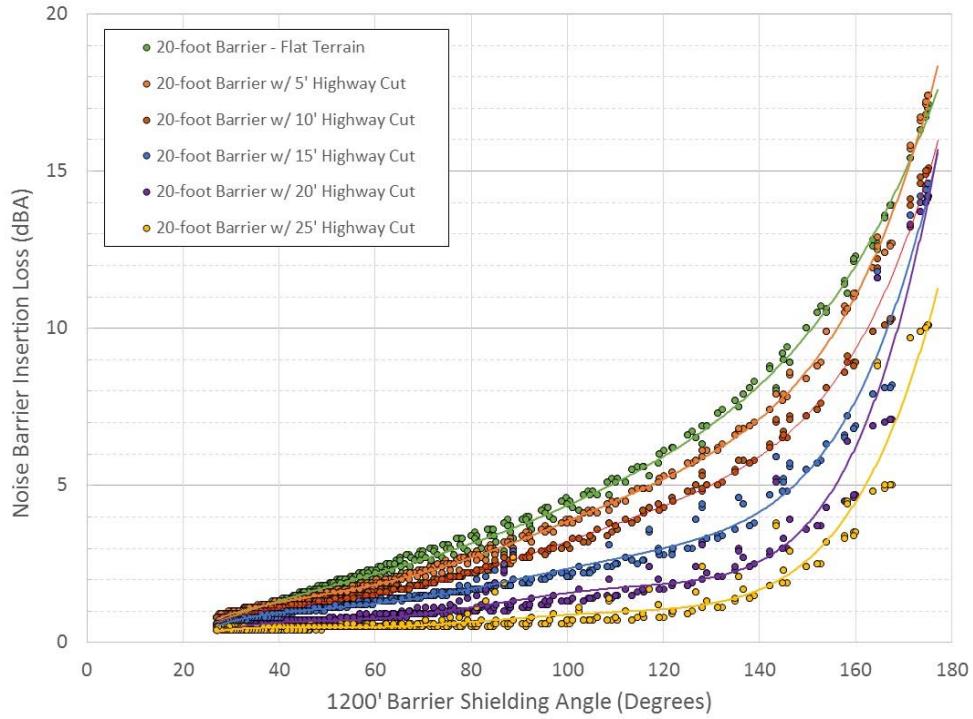

Figure 7. Noise Barrier Insertion Loss vs. Shielding Angle (Highway in Cut 5 to 25 feet

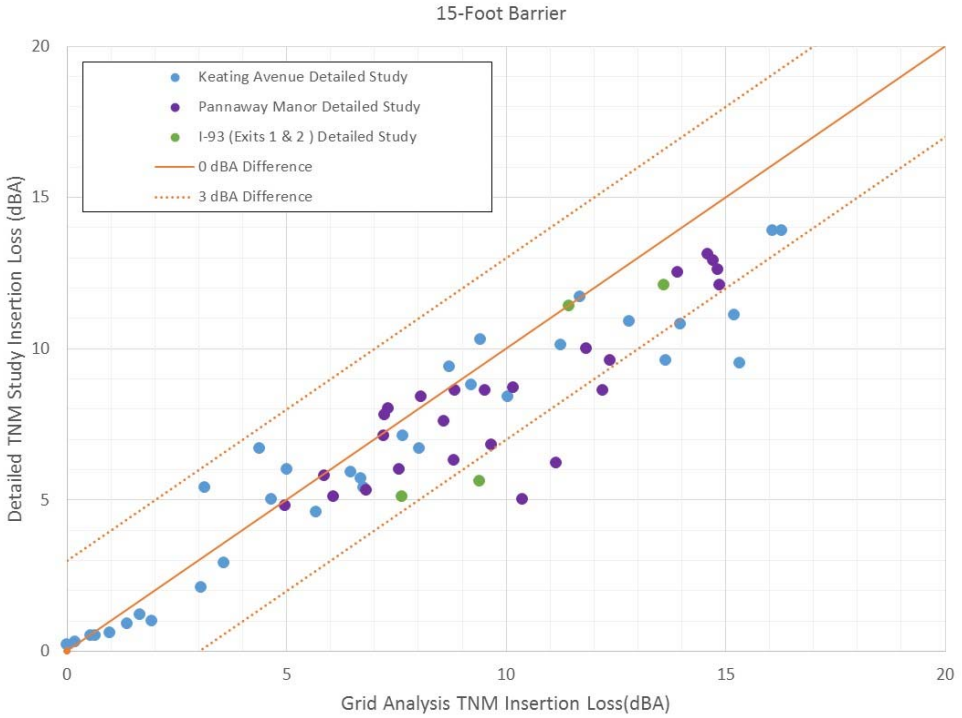

Figure 8. Insertion Loss for Detailed TNM Study vs. Grid Analysis (15-foot Barrier) – Flat Terrain

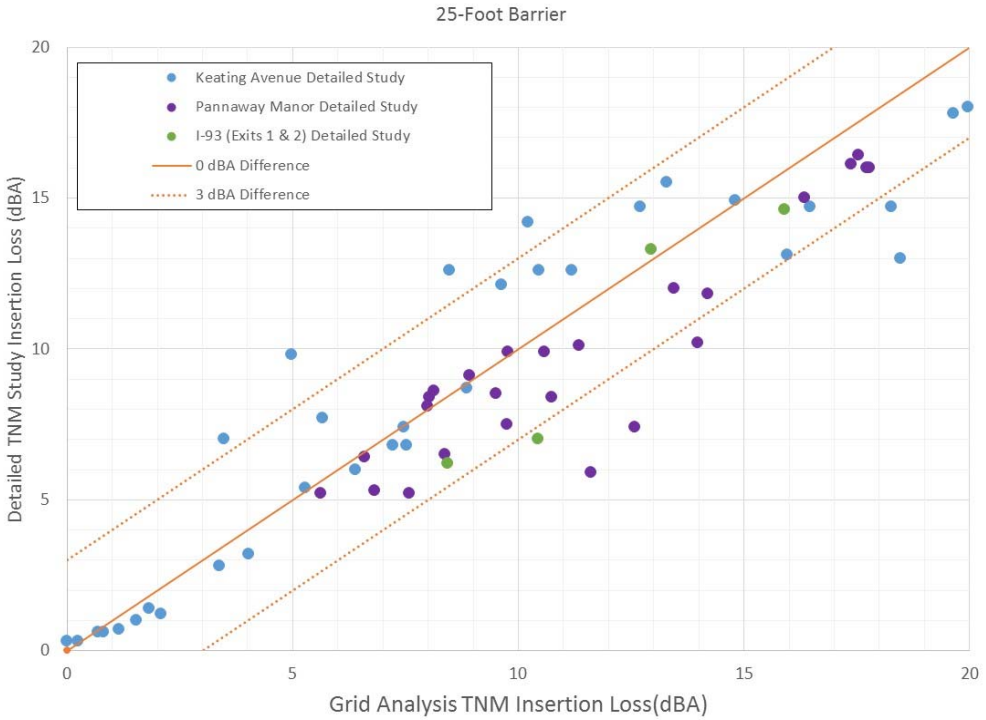

Figure 9. Insertion Loss for Detailed TNM Study vs. Grid Analysis (25-foot Barrier) – Flat Terrain

For all study areas, noise barriers have been evaluated for feasibility and reasonableness in accordance with the draft NHDOT Type II Noise Policy. A Type II barrier is considered to be feasible and reasonable if it meets the following criteria:

- Highway noise levels during existing loudest-hour conditions meet or exceed the NAC (66 dBA Leq).
- At least one benefitted receptor was constructed or developed prior to November 28, 1995.
- The barrier must provide a minimum of 7 dB insertion loss for at least one benefited receptor
- The DEI of the barrier (square footage of barrier per benefitted receptor) shall be less than the criteria which is nominally 1500 plus adjustments based on the date of developments.
- Constructability and safety shall be considered.
- It is also a goal (not a requirement) that the barrier should provide 10 dBA or greater insertion loss at first row receptors.

Based on highway noise level predictions and the grid analysis insertion loss calculations, the DEI for 10, 15, 20 and 25-foot barriers have been computed. Study areas were evaluated according to NHDOT Type II eligibility, feasibility and reasonableness criteria. For all eligible barriers, the tallest barrier that meet all criteria have been assumed in this analysis. For ineligible barriers, the barrier height resulting in the lowest DEI that can be achieved has been reported.

As shown in Table 1 in the Summary of Results, a total of 49 barriers over 37.2 miles at an estimated cost of $124,482,000 are likely to be eligible for the Type II program. Approximately 52% of the barriers by cost would be on the Turnpike System and 48% would be on non-turnpike highways.

Table 6 presents the detailed results of all 49 noise barriers that have been considered to be eligible for the Type II program. This table presents information on the barrier number, location, adjacent highway, length, height, number of impacted and benefited receptors, DEI, eligibility and cost (if eligible).

Table 7 presents detailed results of all 298 study areas. The appendix to this report includes figures of all 298 study areas including key maps to identify the location of each study area within the state. Two representative figures of Type II eligible areas are provided in the body of the report for Study Area #252 Pannaway Manor in Portsmouth and Study Area #268 Keating Avenue in Dover which were also modeled using detailed TNM methods.

Comparing the determination of feasibility and reasonableness from this analysis in areas where detailed TNM modeling was previously conducted for Type I projects such as I-93 Salem to Manchester and Spaulding Turnpike show strong agreement with the methods.

