

APPENDIX H

Traffic Noise Report



Traffic Noise Analysis Report

Interstate 85 Improvement Project

Cherokee County, South Carolina

February 2017



TRAFFIC NOISE ANALYSIS SUMMARY REPORT
Interstate 85 (I-85) Widening Project
Cherokee County, South Carolina

EXECUTIVE SUMMARY

The Code of Federal Regulations (CFR) Section 23, Part 772 contains the Federal Highway Administration (FHWA) traffic noise standards. The South Carolina Department of Transportation (SCDOT) has implemented these standards in its Traffic Noise Abatement Policy. A traffic noise analysis is required for proposed Federal-aid highway projects that will construct a highway on new location or physically alter an existing highway, which will significantly change either the horizontal or vertical alignment of the road or increase the number of through-traffic lanes. A noise analysis was completed for this project in September of 2016. The noise analysis has been prepared to comply with the SCDOT Traffic Noise Abatement Policy implemented in August of 2014.

The analysis was performed on Interstate 85 (I-85) in Cherokee County, South Carolina to determine the effect of the project on traffic noise levels in the immediate area. This investigation includes an inventory of existing noise sensitive land uses, and a field survey of background (existing) noise levels in the project study area. It also includes a comparison of the predicted noise levels and the background noise levels to determine if traffic noise impacts can be expected resulting from the proposed project. Traffic noise impacts are predicted for this project.

TNM version 2.5, a FHWA traffic noise prediction model, was used in the analysis to compare existing and future Leq(h) noise levels. Leq(h) is the average energy of a sound level over a one hour period. A-weighted decibels (dBA) are the units of measurement used in the study.

Existing noise measurements were taken in the vicinity of the project to quantify the existing acoustic environment and to provide a base for assessing the impact of noise level increases. Model inputs included existing and proposed roadway characteristics, estimated traffic volumes, and receiver locations.

Traffic noise impacts occur when the predicted traffic noise levels either: (a) approach or exceed the FHWA noise abatement criteria (“approach” meaning within 1 dBA of the value listed in Table 3), or (b) substantially exceed the existing noise levels. According to the SCDOT Traffic Noise Abatement Policy, a 15 dBA increase is deemed to be a “substantial increase.” Consideration for noise abatement measures must be given to receivers that fall in either category.

The results of the noise analysis indicate that traffic related noise impacts would occur to 49 receivers under the 2040 Build Alternative. However, 48 receivers would be impacted under the 2040 No-Build Alternative. No receivers were found to substantially exceed the FHWA noise abatement criteria. Table 2 provides a summary of the noise analysis results.

Table 2: Summary of Noise Impact Analysis

ROADWAY LOCATION	TOTAL NO. OF RECEIVERS	APPROXIMATE # OF IMPACTED RECEIVERS ACCORDING TO TITLE 23 CFR PART 772 / SCDOT POLICY				
		A	B	C	D	E
2040 Year No-Build Alternative						
I-85	114	---	35	2	---	11
2040 Year Build Alternative						
I-85	114	---	36	2	---	11

Noise Barrier Analysis Areas

The use of structural barriers (i.e. noise walls) is considered as an abatement measure for impacted receivers. Noise barriers are most effective along a dense concentration of impacted receivers that are located adjacent to the roadway. The use of structural barriers (i.e. noise walls) is considered as an abatement measure for impacted receivers. Noise barriers are most effective along a dense concentration of impacted receivers that are located adjacent to the roadway. An evaluation of the project corridor identified four locations where the density of receivers warranted a barrier analysis. A barrier analysis was completed at these sites to determine if a barrier would be reasonable and feasible. All four sites were determined to be either not feasible and/or not reasonable according to SCDOT noise abatement criteria. A sample barrier analysis was also completed on an isolated receiver (Receiver 5) that was found feasible but not reasonable due to costs. This result also applies to Barriers 36, 39, 41, 45, 48, 87, and 94. In addition, a two isolated receiver calculation was completed on receivers 46 and 47 that were found to be not feasible or reasonable. This result also applies to Barriers 37 and 38.

TABLE OF CONTENTS

INTERSTATE 85 (I-85) NOISE ANALYSIS CHEROKEE COUNTY, SOUTH CAROLINA

I.	HIGHWAY TRAFFIC NOISE ANALYSIS	1
	A. Introduction	1
	B. Project Description	1
	C. Characteristics of Noise	1
	D. Noise Abatement Criteria	4
	E. Existing Noise Levels	6
	F. Procedures For Predicting Future Noise Levels	8
	G. Traffic Noise Impacts and Noise Thresholds	12
II.	TRAFFIC NOISE ABATEMENT MEASURES	13
	A. Noise Barriers	13
	B. Highway Alignment Selection	13
	C. Traffic System Management Measures	14
	D. Other Mitigation Measures Considered	14
	E. Barrier Analysis	14
III.	CONSTRUCTION NOISE	17
IV.	NOTIFICATION OF LOCAL PLANNING OFFICIALS	18
V.	SUMMARY	18

LIST OF TABLES

Table 1	Daily Sounds	3
Table 2	FHWA Noise Abatement Criteria	5
Table 3	Existing Noise Levels	6
Table 4	Field Noise Measurements	7
Table 5	Existing TNM Calculated Noise Levels vs. Field Measurements	7
Table 6	Traffic Data for Section 1 Noise Analysis Area	9
Table 7	Traffic Data for Section 2 Noise Analysis Area	10
Table 8	Traffic Data for Section 3 Noise Analysis Area	11
Table 9	Traffic Data for Section 4 Noise Analysis Area	11
Table 10	Noise Impact Analysis	12
Table 11	Sound Level Contours	18

ATTACHMENTS

Traffic Noise Impacts and Locations
Noise Measurement Data Sheets
Traffic Data
TNM Validations
Section 1 Noise Analysis Area
Section 2 Noise Analysis Area
Section 3 Noise Analysis Area
Section 4 Noise Analysis Area
Barrier Analysis

I. HIGHWAY TRAFFIC NOISE ANALYSIS

A. Introduction

The Code of Federal Regulations (CFR) Section 23, Part 772 contains the FHWA traffic noise standards. The SCDOT has implemented these standards in its Traffic Noise Abatement Policy. A traffic noise analysis is required for proposed Federal-aid highway projects that will construct a highway on new location or physically alter an existing highway, which will significantly change either the horizontal or vertical alignment of the road or increase the number of through-traffic lanes. Traffic noise impacts are predicted for this project. Noise abatement measures have been considered for reducing or eliminating the traffic noise impacts in accordance SCDOT's Traffic Noise Abatement Policy.