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Google Earth Data

Figure 10 shows the study area and receptor information that is available in the Google Earth kmz files.

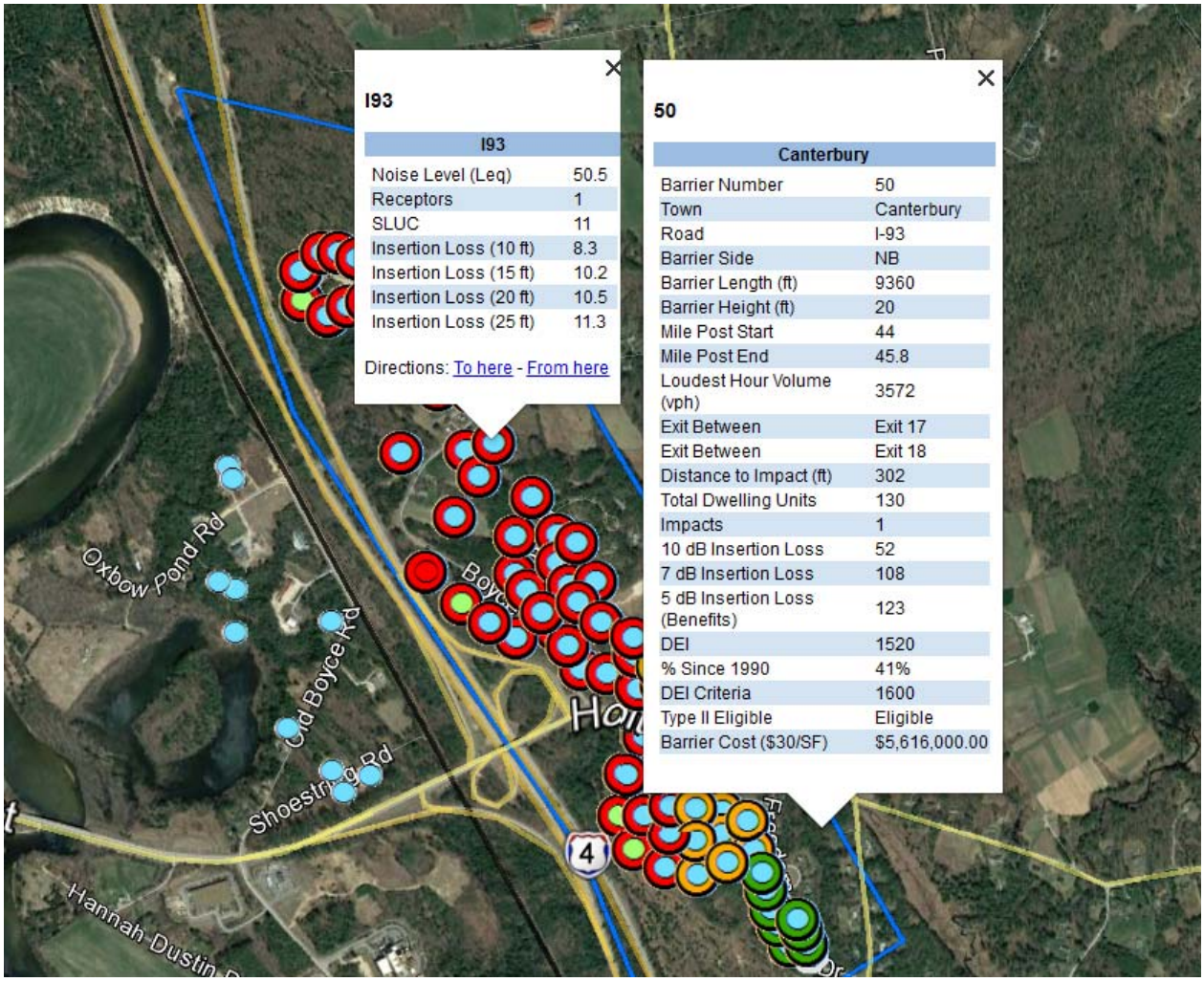

Figure 10. Google Earth Files with Noise Barrier and Receptor Information

The following symbology has been used in the figures as well the Google Earth files:

Highway Noise Level
- <61 dBA Leq
- 61 to 65 dBA Leq
- 66 to 70 dBA Leq (Impact)
- >70 dBA Leq (Impact)

Insertion Loss
- Less than 5 dB
- 5 to 6 dB (Benefit)
- 7 to 9 dB (Benefit/Feasible)
- 10+ dB (Benefit/Design Goal)

Study Areas
- Ineligible for Type II
- Eligible for Type II
- Eligible for Type II (Extend Existing Barrier)

Table 6. Noise Barriers Potentially Eligible for Type II Program

Barrier #	City/Town	Road	Side	Barrier Length (ft)	Barrier Height (ft)	MP Start	MP End	Peak Hour Traffic	Between Exits		Distance to Impact (ft)	Impacts	10 dB Insertion Loss	7-9 dB Insertion Loss	5-7 dB Insertion Loss	DEI	% Housing Units Built After 1995	% Housing Units Built Before Highway	DEI Criteria	Cost ($30/SF)
2	Nashua	FEET	NB	5030	25	0.5	1.5	8628	Exit 1	Exit 2	462	96	168	408	612	205	7%	8%	1500	$3,772,500
3	Nashua	FEET	SB	5180	25	36.2	37.1	11548	Exit 5	Exit 4	512	38	137	184	219	591	25%	15%	1500	$3,885,000
7	Nashua	FEET	NB	2250	25	4.1	4.5	11548	Exit 5	Exit 4	512	24	23	40	88	639	6%	65%	1700	$1,687,500
11	Nashua	FEET	NB	4310	25	6.8	7.6	11024	Exit 7	Exit 8	502	37	49	103	173	623	7%	37%	1600	$3,232,500
29	Manchester	FEET	SB	1610	15	18.9	19.2	7637	Exit 3	Exit 4	382	9	3	8	16	1509	18%	35%	1600	$724,500
42	Hooksett	I-93	SB	2100	20	8.2	8.6	7520	Exit 1	Exit 1A	402	17	19	25	30	1400	19%	38%	1600	$1,260,000
46	Bow	I-93	NB	4320	10	35.4	36.2	7520	Exit 1	Exit 1A	402	15	3	21	30	1440	18%	24%	1500	$1,296,000
49	Concord	I-93	NB	2840	25	39.9	40.4	5404	Exit 15	Exit 16	302	11	21	44	57	1246	24%	21%	1500	$2,130,000
61	Northfield	I-93	NB	3360	10	54.3	55.0	3907	Exit 19	Exit 20	332	2	5	11	25	1344	18%	32%	1600	$1,008,000
63	Northfield	I-93	SB	6010	25	75.8	76.9	3907	Exit 19	Exit 20	332	25	56	128	208	722	18%	32%	1600	$4,507,500
106	Lincoln	I-93	NB	4660	25	100.9	101.8	1530	Exit 32	Exit 33	262	3	85	140	149	782	16%	9%	1500	$3,495,000
161	Manchester	I-93	NB	4060	25	22.1	22.9	6725	Exit 9	Exit 8	372	12	60	95	130	781	27%	3%	1400	$3,045,000
162	Manchester	I-93	SB	4580	25	108.9	109.7	6725	Exit 9	Exit 8	372	140	384	509	591	194	6%	30%	1600	$3,435,000
163	Manchester	I-93	SB	2490	25	108.4	108.8	6725	Exit 9	Exit 8	372	29	29	68	118	528	6%	30%	1600	$1,867,500
166	Manchester	I-93	SB	4430	25	107.0	107.8	5704	Exit 9	Exit 10	352	4	43	97	155	715	7%	36%	1600	$3,322,500
169	Bedford	Route 101	EB	3190	25	53.2	53.8	3772	Exit 3	Exit 2	262	6	22	69	113	706	40%	16%	1400	$2,392,500
173	Manchester	Route 101	WB	2600	25	0.4	0.9	7337	Exit 1	Exit 6	322	2	25	35	51	1275	7%	57%	1700	$1,950,000
180	Auburn	Route 101	EB	2000	15	61.6	62.0	5870	Exit 2	Exit 1	312	11	3	15	24	1250	18%	30%	1600	$900,000
192	Raymond	Route 101	WB	4540	10	40.9	41.8	4362	Exit 4	Exit 3	282	1	20	32	41	1107	33%	11%	1400	$1,362,000
193	Raymond	Route 101	EB	6020	10	70.9	72.0	4362	Exit 4	Exit 3	282	3	5	23	43	1400	33%	11%	1400	$1,806,000
195	Raymond	Route 101	EB	3530	20	73.2	73.9	4493	Exit 4	Exit 5	332	4	9	28	45	1569	24%	32%	1600	$2,118,000
196	Raymond	Route 101	WB	4210	20	37.2	38.0	4788	Exit 6	Exit 5	352	8	14	33	56	1504	24%	32%	1600	$2,526,000
204	Exeter	Route 101	EB	6000	25	87.9	88.7	4844	Exit 12	Exit 11	352	9	64	109	145	1034	18%	49%	1600	$4,500,000
217	Hopkinton	I-89	NB	4240	20	12.1	12.9	2297	Exit 6	Exit 7	282	1	17	40	59	1437	18%	43%	1600	$2,544,000
220	Warner	I-89	NB	9280	15	17.4	19.2	2544	Exit 8	Exit 9	292	1	48	100	112	1243	22%	40%	1600	$4,176,000
238	Lebanon	I-89	SB	2590	10	5.7	6.2	3190	Exit 17	Exit 18	312	13	0	9	22	1177	29%	34%	1500	$1,165,500
240	Lebanon	I-89	SB	4490	25	5.0	5.8	3190	Exit 17	Exit 18	312	33	106	123	126	891	29%	34%	1500	$3,367,500
242	Lebanon	I-89	SB	2970	25	3.9	4.4	3808	Exit 19	Exit 18	332	25	79	151	218	341	11%	53%	1700	$2,227,500
243	Lebanon	I-89	SB	2600	25	3.0	3.5	3808	Exit 19	Exit 18	332	8	11	34	77	844	11%	53%	1700	$1,950,000
245	Concord	I-393	WB	5640	25	2.6	3.6	3583	Exit 3	Exit 2	262	8	49	92	104	1356	24%	21%	1500	$4,230,000
252	Seabrook	I-95	NB	4680	15	1.1	2.0	8675	Exit 2	Exit 1	492	9	19	41	61	1151	22%	20%	1500	$2,106,000
254	Hampton	I-95	SB	6540	10	13.0	14.2	8675	Exit 2	Exit 1	492	11	8	20	42	1557	23%	40%	1600	$1,962,000
259	Greenland	I-95	NB	6540	15	8.8	10.1	9962	Exit 2	Exit 3	482	15	26	52	75	1308	21%	33%	1600	$2,943,000
260	Greenland	I-95	SB	5960	20	6.2	7.3	9962	Exit 2	Exit 3	482	7	16	42	80	1490	21%	33%	1600	$3,576,000
261	Greenland	I-95	NB	2740	25	10.0	10.5	9962	Exit 2	Exit 3	482	20	16	28	52	1317	21%	33%	1600	$2,055,000
262	Greenland	I-95	SB	3240	25	5.7	6.3	9962	Exit 2	Exit 3	482	17	16	32	64	1266	21%	33%	1600	$2,430,000
263	Portsmouth	I-95	NB	1960	15	12.9	13.3	10268	Exit 4	Exit 3	542	15	8	14	18	1633	9%	74%	1700	$882,000

Barrier #	City/Town	Road	Side	Barrier Length (ft)	Barrier Height (ft)	MP Start	MP End	Peak Hour Traffic	Between Exits		Distance to Impact (ft)	Impacts	10 dB Insertion Loss	7-9 dB Insertion Loss	5-7 dB Insertion Loss	DEI	% Housing Units Built After 1995	% Housing Units Built Before Highway	DEI Criteria	Cost ($30/SF)
264	Portsmouth	I-95	SB	2820	25	2.6	3.1	10268	Exit 4	Exit 3	542	46	27	69	133	530	9%	74%	1700	$2,115,000
267	Portsmouth	I-95	SB	3480	25	0.9	1.6	5387	Exit 6	Exit 7	392	21	58	75	83	1048	12%	41%	1600	$2,610,000
268	Portsmouth	I-95	NB	1630	25	15.1	15.4	5387	Exit 6	Exit 7	392	6	1	11	31	1315	7%	84%	1800	$1,222,500
272	Portsmouth	Spaulding	NB	4690	25	0.1	0.9	6318	Exit 6	Exit 1	412	13	6	71	149	787	12%	41%	1600	$3,517,500
278	Dover	Spaulding	NB	2330	25	7.4	7.8	4091	Exit 6	Exit 7	302	6	8	20	39	1494	17%	47%	1600	$1,747,500
279	Dover	Spaulding	NB	1220	20	8.2	8.5	4091	Exit 6	Exit 7	302	8	2	8	17	1435	17%	47%	1600	$732,000
280	Dover	Spaulding	NB	3550	25	8.5	9.2	4091	Exit 6	Exit 7	302	23	26	63	133	667	17%	47%	1600	$2,662,500
285	Dover	Spaulding	NB	2880	25	10.8	11.4	4489	Exit 8	Exit 9	312	60	150	221	228	316	33%	38%	1500	$2,160,000
286	Dover	Spaulding	NB	3780	25	11.5	12.2	4489	Exit 8	Exit 9	312	44	0	23	164	576	13%	64%	1700	$2,835,000
287	Dover	Spaulding	SB	3150	25	10.6	11.2	4489	Exit 8	Exit 9	312	10	36	48	55	1432	33%	38%	1500	$2,362,500
289	Dover	Spaulding	NB	10360	25	12.3	14.3	2638	Exit 11	Exit 9	312	16	140	225	261	992	33%	38%	1500	$7,770,000
292	Rochester	Spaulding	NB	3880	25	16.2	16.9	2638	Exit 11	Exit 9	312	40	90	180	265	366	22%	32%	1600	$2,910,000

Source: VHB, 2017.

Table 7. All Study Areas Evaluated

Barrier #	City/Town	Road	Side	Barrier Length (ft)	Barrier Height (ft)	MP Start	MP End	Peak Hour Traffic	Between Exits		Distance to Impact (ft)	Impacts	10 dB Insertion Loss	7-9 dB Insertion Loss	5-7 dB Insertion Loss	DEI	% Housing Units Built After 1995	% Housing Units Built Before Highway	DEI Criteria	Cost ($30/SF)
1	Nashua	FEET	SB	2880	25	38.8	39.4	8628	Exit 1	Exit 2	462	72	0	60	140	514	15%	5%	1500	
2	Nashua	FEET	NB	5030	25	0.5	1.5	8628	Exit 1	Exit 2	462	96	168	408	612	205	7%	8%	1500	$3,772,500
3	Nashua	FEET	SB	5180	25	36.2	37.1	11548	Exit 5	Exit 4	512	38	137	184	219	591	25%	15%	1500	$3,885,000
4	Nashua	FEET	NB	2760	25	2.0	2.5	10119	Exit 3	Exit 2	492	25	0	3	29	2379	5%	59%	1700	
5	Nashua	FEET	NB	3570	25	2.6	3.3	11548	Exit 5	Exit 4	512	53	46	92	179	499	5%	59%	1700	
6	Nashua	FEET	NB	1000	25	3.3	4.1	11548	Exit 5	Exit 4	512	89	119	183	257	428	6%	65%	1700	
7	Nashua	FEET	NB	2250	25	4.1	4.5	11548	Exit 5	Exit 4	512	24	23	40	88	639	6%	65%	1700	$1,687,500
8	Nashua	FEET	SB	2150	25	32.8	33.2	10864	Exit 7	Exit 6	482	241	0	241	277	194	4%	33%	1600	
9	Nashua	FEET	NB	3120	25	6.3	6.9	11024	Exit 7	Exit 8	502	23	16	39	70	1114	2%	73%	1700	
10	Nashua	FEET	SB	2810	25	31.9	32.5	11024	Exit 7	Exit 8	502	90	80	140	240	293	9%	5%	1500	
11	Nashua	FEET	NB	4310	25	6.8	7.6	11024	Exit 7	Exit 8	502	37	49	103	173	623	7%	37%	1600	$3,232,500
12	Nashua	FEET	SB	2700	15	31.1	31.6	7669	Exit 10	Exit 8	382	4	3	12	23	1761	9%	5%	1500	
13	Merrimack	FEET	SB	3970	25	28.3	29.0	6497	Exit 10	Exit 11	362	25	83	118	150	662	15%	14%	1500	
14	Merrimack	FEET	NB	2580	25	10.7	11.2	6577	Exit 12	Exit 11	322	66	78	120	147	439	18%	26%	1600	
15	Merrimack	FEET	NB	3750	25	11.2	11.8	6577	Exit 12	Exit 11	322	20	42	72	86	1090	18%	26%	1600	
16	Merrimack	FEET	SB	250	10	27.1	27.2	6577	Exit 12	Exit 11	322	12	0	0	4	1500	15%	14%	1500	
17	Merrimack	FEET	SB	2100	15	27.2	27.6	6577	Exit 12	Exit 11	322	0	0	8	56	563	15%	14%	1500	
18	Merrimack	FEET	NB	3270	25	11.9	12.6	6577	Exit 12	Exit 11	322	20	38	71	83	985	18%	26%	1600	
19	Merrimack	FEET	SB	3440	25	26.0	26.7	6577	Exit 12	Exit 11	322	0	0	0	27	3185	7%	11%	1500	
20	Merrimack	FEET	NB	2690	25	13.6	14.1	6577	Exit 12	Exit 11	322	10	12	31	47	1431	18%	26%	1600	
21	Merrimack	FEET	SB	2470	15	25.5	26.0	6577	Exit 12	Exit 11	322	7	1	9	23	1611	7%	11%	1500	
22	Merrimack	FEET	NB	2210	15	14.6	15.0	6577	Exit 12	Exit 11	322	10	0	11	26	1275	18%	26%	1600	
23	Merrimack	FEET	SB	4790	25	24.5	25.4	6577	Exit 12	Exit 11	322	19	72	103	125	958	7%	11%	1500	
24	Merrimack	FEET	NB	1890	10	15.0	15.3	5617	Exit 12	Exit 2	352	4	0	3	6	3150	18%	26%	1600	
25	Merrimack	FEET	SB	3150	25	23.9	24.5	5617	Exit 12	Exit 2	352	15	26	51	85	926	7%	11%	1500	
26	Merrimack	FEET	NB	1870	25	15.6	16.0	5617	Exit 12	Exit 2	352	52	40	92	120	390	18%	26%	1600	
27	Bedford	FEET	SB	4030	15	20.5	21.3	5617	Exit 12	Exit 2	352	5	6	19	33	1832	40%	16%	1400	
28	Manchester	FEET	NB	7740	10	19.9	21.1	7637	Exit 3	Exit 4	382	0	20	111	160	484	14%	56%	1700	
29	Manchester	FEET	SB	1610	15	18.9	19.2	7637	Exit 3	Exit 4	382	9	3	8	16	1509	18%	35%	1600	$724,500
30	Manchester	FEET	SB	650	25	18.7	18.8	7637	Exit 3	Exit 4	382	1	0	0	1	16250	18%	35%	1600	
31	Manchester	FEET	SB	850	25	18.4	18.7	7637	Exit 3	Exit 4	382	64	10	57	92	231	8%	62%	1700	
32	Manchester	FEET	SB	700	25	18.2	18.3	7637	Exit 3	Exit 4	382	31	0	10	14	1250	8%	62%	1700	
33	Manchester	FEET	NB	1780	25	21.6	21.9	6301	Exit 5	Exit 4	312	0	0	0	2	22250	8%	71%	1700	
34	Manchester	FEET	SB	2230	25	17.1	17.9	5595	Exit 5	Exit 6	302	109	431	521	658	147	5%	67%	1700	
35	Manchester	FEET	SB	3040	15	16.1	16.7	5595	Exit 5	Exit 6	302	0	0	69	116	393	2%	89%	1800	
36	Manchester	FEET	SB	4630	25	15.1	16.0	4168	Exit 7	Exit 6	272	9	111	167	216	536	25%	15%	1500	
37	Manchester	FEET	NB	4700	20	24.0	24.8	3794	Exit 7	Exit 10	312	10	1	50	65	1446	15%	11%	1500	