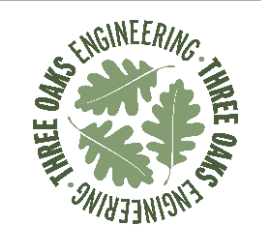
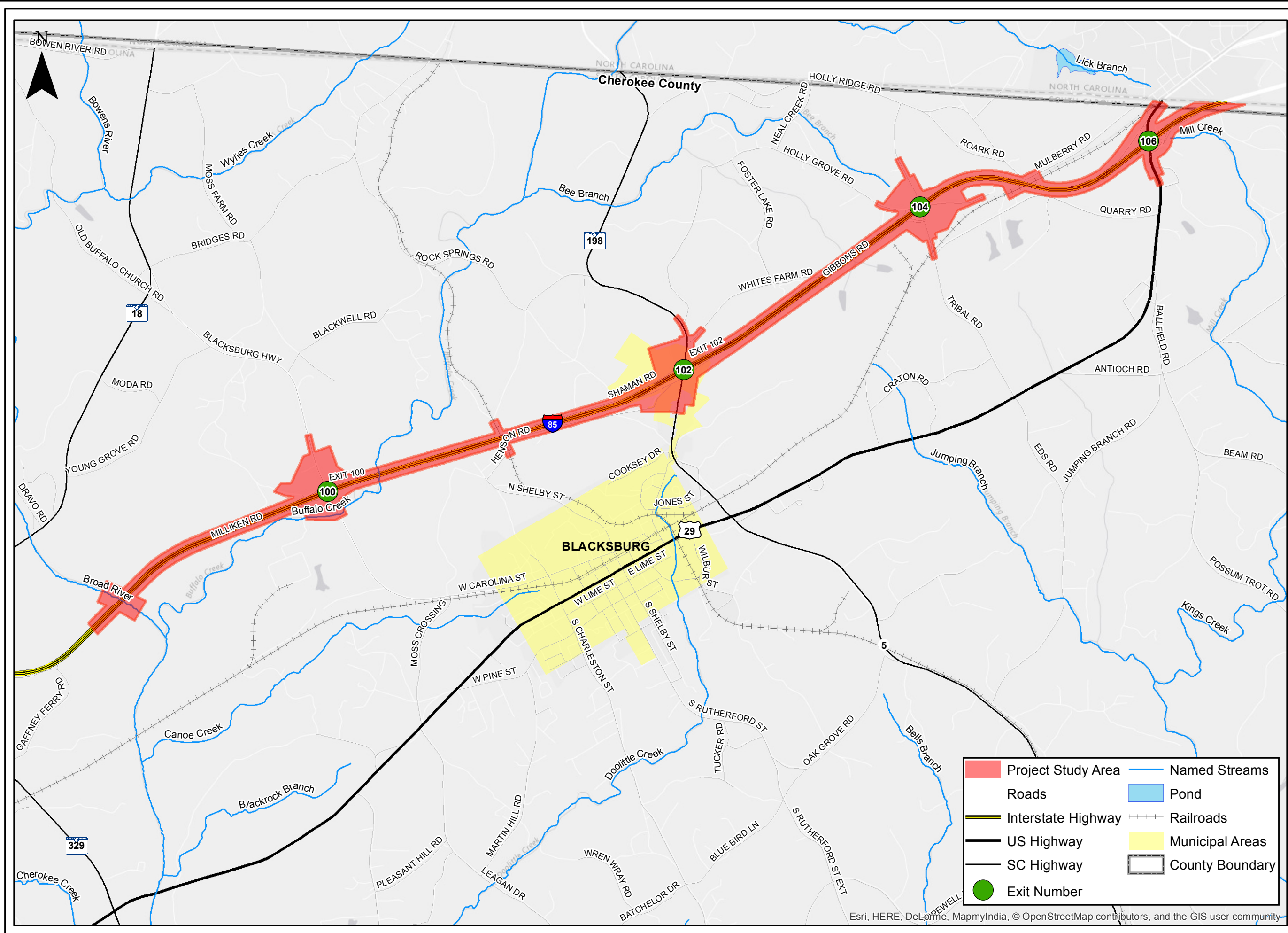
An analysis was performed on Interstate 85 (I-85) in Cherokee County, South Carolina to determine the effect of the project on traffic noise levels in the immediate area. This investigation includes an inventory of existing noise sensitive land uses, and a field survey of background (existing) noise levels in the project study area. It also includes a comparison of the predicted noise levels and the background noise levels to determine if traffic noise impacts can be expected resulting from the proposed project. Traffic noise impacts are predicted for this project.

B. Project Description

The SCDOT proposes to improve the I-85 corridor from approximately one mile north of SC 18 (Exit 96) to US 29 (Exit 106) near the SC/NC state line, a distance of approximately 10 miles (Figure 1). There are various operational deficiencies associated with many of the interchange facilities, as well as mainline capacity needs. It is anticipated that the project would add travel lanes along the mainline (one in each direction), re-configure various interchanges, and replace insufficient overpass bridges. The purpose of the project is to improve the operational efficiency and performance of the existing facility.