Barrier #	City/Town	Road	Side	Barrier Length (ft)	Barrier Height (ft)	MP Start	MP End	Peak Hour Traffic	Between Exits		Distance to Impact (ft)	Impacts	10 dB Insertion Loss	7-9 dB Insertion Loss	5-7 dB Insertion Loss	DEI	% Housing Units Built After 1995	% Housing Units Built Before Highway	DEI Criteria	Cost ($30/SF)
38	Manchester	FEET	NB	7480	25	24.9	26.3	3794	Exit 7	Exit 10	312	72	742	771	819	228	15%	11%	1500	
39	Hooksett	I-93	NB	4990	15	28.1	29.0	5924	Exit 11	Exit 10	312	0	3	18	59	1269	19%	38%	1600	
40	Hooksett	I-93	NB	1870	25	30.0	30.4	7520	Exit 1	Exit 1A	402	0	0	0	1	46750	19%	38%	1600	
41	Hooksett	I-93	NB	2290	25	30.6	31.0	7520	Exit 1	Exit 1A	402	0	0	0	3	19083	19%	38%	1600	
42	Hooksett	I-93	SB	2100	20	8.2	8.6	7520	Exit 1	Exit 1A	402	17	19	25	30	1400	19%	38%	1600	$1,260,000
43	Bow	I-93	NB	3460	15	32.6	33.2	7520	Exit 1	Exit 1A	402	0	0	1	9	5767	18%	24%	1500	
44	Bow	I-93	NB	1590	10	34.1	34.4	7520	Exit 1	Exit 1A	402	2	0	0	2	7950	18%	24%	1500	
45	Bow	I-93	SB	4450	15	3.0	3.8	7520	Exit 1	Exit 1A	402	7	5	22	47	1420	18%	24%	1500	
46	Bow	I-93	NB	4320	10	35.4	36.2	7520	Exit 1	Exit 1A	402	15	3	21	30	1440	18%	24%	1500	$1,296,000
47	Concord	I-93	SB	4130	25	2.0	2.8	7372	Exit 13	Exit 12	402	0	0	0	2	51625	4%	73%	1700	
48	Concord	I-93	NB	1660	25	37.6	37.9	7372	Exit 13	Exit 12	402	0	0	0	1	41500	5%	82%	1800	
49	Concord	I-93	NB	2840	25	39.9	40.4	5404	Exit 15	Exit 16	302	11	21	44	57	1246	24%	21%	1500	$2,130,000
50	Concord	I-93	NB	3400	25	40.4	41.0	4446	Exit 17	Exit 16	322	0	2	6	52	1635	24%	21%	1500	
51	Concord	I-93	NB	3460	10	41.3	41.9	4446	Exit 17	Exit 16	322	0	0	0	8	4325	24%	21%	1500	
52	Concord	I-93	NB	3990	10	41.9	42.7	4446	Exit 17	Exit 16	322	0	0	0	10	3990	24%	21%	1500	
53	Concord	I-93	NB	3340	25	42.7	43.3	4446	Exit 17	Exit 16	322	0	0	4	16	5219	24%	21%	1500	
54	Concord	I-93	NB	5000	15	43.1	44.1	4446	Exit 17	Exit 16	322	0	1	13	31	2419	24%	21%	1500	
55	Canterbury	I-93	NB	3200	15	44.6	45.8	3572	Exit 17	Exit 18	302	0	0	12	37	1297	24%	21%	1500	
56	Canterbury	I-93	NB	6000	10	44.0	44.6	3572	Exit 17	Exit 18	302	1	6	17	30	2000	23%	32%	1600	
57	Canterbury	I-93	NB	3970	10	50.1	50.9	4344	Exit 19	Exit 18	342	0	0	0	4	9925	23%	32%	1600	
58	Northfield	I-93	NB	4240	10	50.7	51.6	4344	Exit 19	Exit 18	342	1	1	7	11	3855	18%	32%	1600	
59	Northfield	I-93	SB	8330	10	78.8	80.4	4344	Exit 19	Exit 18	342	9	13	38	50	1666	18%	32%	1600	
60	Northfield	I-93	SB	7160	10	77.7	79.1	4344	Exit 19	Exit 18	342	2	1	11	16	4475	18%	32%	1600	
61	Northfield	I-93	NB	3360	10	54.3	55.0	3907	Exit 19	Exit 20	332	2	5	11	25	1344	18%	32%	1600	$1,008,000
62	Northfield	I-93	NB	5180	15	55.1	56.1	3907	Exit 19	Exit 20	332	2	14	21	46	1689	18%	32%	1600	
63	Northfield	I-93	SB	6010	25	75.8	76.9	3907	Exit 19	Exit 20	332	25	56	128	208	722	18%	32%	1600	$4,507,500
64	Tilton	I-93	SB	3370	15	74.1	74.8	3505	Exit 22	Exit 20	322	0	0	4	24	2106	18%	45%	1600	
65	Tilton	I-93	SB	6120	10	72.7	73.9	3505	Exit 22	Exit 20	322	0	0	4	14	4371	18%	45%	1600	
66	Sanbornton	I-93	SB	4050	15	71.1	71.9	3505	Exit 22	Exit 20	322	0	1	5	12	5063	18%	35%	1600	
67	Sanbornton	I-93	SB	2800	10	70.7	71.2	3505	Exit 22	Exit 23	322	0	0	0	5	5600	18%	35%	1600	
68	Sanbornton	I-93	SB	1500	15	70.4	70.7	3505	Exit 22	Exit 23	322	1	0	0	2	11250	18%	35%	1600	
69	Sanbornton	I-93	NB	4360	15	61.4	62.2	3505	Exit 22	Exit 23	322	0	0	7	13	5031	18%	35%	1600	
70	Sanbornton	I-93	SB	4310	15	68.4	69.3	3505	Exit 22	Exit 23	322	0	0	9	16	4041	18%	35%	1600	
71	Sanbornton	I-93	NB	3220	15	63.3	63.9	3505	Exit 22	Exit 23	322	0	1	2	6	8050	18%	35%	1600	
72	Sanbornton	I-93	NB	3850	15	63.7	64.5	3505	Exit 22	Exit 23	322	0	0	0	6	9625	18%	35%	1600	
73	Sanbornton	I-93	SB	5230	15	66.8	67.8	3505	Exit 22	Exit 23	322	0	2	4	10	7845	18%	35%	1600	
74	Sanbornton	I-93	NB	5160	15	64.2	65.2	3505	Exit 22	Exit 23	322	0	1	7	19	4074	18%	35%	1600	
75	Sanbornton	I-93	NB	3890	15	65.1	65.9	3505	Exit 22	Exit 23	322	2	2	6	11	5305	18%	35%	1600	
76	New	I-93	SB	3310	10	63.4	64.1	3505	Exit 22	Exit 23	322	2	5	8	14	2364	23%	33%	1600	

Barrier #	City/Town	Road	Side	Barrier Length (ft)	Barrier Height (ft)	MP Start	MP End	Peak Hour Traffic	Between Exits		Distance to Impact (ft)	Impacts	10 dB Insertion Loss	7-9 dB Insertion Loss	5-7 dB Insertion Loss	DEI	% Housing Units Built After 1995	% Housing Units Built Before Highway	DEI Criteria	Cost ($30/SF)
77	New	I-93	NB	1980	25	69.5	69.9	3077	Exit 24	Exit 23	312	0	0	0	3	16500	23%	33%	1600	
78	New	I-93	SB	7150	10	59.0	60.4	3077	Exit 24	Exit 23	312	13	18	39	42	1702	23%	33%	1600	
79	New	I-93	NB	3290	15	72.8	73.5	3077	Exit 24	Exit 23	312	0	1	5	8	6169	23%	33%	1600	
80	New	I-93	NB	8500	10	73.3	74.9	3077	Exit 24	Exit 23	312	2	0	21	41	2073	23%	33%	1600	
81	Ashland	I-93	SB	7230	10	54.3	55.6	2747	Exit 24	Exit 25	302	0	7	15	18	4017	15%	43%	1600	
82	Ashland	I-93	SB	6390	10	53.0	54.2	2747	Exit 24	Exit 25	302	1	11	15	20	3195	15%	43%	1600	
83	Ashland	I-93	NB	2580	25	78.5	79.0	2747	Exit 24	Exit 25	302	1	2	4	14	4607	15%	43%	1600	
84	Holderness	I-93	NB	2770	15	79.1	79.6	2747	Exit 24	Exit 25	302	0	0	2	8	5194	15%	43%	1600	
85	Plymouth	I-93	SB	2880	10	50.2	50.7	2692	Exit 26	Exit 27	292	0	0	3	12	2400	9%	40%	1600	
86	Plymouth	I-93	NB	2950	25	81.3	81.9	2692	Exit 26	Exit 27	292	1	1	3	14	5268	9%	40%	1600	
87	Campton	I-93	NB	2310	15	82.0	82.5	2692	Exit 26	Exit 27	292	2	0	3	6	5775	20%	29%	1600	
88	Campton	I-93	SB	4230	15	49.0	49.8	2692	Exit 26	Exit 27	292	0	7	10	19	3339	20%	29%	1600	
89	Campton	I-93	NB	4680	10	82.4	83.3	2692	Exit 26	Exit 27	292	0	7	15	16	2925	20%	29%	1600	
90	Campton	I-93	SB	3450	15	48.4	49.1	2692	Exit 26	Exit 27	292	0	0	4	10	5175	20%	29%	1600	
91	Campton	I-93	NB	3780	10	83.2	83.9	2692	Exit 26	Exit 27	292	0	5	11	14	2700	20%	29%	1600	
92	Campton	I-93	SB	3370	15	47.9	48.5	2516	Exit 28	Exit 27	292	0	0	6	11	4595	20%	29%	1600	
93	Campton	I-93	NB	2840	15	85.0	85.6	2516	Exit 28	Exit 27	292	0	0	0	13	3277	20%	29%	1600	
94	Thornton	I-93	SB	2780	15	42.5	43.1	1758	Exit 30	Exit 29	272	0	0	0	8	5213	16%	9%	1500	
95	Thornton	I-93	NB	2970	15	89.0	89.6	1758	Exit 30	Exit 29	272	0	0	6	16	2784	16%	9%	1500	
96	Thornton	I-93	NB	5350	15	90.1	91.1	1758	Exit 30	Exit 29	272	0	3	16	29	2767	16%	9%	1500	
97	Thornton	I-93	NB	2610	10	91.4	91.9	1758	Exit 30	Exit 29	272	0	0	3	5	5220	16%	9%	1500	
98	Thornton	I-93	NB	4320	10	92.3	93.1	1758	Exit 30	Exit 29	272	0	0	9	20	2160	16%	9%	1500	
99	Thornton	I-93	NB	3830	10	93.0	93.6	1758	Exit 30	Exit 29	272	0	7	15	19	2016	16%	9%	1500	
100	Woodstock	I-93	SB	2000	10	37.3	37.7	1758	Exit 30	Exit 29	272	0	0	0	0	INF	17%	30%	1600	
101	Woodstock	I-93	NB	2610	15	94.4	94.9	1758	Exit 30	Exit 29	272	0	0	6	32	1223	17%	30%	1600	
102	Woodstock	I-93	NB	4500	15	95.2	96.1	1744	Exit 30	Exit 31	272	0	3	7	21	3214	17%	30%	1600	
103	Woodstock	I-93	SB	7610	10	32.8	34.3	1744	Exit 32	Exit 31	272	0	15	37	41	1856	17%	30%	1600	
104	Woodstock	I-93	SB	1240	10	31.4	31.7	1744	Exit 32	Exit 31	272	0	0	0	0	INF	17%	30%	1600	
105	Woodstock	I-93	SB	4180	15	30.7	31.5	1530	Exit 32	Exit 33	262	0	0	22	54	1161	17%	30%	1600	
106	Lincoln	I-93	NB	4660	25	100.9	101.8	1530	Exit 32	Exit 33	262	3	85	140	149	782	16%	9%	1500	$3,495,000
107	Lincoln	I-93	SB	2900	15	29.1	29.6	1325	Exit 34A	Exit 33	262	1	2	7	20	2175	16%	9%	1500	
108	Lincoln	I-93	NB	2430	15	102.8	103.3	1325	Exit 34A	Exit 33	262	0	1	17	29	1257	16%	9%	1500	
109	Lincoln	I-93	NB	1920	15	104.2	104.6	1325	Exit 34A	Exit 33	262	0	0	0	3	9600	16%	9%	1500	
110	Franconia	I-93	SB	3410	15	16.5	17.2	962	Exit 37	Exit 36	232	0	0	3	7	7307	21%	42%	1600	
111	Franconia	I-93	NB	4560	10	114.9	115.7	962	Exit 37	Exit 36	232	2	7	16	25	1824	21%	42%	1600	
112	Franconia	I-93	SB	2720	10	16.0	16.5	962	Exit 37	Exit 36	232	0	0	4	8	3400	21%	42%	1600	
113	Franconia	I-93	SB	4180	10	14.9	15.7	859	Exit 39	Exit 38	212	0	14	26	44	950	21%	42%	1600	
114	Franconia	I-93	NB	4580	10	115.9	116.8	859	Exit 39	Exit 38	212	0	0	14	21	2181	21%	42%	1600	
115	Franconia	I-93	SB	3630	15	14.3	15.0	859	Exit 39	Exit 38	212	0	0	0	22	2475	21%	42%	1600	

Barrier #	City/Town	Road	Side	Barrier Length (ft)	Barrier Height (ft)	MP Start	MP End	Peak Hour Traffic	Between Exits		Distance to Impact (ft)	Impacts	10 dB Insertion Loss	7-9 dB Insertion Loss	5-7 dB Insertion Loss	DEI	% Housing Units Built After 1995	% Housing Units Built Before Highway	DEI Criteria	Cost ($30/SF)
116	Sugar Hill	I-93	SB	8370	15	12.8	14.4	859	Exit 39	Exit 38	212	1	0	8	21	5979	21%	42%	1600	
117	Bethlehem	I-93	SB	2770	10	12.4	12.9	859	Exit 39	Exit 38	212	0	0	1	4	6925	21%	42%	1600	
118	LITTLETON	I-93	SB	2410	15	9.0	9.5	1134	Exit 41	Exit 42	212	0	0	0	6	6025	12%	52%	1700	
119	LITTLETON	I-93	SB	3450	10	8.3	8.9	1134	Exit 41	Exit 42	212	0	9	13	18	1917	12%	52%	1700	
120	LITTLETON	I-93	NB	10220	10	122.1	124.0	1134	Exit 41	Exit 42	212	0	36	76	145	705	12%	52%	1700	
121	LITTLETON	I-93	NB	2710	10	124.7	125.2	1040	Exit 43	Exit 42	192	0	8	12	12	2258	12%	52%	1700	
122	LITTLETON	I-93	SB	5500	15	3.3	4.3	1011	Exit 43	Exit 44	182	0	0	0	14	5893	12%	52%	1700	
123	LITTLETON	I-93	NB	3150	15	125.1	125.7	1040	Exit 43	Exit 42	192	0	0	1	5	9450	12%	52%	1700	
124	LITTLETON	I-93	NB	2510	10	127.4	127.8	1011	Exit 43	Exit 44	182	0	0	0	1	25100	12%	52%	1700	
125	LITTLETON	I-93	SB	4820	10	4.8	5.7	1011	Exit 43	Exit 44	182	0	0	3	7	6886	12%	52%	1700	
126	LITTLETON	I-93	NB	3720	15	126.1	126.8	1011	Exit 43	Exit 44	182	0	1	1	3	18600	12%	52%	1700	
127	LITTLETON	I-93	SB	2140	15	1.0	1.4	866	Exit 43	Exit 44	172	0	0	0	2	16050	12%	52%	1700	
128	Salem	I-93	NB	4230	25	0.1	0.9	7957	Exit 1	Exit 2	462	20	29	75	109	970	11%	28%	1600	
129	Salem	I-93	SB	6980	25	130.4	131.7	7957	Exit 1	Exit 2	462	15	98	130	135	1293	11%	28%	1600	
130	Salem	I-93	NB	3190	25	1.3	1.9	7957	Exit 1	Exit 2	462	5	18	44	73	1092	11%	28%	1600	
131	Salem	I-93	SB	1410	25	125.5	130.1	7375	Exit 1	Exit 2	392	0	0	0	22	1602	11%	28%	1600	
132	Salem	I-93	NB	2660	15	2.0	2.5	7375	Exit 1	Exit 2	392	1	1	5	22	1814	6%	52%	1700	
133	Salem	I-93	SB	3150	25	127.7	128.3	8501	Exit 3	Exit 2	422	14	11	29	50	1575	6%	52%	1700	
134	Salem	I-93	NB	4870	25	3.5	4.4	8501	Exit 3	Exit 2	422	15	47	64	72	1691	6%	52%	1700	
135	Windham	I-93	SB	3190	15	127.1	127.7	8501	Exit 3	Exit 2	422	8	0	6	16	2991	29%	24%	1400	
136	Windham	I-93	NB	4510	15	4.6	5.4	8501	Exit 3	Exit 2	422	0	2	16	37	1828	29%	24%	1400	
137	Windham	I-93	SB	3090	15	126.4	126.9	8501	Exit 3	Exit 2	422	10	5	24	37	1253	29%	24%	1400	
138	Windham	I-93	NB	4070	10	6.4	7.1	6718	Exit 3	Exit 4	342	0	9	20	27	1507	30%	12%	1400	
139	Windham	I-93	SB	3860	15	123.9	124.6	6718	Exit 3	Exit 4	342	0	1	12	28	2068	30%	12%	1400	
140	Windham	I-93	NB	3320	15	7.3	7.9	6718	Exit 3	Exit 4	342	0	0	13	22	2264	30%	12%	1400	
141	Windham	I-93	SB	3250	15	123.4	124.0	6718	Exit 3	Exit 4	342	2	9	13	23	2120	30%	12%	1400	
142	Windham	I-93	NB	3990	10	8.0	8.7	6718	Exit 3	Exit 4	342	1	1	7	13	3069	30%	12%	1400	
143	Derry	I-93	SB	7730	20	121.7	123.2	6718	Exit 3	Exit 4	342	6	65	98	107	1445	10%	19%	1500	
144	Derry	I-93	NB	3290	25	10.1	10.7	6718	Exit 3	Exit 4	342	24	27	87	162	508	10%	19%	1500	
145	Londonderry	I-93	SB	3290	20	120.4	121.1	6718	Exit 3	Exit 4	342	2	0	5	46	1430	13%	12%	1500	
146	Londonderry	I-93	NB	2120	10	11.7	12.1	7733	Exit 5	Exit 4	342	2	0	2	3	7067	11%	10%	1500	
147	Londonderry	I-93	NB	2570	15	12.2	12.7	7733	Exit 5	Exit 4	342	1	0	1	5	7710	32%	20%	1400	
148	Londonderry	I-93	SB	5110	10	118.7	119.6	7733	Exit 5	Exit 4	342	11	20	29	34	1503	11%	10%	1500	
149	Londonderry	I-93	NB	5080	15	12.8	13.8	7733	Exit 5	Exit 4	342	4	21	35	58	1314	32%	20%	1400	
150	Londonderry	I-93	SB	2990	15	117.4	117.9	7733	Exit 5	Exit 4	342	0	0	3	5	8970	32%	20%	1400	
151	Londonderry	I-93	NB	5410	15	14.1	15.1	7733	Exit 5	Exit 4	342	1	10	31	57	1424	32%	20%	1400	
152	Manchester	I-93	SB	4720	25	113.3	114.2	5840	Exit 5	Exit 6	312	21	93	137	175	674	15%	34%	1600	
153	Manchester	I-93	NB	8200	25	17.2	18.8	5840	Exit 5	Exit 6	312	3	276	381	416	493	28%	29%	1500	
154	Manchester	I-93	SB	2040	10	112.9	113.3	5840	Exit 5	Exit 6	312	0	0	0	0	INF	15%	34%	1600	