C. Characteristics of Noise

Noise is basically defined as unwanted sound. It is emitted from many sources including airplanes, factories, railroads, commercial businesses, and highway vehicles. Highway traffic noise is usually a composite of noises from engine exhaust, drive train, and tire-roadway interaction. Of these sources, tire noise is typically the most offensive at unimpeded travel speeds. The magnitude of noise is usually described by its sound pressure. Since the range of sound pressure varies greatly, a logarithmic scale is used to



Prepared For:



**Proposed I-85
Widening and
Interchange
Improvements
Project
(Mile Marker
96 to 106)**
Site Location
Map

Cherokee County,
South Carolina

Date:	February 2016
Scale:	0 0.25 0.5 Miles
Job No.:	6214
Drawn By:	Checked By:
KMS	CS

Figure
1

some common reference level, usually the decibel (dB). Sound pressures described in decibels are called sound pressure levels and are often defined in terms of frequency weighted scales (A, B, C, or D). The weighted-A decibel scale is used almost exclusively in vehicle noise measurements because it places the most emphasis on the frequency range to which the human ear is most sensitive (1,000-6,000 Hertz). Sound levels measured using a weighted-A decibel scale are often expressed as dBA. Throughout this report, all noise levels will be expressed in dBA's. Most individuals are exposed to fairly high noise levels from many sources as they go about their daily activities. Sound levels experienced by individuals on a daily basis are listed in Table 1.

Table 1 – Daily Sounds

140	Shotgun blast, jet 100' away at takeoff	PAIN
	Motor test chamber	HUMAN EAR PAIN THRESHOLD
130	-----	
	Firecrackers	
120	Severe thunder, pneumatic jackhammer	
	Hockey crowd	
	Amplified rock music	UNCOMFORTABLY LOUD
110	-----	
	Textile loom	
100	Subway train, elevated train, farm tractor	
	Power lawn mower, newspaper press	
	Heavy city traffic, noisy factory	LOUD
90	-----	
D	Diesel truck 40 mph at 50' away	
E	80	Crowded restaurant, garbage disposal
C		Average factory, vacuum cleaner
I		Passenger car 50 mph at 50' away
B	70	MODERATELY LOUD
E		-----
L		Quiet typewriter
S	60	Singing birds, window air-conditioner
		Quiet automobile
		Normal conversation, average office
50		QUIET

	Household refrigerator	
	Quiet office	VERY QUIET
40	-----	
	Average home	
30	Dripping faucet	
	Whisper at 5' away	
20	Light rainfall, rustle of leaves	
		AVERAGE PERSON'S THRESHOLD OF HEARING
	Whisper	JUST AUDIBLE
10	-----	
0		THRESHOLD FOR ACUTE HEARING

Sources: World Book, Rand McNally Atlas of the Human Body, Encyclopedia America, "Industrial Noise and Hearing Conversation" by J. B. Olishifski and E. R. Harford (Researched by N. Jane Hunt and published in the Chicago Tribune in an illustrated graphic by Tom Heinz.)

The degree of disturbance or annoyance of unwanted sound depends essentially on three things:

1. The amount and nature of the intruding noise.
2. The relationship between the background noise and the intruding noise.
3. The type of activity occurring when the noise is heard.

In considering the first of these factors, it is important to note that individuals have different sensitivity to noise. Loud noises disturb some individuals more than others and some individuals become upset if an unwanted noise persists. The time patterns of noise also enter into an individual's judgment of whether or not a noise is offensive. For example, noises that occur during sleeping hours are usually considered to be more offensive than the same noises in the daytime.

With regard to the second factor, individuals tend to judge the annoyance of an unwanted noise in terms of its relationship to noise from other sources (background noise). The blowing of a car horn at night when background noise levels are approximately 45 dBA would generally be more objectionable than the blowing in the afternoon when background noises might be 55 dBA.