Barrier #	City/Town	Road	Side	Barrier Length (ft)	Barrier Height (ft)	MP Start	MP End	Peak Hour Traffic	Between Exits		Distance to Impact (ft)	Impacts	10 dB Insertion Loss	7-9 dB Insertion Loss	5-7 dB Insertion Loss	DEI	% Housing Units Built After 1995	% Housing Units Built Before Highway	DEI Criteria	Cost ($30/SF)
155	Manchester	I-93	NB	3510	25	18.9	19.5	5840	Exit 5	Exit 6	312	12	25	45	77	1140	28%	29%	1500	
156	Manchester	Route 101	WB	2840	25	0.0	0.3	7337	Exit 1	Exit 6	322	0	0	2	8	8875	7%	57%	1700	
157	Manchester	I-93	SB	3820	25	111.6	112.3	8985	Exit 7	Exit 6	482	64	81	145	242	395	7%	57%	1700	
158	Manchester	I-93	NB	3050	25	20.1	20.6	8985	Exit 7	Exit 6	482	40	48	134	314	243	28%	29%	1500	
159	Manchester	I-93	SB	8020	25	110.5	111.6	7658	Exit 7	Exit 8	352	30	170	322	390	514	7%	57%	1700	
160	Manchester	I-93	SB	1960	15	109.9	110.3	7658	Exit 7	Exit 8	352	2	0	3	15	1960	7%	57%	1700	
161	Manchester	I-93	NB	4060	25	22.1	22.9	6725	Exit 9	Exit 8	372	12	60	95	130	781	27%	3%	1400	$3,045,000
162	Manchester	I-93	SB	4580	25	108.9	109.7	6725	Exit 9	Exit 8	372	140	384	509	591	194	6%	30%	1600	$3,435,000
163	Manchester	I-93	SB	2490	25	108.4	108.8	6725	Exit 9	Exit 8	372	29	29	68	118	528	6%	30%	1600	$1,867,500
164	Manchester	I-93	NB	1370	10	23.2	23.4	6725	Exit 9	Exit 8	372	6	0	1	7	1957	27%	3%	1400	
165	Hooksett	I-93	NB	2940	15	24.1	24.6	5704	Exit 9	Exit 10	352	4	7	14	27	1633	22%	30%	1600	
166	Manchester	I-93	SB	4430	25	107.0	107.8	5704	Exit 9	Exit 10	352	4	43	97	155	715	7%	36%	1600	$3,322,500
167	Bedford	Route 101	WB	2990	25	59.0	59.6	3772	Exit 3	Exit 2	262	11	23	52	96	779	18%	35%	1600	
168	Bedford	Route 101	EB	3580	10	52.6	53.2	3772	Exit 3	Exit 2	262	5	8	15	23	1557	40%	16%	1400	
169	Bedford	Route 101	EB	3190	25	53.2	53.8	3772	Exit 3	Exit 2	262	6	22	69	113	706	40%	16%	1400	$2,392,500
170	Manchester	Route 101	WB	6330	25	2.0	3.2	8782	Exit 1	Exit 2	342	40	198	363	417	379	14%	56%	1700	
171	Manchester	Route 101	EB	3750	25	9.7	10.4	8782	Exit 1	Exit 2	342	27	89	123	146	642	15%	34%	1600	
172	Manchester	Route 101	EB	3510	25	11.0	11.7	7337	Exit 1	Exit 6	322	8	32	52	82	1070	15%	34%	1600	
173	Manchester	Route 101	WB	2600	25	0.4	0.9	7337	Exit 1	Exit 6	322	2	25	35	51	1275	7%	57%	1700	$1,950,000
174	Manchester	Route 101	WB	1260	25	0.9	1.4	7337	Exit 1	Exit 6	322	11	22	46	61	1066	9%	50%	1600	
175	Manchester	Route 101	EB	5100	25	59.5	60.4	4803	Exit 7	Exit 1	292	7	103	202	243	525	28%	29%	1500	
176	Manchester	Route 101	WB	2800	25	51.2	51.8	4803	Exit 7	Exit 1	292	18	19	50	95	737	27%	3%	1400	
177	Manchester	Route 101	EB	2500	15	60.6	61.1	4803	Exit 7	Exit 1	292	16	16	28	33	1136	28%	29%	1500	
178	Auburn	Route 101	EB	2320	25	61.1	61.5	5870	Exit 2	Exit 1	312	23	25	37	49	1184	18%	30%	1600	
179	Auburn	Route 101	WB	5740	20	49.9	51.0	5870	Exit 2	Exit 1	312	25	39	56	72	1594	18%	30%	1600	
180	Auburn	Route 101	EB	2000	15	61.6	62.0	5870	Exit 2	Exit 1	312	11	3	15	24	1250	18%	30%	1600	$900,000
181	Auburn	Route 101	WB	3320	15	49.2	49.9	5870	Exit 2	Exit 1	312	0	1	4	10	4980	18%	30%	1600	
182	Auburn	Route 101	EB	3990	10	62.4	63.2	5035	Exit 2	Exit 3	302	2	1	11	21	1900	18%	30%	1600	
183	Candia	Route 101	WB	2180	10	47.6	48.0	5035	Exit 2	Exit 3	302	2	0	4	8	2725	14%	34%	1600	
184	Candia	Route 101	EB	7840	10	63.7	65.1	5035	Exit 2	Exit 3	302	4	13	31	48	1633	14%	34%	1600	
185	Candia	Route 101	WB	2820	15	46.7	47.2	5035	Exit 2	Exit 3	302	1	0	1	9	4700	14%	34%	1600	
186	Candia	Route 101	WB	3300	15	46.1	46.7	5035	Exit 2	Exit 3	302	0	0	0	3	16500	14%	34%	1600	
187	Candia	Route 101	EB	3060	10	65.3	65.9	5035	Exit 2	Exit 3	302	0	0	5	8	3825	14%	34%	1600	
188	Candia	Route 101	EB	4030	15	66.6	67.3	4362	Exit 4	Exit 3	282	0	0	3	8	7556	14%	34%	1600	
189	Candia	Route 101	EB	3450	10	67.2	67.8	4362	Exit 4	Exit 3	282	0	0	4	6	5750	14%	34%	1600	
190	Candia	Route 101	EB	6610	10	67.8	69.1	4362	Exit 4	Exit 3	282	0	4	8	16	4131	14%	34%	1600	
191	Raymond	Route 101	EB	9820	10	69.0	70.8	4362	Exit 4	Exit 3	282	1	0	26	67	1466	33%	11%	1400	
192	Raymond	Route 101	WB	4540	10	40.9	41.8	4362	Exit 4	Exit 3	282	1	20	32	41	1107	33%	11%	1400	$1,362,000
193	Raymond	Route 101	EB	6020	10	70.9	72.0	4362	Exit 4	Exit 3	282	3	5	23	43	1400	33%	11%	1400	$1,806,000

Barrier #	City/Town	Road	Side	Barrier Length (ft)	Barrier Height (ft)	MP Start	MP End	Peak Hour Traffic	Between Exits		Distance to Impact (ft)	Impacts	10 dB Insertion Loss	7-9 dB Insertion Loss	5-7 dB Insertion Loss	DEI	% Housing Units Built After 1995	% Housing Units Built Before Highway	DEI Criteria	Cost ($30/SF)
194	Raymond	Route 101	EB	3530	15	72.1	72.8	4493	Exit 4	Exit 5	332	0	0	8	24	2206	24%	32%	1600	
195	Raymond	Route 101	EB	3530	20	73.2	73.9	4493	Exit 4	Exit 5	332	4	9	28	45	1569	24%	32%	1600	$2,118,000
196	Raymond	Route 101	WB	4210	20	37.2	38.0	4788	Exit 6	Exit 5	352	8	14	33	56	1504	24%	32%	1600	$2,526,000
197	Epping	Route 101	WB	2700	10	36.1	36.6	4788	Exit 6	Exit 5	352	4	0	4	9	3000	32%	22%	1400	
198	Epping	Route 101	WB	4680	15	33.5	34.4	4880	Exit 6	Exit 7	352	1	0	16	52	1350	32%	22%	1400	
199	Brentwood	Route 101	EB	2540	25	80.3	80.8	4448	Exit 8	Exit 7	342	0	0	0	3	21167	39%	20%	1400	
200	Exeter	Route 101	WB	3630	10	29.6	30.3	4338	Exit 8	Exit 9	342	0	0	3	13	2792	25%	34%	1600	
201	Exeter	Route 101	EB	2440	10	85.2	85.6	4946	Exit 10	Exit 11	352	1	0	2	6	4067	25%	34%	1600	
202	Exeter	Route 101	EB	141	15	87.7	87.9	4844	Exit 12	Exit 11	352	10	6	9	13	1385	18%	49%	1600	
203	Exeter	Route 101	WB	4060	25	23.5	24.2	4844	Exit 12	Exit 11	352	1	22	56	95	1068	18%	49%	1600	
204	Exeter	Route 101	EB	6000	25	87.9	88.7	4844	Exit 12	Exit 11	352	9	64	109	145	1034	18%	49%	1600	$4,500,000
205	Hampton	Route 101	EB	4740	10	89.9	90.8	4567	Exit 2	Exit 13	452	5	6	14	20	2370	21%	39%	1600	
206	Bow	I-89	SB	2560	15	59.9	60.4	4225	Exit 2	Exit 1A	332	0	0	3	5	7680	27%	12%	1400	
207	Concord	I-89	SB	2850	15	59.3	59.9	4225	Exit 2	Exit 1A	332	0	0	0	3	14250	16%	61%	1700	
208	Concord	I-89	SB	2630	10	58.8	59.3	4225	Exit 2	Exit 1A	332	1	0	2	3	8767	16%	61%	1700	
209	Concord	I-89	SB	8410	15	55.9	57.5	4107	Exit 4	Exit 3	332	1	0	5	17	7421	16%	61%	1700	
210	Hopkinton	I-89	SB	7190	10	54.1	55.5	4107	Exit 4	Exit 3	332	1	1	15	24	2996	18%	43%	1600	
211	Hopkinton	I-89	NB	1650	25	7.6	7.9	3222	Exit 4	Exit 5	312	1	1	1	4	10313	18%	43%	1600	
212	Hopkinton	I-89	SB	3310	10	52.6	53.3	3222	Exit 4	Exit 5	312	0	0	4	7	4729	18%	43%	1600	
213	Hopkinton	I-89	NB	5470	10	8.5	9.5	2489	Exit 6	Exit 5	282	0	7	14	15	3647	18%	43%	1600	
214	Hopkinton	I-89	NB	5520	10	9.5	10.6	2489	Exit 6	Exit 5	282	0	0	9	18	3067	18%	43%	1600	
215	Hopkinton	I-89	NB	2650	15	11.6	12.1	2297	Exit 6	Exit 7	282	0	0	3	8	4969	18%	43%	1600	
216	Hopkinton	I-89	SB	3550	15	48.9	49.6	2297	Exit 6	Exit 7	282	1	0	2	9	5917	18%	43%	1600	
217	Hopkinton	I-89	NB	4240	20	12.1	12.9	2297	Exit 6	Exit 7	282	1	17	40	59	1437	18%	43%	1600	$2,544,000
218	Warner	I-89	NB	4000	10	16.2	16.9	2745	Exit 8	Exit 7	302	0	2	4	8	5000	22%	40%	1600	
219	Warner	I-89	SB	7050	10	42.9	44.3	2745	Exit 8	Exit 7	302	0	8	23	31	2274	22%	40%	1600	
220	Warner	I-89	NB	9280	15	17.4	19.2	2544	Exit 8	Exit 9	292	1	48	100	112	1243	22%	40%	1600	$4,176,000
221	Warner	I-89	NB	6090	15	20.2	21.3	2488	Exit 10	Exit 9	302	0	0	4	18	5075	22%	40%	1600	
222	Sutton	I-89	NB	5210	15	26.0	27.0	2488	Exit 10	Exit 9	302	0	0	0	10	7815	22%	39%	1600	
223	Sutton	I-89	SB	5370	15	33.4	34.5	2488	Exit 10	Exit 9	302	0	8	15	25	3222	22%	39%	1600	
224	Sutton	I-89	NB	4420	10	28.8	29.6	2343	Exit 10	Exit 11	292	0	0	2	8	5525	22%	39%	1600	
225	Sutton	I-89	NB	3830	15	29.6	30.4	2343	Exit 10	Exit 11	292	0	6	11	19	3024	22%	39%	1600	
226	New London	I-89	NB	2540	10	30.8	31.3	2343	Exit 10	Exit 11	292	0	0	0	6	4233	15%	35%	1600	
227	New London	I-89	NB	4220	10	32.3	33.1	2390	Exit 12	Exit 11	292	0	5	9	9	4689	15%	35%	1600	
228	New London	I-89	SB	4100	15	28.0	28.8	2390	Exit 12	Exit 11	292	0	0	4	11	5591	15%	35%	1600	
229	New London	I-89	SB	4000	15	27.3	28.1	2390	Exit 12	Exit 11	292	0	0	7	13	4615	15%	35%	1600	
230	New London	I-89	NB	4090	10	34.1	34.9	2390	Exit 12	Exit 11	292	0	0	0	6	6817	15%	35%	1600	
231	New London	I-89	NB	3870	10	34.9	35.6	2390	Exit 12	Exit 11	292	1	1	6	9	4300	15%	35%	1600	
232	Grantham	I-89	SB	4890	10	19.6	20.5	2323	Exit 13	Exit 12A	292	0	0	8	24	2038	27%	14%	1400	