The third factor is related to the interference of noise with activities of individuals. In a 60 dBA environment, normal conversation would be possible while sleep might be difficult. Work activities requiring high levels of concentration may be interrupted by loud noises while activities requiring manual effort may not be interrupted to the same degree.

Over time, particularly if the noises occur at predicted intervals and are expected, individuals tend to accept the noises that intrude into their lives. Attempts have been made to regulate many of these types of noises including airplane noise, factory noise, railroad noise, and highway noise. In relation to highway traffic noise, methods of analysis and control have developed rapidly over the past few years.

D. Noise Abatement Criteria

The FHWA has developed NAC and procedures to be used in the planning and design of highways to determine whether highway noise levels are or are not compatible with various land uses. The abatement criteria and procedures are set forth in the aforementioned Federal reference (Title 23 CFR Part 772). A summary of the noise abatement criteria for various land uses is presented in Table 2.

Table 2 – FHWA Noise Abatement Criteria

Activity Category	Activity Criteria ^{2\}		Evaluation Location	Activity Description
	Leq(h)	L10(h)		
A	57	60	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 purpose.
B ^{3\}	67	70	Exterior	Residential
C ^{3\}	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	55	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	75	Exterior	Motels, hotels, offices, restaurant/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\} Either Leq(h) or L10(h) (but not both) may be used on a project

^{2\} The Leq(h) and L10(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures

^{3\} Includes undeveloped lands permitted for this activity category

Activity Category A consists of tracts of land that are locally significant for their serenity and quiet surroundings. Activity Category B consists of residential properties. Activity Category C consists of exterior locations of public outdoor areas, places of worship, cemeteries, recreational areas, etc. Activity Category D consists primarily of the same activities as Activity Category C but is for interior locations. Activity Category E

consists of hotel/motels, offices, restaurants, and other developed land with activities not included in Activity Categories A-D. Activity F consists of agricultural lands, airports, and commercial/industrial facilities. Activity G is for undeveloped lands not presently permitted. Activity Categories adjacent to the project are mostly residential category (B).

Sound pressure levels in this report are referred to as Leq(h). The hourly Leq, or equivalent sound level, is the level of constant sound in a one-hour time period that would have the same energy as a time-varying sound. In other words, the fluctuating sound levels of traffic noise are represented in terms of a steady noise level with the same energy content.

E. Existing Noise Levels

Existing noise measurements were taken in the vicinity of the project to quantify the existing acoustic environment and to provide a base for assessing the impact of noise level increases. Measurements were taken in accordance with FHWA's "Measurement of Highway-related Noise." For all locations, the measurement device was set at approximately 60 inches above the existing ground elevation. There are eight traffic noise measurement sites which are listed in Table 3:

The existing Leq(h) traffic noise levels, as measured at each site, and the type of ground conditions identified at each site can be found in Table 3.

Table 3 - Existing Noise Levels [Leq(h)]

Site-Rec.	Location	Description	Noise Level (dBA)
1	1319 Blacksburg Highway	Grass	58.9
2	338 Henson Road	Grass	66.7
3	360 Shaman Road	Grass	62.2
4	108 White Farm Road	Grass	54.5
5	248 Cherokee Creek Road	Grass	64.2
6	571 White Farm Road	Grass	65.3
7	148 Mulberry Road	Grass	60.5
8	161 Poplar Drive	Grass	63.9

Note: See Attachments for noise measurement data sheets.

The existing roadway and traffic conditions along the I-85 mainline were used with the current traffic noise prediction model (TNM version 2.5, February 2004) to calculate existing noise levels for comparison with actual measured noise levels. Project-related traffic noise level increases are based upon the existing loudest-hour noise levels. See Table 4 for traffic counts during field measurements. All measurements were performed on August 24, 2016.