Barrier #	City/Town	Road	Side	Barrier Length (ft)	Barrier Height (ft)	MP Start	MP End	Peak Hour Traffic	Between Exits		Distance to Impact (ft)	Impacts	10 dB Insertion Loss	7-9 dB Insertion Loss	5-7 dB Insertion Loss	DEI	% Housing Units Built After 1995	% Housing Units Built Before Highway	DEI Criteria	Cost ($30/SF)
233	Grantham	I-89	NB	3300	15	42.7	43.3	2323	Exit 13	Exit 12A	292	1	1	5	19	2605	27%	14%	1400	
234	Grantham	I-89	NB	5770	10	44.5	45.6	2110	Exit 13	Exit 14	272	0	9	20	31	1861	27%	14%	1400	
235	Grantham	I-89	SB	8420	10	13.4	15.0	2110	Exit 13	Exit 14	272	4	9	20	21	4010	27%	14%	1400	
236	Enfield	I-89	SB	4910	10	8.5	9.4	2322	Exit 15	Exit 16	282	0	0	4	9	5456	14%	41%	1600	
237	Lebanon	I-89	NB	5750	10	53.0	54.1	2626	Exit 17	Exit 16	292	0	12	18	18	3194	11%	53%	1700	
238	Lebanon	I-89	SB	2590	10	5.7	6.2	3190	Exit 17	Exit 18	312	13	0	9	22	1177	29%	34%	1500	$1,165,500
239	Lebanon	I-89	NB	4340	15	55.1	55.9	3190	Exit 17	Exit 18	312	5	10	18	32	2034	29%	34%	1500	
240	Lebanon	I-89	SB	4490	25	5.0	5.8	3190	Exit 17	Exit 18	312	33	106	123	126	891	29%	34%	1500	$3,367,500
241	Lebanon	I-89	SB	1900	15	4.6	5.0	3190	Exit 17	Exit 18	312	0	0	4	15	1900	29%	34%	1500	
242	Lebanon	I-89	SB	2970	25	3.9	4.4	3808	Exit 19	Exit 18	332	25	79	151	218	341	11%	53%	1700	$2,227,500
243	Lebanon	I-89	SB	2600	25	3.0	3.5	3808	Exit 19	Exit 18	332	8	11	34	77	844	11%	53%	1700	$1,950,000
244	Concord	I-393	EB	2500	15	0.0	0.5	4579	Exit 1	Exit 14	292	0	0	6	25	1500	6%	77%	1800	
245	Concord	I-393	WB	5640	25	2.6	3.6	3583	Exit 3	Exit 2	262	8	49	92	104	1356	24%	21%	1500	$4,230,000
246	Concord	I-393	EB	5480	10	1.2	2.2	3583	Exit 3	Exit 2	262	0	0	69	139	394	12%	24%	1500	
247	Concord	I-393	EB	3650	10	2.1	2.8	3583	Exit 3	Exit 2	262	0	0	6	10	3650	12%	24%	1500	
248	Concord	I-393	WB	2650	25	1.2	1.7	3583	Exit 3	Exit 2	262	0	0	1	4	16563	24%	21%	1500	
249	Concord	I-393	WB	3750	10	0.6	1.3	1659	Exit 3	Exit 2	212	0	4	12	14	2679	24%	21%	1500	
250	Chichester	I-393	EB	3060	15	4.0	4.6	1659	Exit 3	Exit 2	212	0	0	2	7	6557	23%	26%	1600	
251	Seabrook	I-95	NB	2640	25	0.3	0.8	10107	Exit 2	Exit 1	582	48	19	49	91	725	22%	20%	1500	
252	Seabrook	I-95	NB	4680	15	1.1	2.0	8675	Exit 2	Exit 1	492	9	19	41	61	1151	22%	20%	1500	$2,106,000
253	Hampton	I-95	NB	2010	10	2.2	2.5	8675	Exit 2	Exit 1	492	7	0	3	8	2513	23%	40%	1600	
254	Hampton	I-95	SB	6540	10	13.0	14.2	8675	Exit 2	Exit 1	492	11	8	20	42	1557	23%	40%	1600	$1,962,000
255	Hampton	I-95	SB	2400	10	11.5	12.0	8675	Exit 2	Exit 1	492	8	1	6	12	2000	21%	39%	1600	
256	Hampton	Route 101	WB	800	15	20.2	20.6	1791	Exit 2	Exit 13	252	2	4	9	16	1875	21%	39%	1600	
257	Hampton	Route 101	WB	1180	10	20.7	20.9	1791	Exit 2	Exit 13	252	0	0	0	0	INF	21%	39%	1600	
258	North	I-95	SB	5160	10	7.4	8.3	9962	Exit 2	Exit 3	482	17	2	23	30	1720	24%	32%	1600	
259	Greenland	I-95	NB	6540	15	8.8	10.1	9962	Exit 2	Exit 3	482	15	26	52	75	1308	21%	33%	1600	$2,943,000
260	Greenland	I-95	SB	5960	20	6.2	7.3	9962	Exit 2	Exit 3	482	7	16	42	80	1490	21%	33%	1600	$3,576,000
261	Greenland	I-95	NB	2740	25	10.0	10.5	9962	Exit 2	Exit 3	482	20	16	28	52	1317	21%	33%	1600	$2,055,000
262	Greenland	I-95	SB	3240	25	5.7	6.3	9962	Exit 2	Exit 3	482	17	16	32	64	1266	21%	33%	1600	$2,430,000
263	Portsmouth	I-95	NB	1960	15	12.9	13.3	10268	Exit 4	Exit 3	542	15	8	14	18	1633	9%	74%	1700	$882,000
264	Portsmouth	I-95	SB	2820	25	2.6	3.1	10268	Exit 4	Exit 3	542	46	27	69	133	530	9%	74%	1700	$2,115,000
265	Portsmouth	I-95	NB	1790	25	14.1	14.4	10268	Exit 4	Exit 5	482	0	0	0	5	8950	9%	74%	1700	
266	Portsmouth	I-95	NB	2260	15	14.8	15.2	5387	Exit 6	Exit 7	392	4	0	3	9	3767	7%	84%	1800	
267	Portsmouth	I-95	SB	3480	25	0.9	1.6	5387	Exit 6	Exit 7	392	21	58	75	83	1048	12%	41%	1600	$2,610,000
268	Portsmouth	I-95	NB	1630	25	15.1	15.4	5387	Exit 6	Exit 7	392	6	1	11	31	1315	7%	84%	1800	$1,222,500
269	Portsmouth	I-95	NB	1460	15	15.4	15.7	5387	Exit 6	Exit 7	392	9	0	3	9	2433	7%	84%	1800	
270	Portsmouth	I-95	SB	1340	25	0.5	0.8	11312	Exit 6	Exit 7	502	3	0	0	5	6700	12%	41%	1600	
271	Portsmouth	I-95	SB	2020	25	0.2	0.5	11312	Exit 6	Exit 7	502	50	0	20	64	789	7%	84%	1800	

Barrier #	City/Town	Road	Side	Barrier Length (ft)	Barrier Height (ft)	MP Start	MP End	Peak Hour Traffic	Between Exits		Distance to Impact (ft)	Impacts	10 dB Insertion Loss	7-9 dB Insertion Loss	5-7 dB Insertion Loss	DEI	% Housing Units Built After 1995	% Housing Units Built Before Highway	DEI Criteria	Cost ($30/SF)
272	Portsmouth	Spaulding	NB	4690	25	0.1	0.9	6318	Exit 6	Exit 1	412	13	6	71	149	787	12%	41%	1600	$3,517,500
273	Dover	Spaulding	SB	3200	20	18.1	18.3	7057	Exit 4	Exit 5	362	15	19	33	45	1422	17%	47%	1600	
274	Dover	Spaulding	NB	1850	15	4.2	4.2	7057	Exit 4	Exit 5	362	10	0	10	18	1542	17%	47%	1600	
275	Dover	Spaulding	NB	2260	25	4.7	5.0	5520	Exit 6	Exit 5	332	17	25	38	48	1177	17%	47%	1600	
276	Dover	Spaulding	NB	6600	25	5.2	6.4	4091	Exit 6	Exit 7	302	24	95	160	194	851	17%	47%	1600	
277	Dover	Spaulding	SB	9930	10	15.7	17.5	4091	Exit 6	Exit 7	302	15	41	61	71	1399	23%	26%	1600	
278	Dover	Spaulding	NB	2330	25	7.4	7.8	4091	Exit 6	Exit 7	302	6	8	20	39	1494	17%	47%	1600	$1,747,500
279	Dover	Spaulding	NB	1220	20	8.2	8.5	4091	Exit 6	Exit 7	302	8	2	8	17	1435	17%	47%	1600	$732,000
280	Dover	Spaulding	NB	3550	25	8.5	9.2	4091	Exit 6	Exit 7	302	23	26	63	133	667	17%	47%	1600	$2,662,500
281	Dover	Spaulding	SB	2250	25	13.0	13.4	4389	Exit 8	Exit 7	312	4	0	4	22	2557	23%	26%	1600	
282	Dover	Spaulding	SB	1730	15	12.7	13.0	4489	Exit 8	Exit 9	312	8	4	8	13	1996	23%	26%	1600	
283	Dover	Spaulding	NB	2160	15	10.3	10.7	4489	Exit 8	Exit 9	312	3	3	7	19	1705	33%	38%	1500	
284	Dover	Spaulding	SB	1390	15	11.8	12.1	4489	Exit 8	Exit 9	312	1	0	3	6	3475	33%	38%	1500	
285	Dover	Spaulding	NB	2880	25	10.8	11.4	4489	Exit 8	Exit 9	312	60	150	221	228	316	33%	38%	1500	$2,160,000
286	Dover	Spaulding	NB	3780	25	11.5	12.2	4489	Exit 8	Exit 9	312	44	0	23	164	576	13%	64%	1700	$2,835,000
287	Dover	Spaulding	SB	3150	25	10.6	11.2	4489	Exit 8	Exit 9	312	10	36	48	55	1432	33%	38%	1500	$2,362,500
288	Dover	Spaulding	SB	2640	15	9.0	9.5	2638	Exit 11	Exit 9	312	7	7	10	17	2329	33%	38%	1500	
289	Dover	Spaulding	NB	10360	25	12.3	14.3	2638	Exit 11	Exit 9	312	16	140	225	261	992	33%	38%	1500	$7,770,000
290	Rochester	Spaulding	NB	3610	10	15.1	15.8	2638	Exit 11	Exit 9	312	4	2	10	21	1719	22%	32%	1600	
291	Rochester	Spaulding	SB	3750	15	6.4	7.1	2638	Exit 11	Exit 9	312	9	5	19	34	1654	23%	25%	1500	
292	Rochester	Spaulding	NB	3880	25	16.2	16.9	2638	Exit 11	Exit 9	312	40	90	180	265	366	22%	32%	1600	$2,910,000
293	Rochester	Spaulding	NB	5730	25	17.2	18.3	2638	Exit 11	Exit 9	312	73	82	197	275	521	22%	32%	1600	
294	Rochester	Spaulding	SB	2210	15	2.8	3.3	2638	Exit 13	Exit 12	312	1	0	2	7	4736	34%	21%	1400	
295	Rochester	Spaulding	NB	6410	25	19.3	20.5	2638	Exit 13	Exit 12	312	9	162	281	310	517	10%	68%	1700	
296	Rochester	Spaulding	NB	6640	10	23.7	24.9	1336	Exit 17	Exit 16	212	0	8	49	82	810	25%	27%	1600	
297	Milton	Spaulding	SB	4790	10	27.6	28.5	1161	Exit 17	Exit 18	202	1	1	13	23	2083	25%	43%	1600	
298	Milton	Spaulding	SB	1890	10	29.5	29.9	1161	Exit 17	Exit 18	202	1	0	4	4	4725	25%	43%	1600	

Source: VHB, 2017.