Table 4 - Field Noise Measurements

Site-Rec.	Time Period	Hourly Traffic Based on Concurrent Traffic Counts										Measured Leq
		Northbound Lanes					Southbound Lanes					
		Autos	MT	HT	Bus	MC	Autos	MT	HT	Bus	MC	
1	9:52AM-10:07AM	1004	68	328	4	4	920	64	452	0	4	58.9
2	10:21AM-10:36AM	952	72	448	0	4	976	56	336	8	4	66.7
3	10:49AM-11:04AM	780	68	416	4	4	908	76	524	4	0	62.2
4	11:18AM-11:33AM	812	68	312	4	0	996	64	408	8	8	54.5
5	11:45AM-12:00PM	924	60	428	1	4	876	44	480	8	4	64.2
6	01:05PM-01:20PM	800	72	356	4	8	1036	56	480	4	4	65.3
7	01:43AM-01:58AM	1088	92	376	8	12	792	40	432	0	8	60.5
8	02:50AM-03:05AM	1180	64	376	16	4	908	36	396	0	4	63.9

MT = Medium Trucks; HT = Heavy Trucks; MC = Motorcycles - Data was obtained on August 24, 2016.

Table 5 shows the comparison of field measurements versus modeled noise levels. The calculated noise levels for the measurement sites range from 48.8 to 69.5 dBA. The difference between field measured and calculated noise levels at 7 of 8 locations is less than 3 dBA, validating the results of the TNM model. The one location that didn't validate was an unoccupied farm house located approximately 800 feet away from the interstate (Table 5 – Site 4). For receiver distances greater than 300 feet from the source, atmospheric effects have a much greater influence on measured sound levels.¹

Table 5 - Existing TNM Calculated Noise Levels vs. Field Measurements

Site-Receiver	Location	Field Measurement Noise Level (dBA)	TNM Calculated Noise Level (dBA)	Difference (dBA)
1	1319 Blacksburg Highway	58.9	60.5	1.6
2	338 Henson Road	66.7	69.5	2.8
3	360 Shaman Road	62.2	65.1	2.9
4	108 White Farm Road	54.5	48.8	5.7
5	248 Cherokee Creek Road	64.2	66.3	2.1
6	571 White Farm Road	65.3	65.8	0.5

¹ <https://www.fhwa.dot.gov/environment/noise/measurement/mhrn00.cfm>. Last accessed on February 3, 2017.

7	148 Mulberry Road	60.5	62.4	1.9
8	161 Poplar Drive	63.9	64.8	0.9

Difference = Measured Leq minus Modeled Leq

F. Procedure for Predicting Future Noise Levels

Based on the SCDOT Traffic Noise Abatement Policy, a preliminary noise analysis is required for all build alternatives and under consideration in a project's NEPA document. The preliminary analysis models the most conservative noise environment to determine if there will be noise impacts, and if there are, the feasibility and reasonableness of noise abatement to mitigate the impacts. Once a preferred alternative has been identified, a detailed noise analysis is required for any noise abatement that was recommended for that alternative in the preliminary analysis.

Traffic noise is not constant; it varies in time depending upon the number, speed, type, and frequency of vehicles that pass by a given receiver. Furthermore, since traffic noise emissions are different for various types of vehicles, the TNM model distinguishes between the source emissions from the following vehicle types: automobiles, medium trucks, heavy trucks, buses, and motorcycles. The TNM traffic noise prediction model uses the number and type of vehicles on the planned roadway, their speeds, the physical characteristics of the road (curves, hills, depressed, elevated, etc.), receiver location and height, and, if applicable, barrier type, barrier ground elevation, and barrier top elevation.

Preliminary designs, aerial photography, and contour mapping were used to model the proposed roadway and receiver elevations and represent the topographical conditions. The noise predictions made in this report are highway-related noise predictions for the traffic conditions during the year 2040. They do not include other noises related to the excessive background noises (trains, airplanes and construction, etc.) that were measured during the existing conditions.

According to FHWA guidance, the predictions documented in this report are based upon the proposed roadway alignment design and traffic conditions for the year 2040 that result in the loudest predicted hourly-equivalent traffic noise levels for each receiver. Traffic noise level and location spreadsheets are included in the Attachments and contain a list of all receivers in close proximity to the project along with arials showing the receiver locations, and summarize the loudest hour equivalent noise levels for the Existing, No-Build, and Build conditions in the year 2040 under traffic conditions within the project site. The land uses of receivers were determined by field observations and reviewing available GIS parcel data.

Due to substantial differences in traffic volumes on the mainline between the four interchanges, the traffic analysis divided the project into four noise analysis areas to better capture the traffic volumes for each section. Some roadways have no associated traffic volumes and/or speeds due to the lack of available data. The noise analysis areas are described below.

Section 1 – This noise analysis area extended from the east side of the Broad River to the northern end of the Exit 100 (Blacksburg Highway) interchange ramps, and included all ramp, cross-road and frontage road movements. Listed in Table 6 are the traffic volumes used in the analysis for this noise analysis area.

Table 6 - Traffic Data for Section 1 Noise Analysis Area

Roadway Section	Speed (mph)	Two Way Design Hourly Traffic	One Way Hourly Traffic (vph)	Hourly Volume Cars (vph)	Hourly Volume Medium Trucks (vph)	Hourly Heavy Trucks (vph)
2015 Traffic Computations						
I-85 Mainline	70	4360	2180	1482	105	593
Northbound Off Ramp	25	162	162	110	8	44
Northbound On Ramp	---	81	81	55	4	22
Southbound Off Ramp	25	89	89	61	4	24
Southbound On Ramp	---	177	177	120	9	48
Crawford Road	25	192	96	96	0	0
Orlando Drive	---	---	---	---	---	---
Blacksburg Highway North of I-85	35	250	125	95	15	15
Blacksburg Highway South of I-85	35	430	215	161	27	27
2040 Traffic Computations						
I-85 Mainline	70	6421	3210	2183	144	883
Northbound Off Ramp	25	235	235	160	11	64
Northbound On Ramp	---	118	118	80	6	32
Southbound Off Ramp	25	128	128	87	6	35
Southbound On Ramp	---	256	256	174	12	70
Crawford Road	25	278	139	139	0	0
Orlando Drive	---	---	---	---	---	---
Blacksburg Highway North of I-85	35	464	232	174	29	29
Blacksburg Highway South of I-85	35	797	399	299	50	50

- mph = miles per hour
- vph = vehicles per hour
- Design hourly traffic volumes obtained using 10% of average daily traffic

Section 2 - This noise analysis area extended from the northern end of the Exit 100 (Blacksburg Highway) interchange ramps, to the northern end of the Exit 102 (North Mountain Street) interchange ramps, and included all ramp, cross-road and frontage road

movements. Listed in Table 7 are the traffic volumes used in the analysis for this noise analysis area.

Table 7 - Traffic Data for Section 2 Noise Analysis Area

Roadway Section	Speed (mph)	Two Way Design Hourly Traffic	One Way Hourly Traffic (vph)	Hourly Volume Cars (vph)	Hourly Volume Medium Trucks (vph)	Hourly Heavy Trucks (vph)
2015 Traffic Computations						
I-85 Mainline	70	4130	2065	1322	104	639
Northbound Off Ramp	25	469	469	300	24	145
Northbound On Ramp	---	245	245	157	12	76
Southbound Off Ramp	25	261	261	167	13	81
Southbound On Ramp	---	516	516	330	26	160
Rock Springs Road	45	588	294	294	0	0
Henson Road	35	491	246	246	0	0
North Mountain Street North of I-85	35	250	125	125	0	0
North Mountain Street South of I-85	35	720	360	360	0	0
2040 Traffic Computations						
I-85 Mainline	70	6082	3041	1946	153	942
Northbound Off Ramp	25	680	680	435	34	211
Northbound On Ramp	---	355	355	227	18	110
Southbound Off Ramp	25	378	378	242	19	117
Southbound On Ramp	---	749	749	479	38	232
Rock Springs Road	45	853	427	427	0	0
Henson Road	35	712	356	356	0	0
North Mountain Street North of I-85	35	321	161	161	0	0
North Mountain Street South of I-85	35	923	462	462	0	0

- mph = miles per hour
- vph = vehicles per hour
- Design hourly traffic volumes obtained using 10% of average daily traffic

Section 3 - This noise analysis area extended from the northern end of the Exit 102 (North Mountain Street) interchange ramps, to the northern end of the Exit 104 (Tribal Road) interchange ramps, and included all ramp, cross-road and frontage road movements. Listed in Table 8 are the traffic volumes used in the analysis for this noise analysis area.

Table 8 - Traffic Data for Section 3 Noise Analysis Area

Roadway Section	Speed (mph)	Two Way Design Hourly Traffic	One Way Hourly Traffic (vph)	Hourly Volume Cars (vph)	Hourly Volume Medium Trucks (vph)	Hourly Heavy Trucks (vph)
2015 Traffic Computations						
I-85 Mainline	70	3590	1795	1185	79	531
Northbound Off Ramp	45	317	317	209	14	94
Northbound On Ramp	---	271	271	179	12	80
Southbound Off Ramp	35	264	264	174	12	78
Southbound On Ramp	---	263	263	174	12	77
White Farm Road	45	---	---	---	---	---
Priester Road	---	257	129	129	0	0
Road S-52	45	311	156	156	0	0
Tribal Road North of I-85	45	65	33	33	0	0
Tribal Road South of I-85	45	62	33	33	0	0
2040 Traffic Computations						
I-85 Mainline	70	5287	2644	1745	117	782
Northbound Off Ramp	45	460	460	304	20	136
Northbound On Ramp	---	393	393	259	17	117
Southbound Off Ramp	35	383	383	253	17	113
Southbound On Ramp	---	382	382	252	17	113
White Farm Road	45	---	---	---	---	---
Priester Road	---	374	187	187	0	0
Road S-52	45	451	226	226	0	0
Tribal Road North of I-85	45	83	42	42	0	0
Tribal Road South of I-85	45	83	42	42	0	0

- mph = miles per hour
- vph = vehicles per hour
- Design hourly traffic volumes obtained using 10% of average daily traffic

Section 4 - This noise analysis area extended from the northern end of the Exit 104 (Tribal Road) interchange ramps, to the northern end of the Exit 106 (US 29) interchange ramps, and included all ramp, cross-road and frontage road movements. Listed in Table 9 are the traffic volumes used in the analysis for this noise analysis area.

Table 9 - Traffic Data for Section 4 Noise Analysis Area

Roadway Section	Speed (mph)	Two Way Design Hourly Traffic	One Way Hourly Traffic (vph)	Hourly Volume Cars (vph)	Hourly Volume Medium Trucks (vph)	Hourly Heavy Trucks (vph)
2015 Traffic Computations						
I-85 Mainline	70	3540	1770	1204	68	498
Northbound Off Ramp	20	138	138	94	5	39

Northbound On Ramp	---	149	149	101	6	42
Southbound Off Ramp	40	297	297	202	11	84
Southbound On Ramp	---	284	284	193	11	80
Road S-658	45	190	95	95	0	0
US 29 North of I-85	35	610	305	289	8	7
US 29 South of I-85	35	230	115	99	3	3
2040 Traffic Computations						
I-85 Mainline	70	5213	2607	1773	100	734
Northbound Off Ramp	20	199	199	135	8	56
Northbound On Ramp	---	213	213	145	8	60
Southbound Off Ramp	40	431	431	293	17	121
Southbound On Ramp	---	411	411	279	16	116
Road S-658	45	276	138	132	3	3
US 29 North of I-85	35	885	443	421	11	11
US 29 South of I-85	35	295	148	140	4	4

- mph = miles per hour
- vph = vehicles per hour
- Design hourly traffic volumes obtained using 10% of average daily traffic

G. Traffic Noise Impacts and Noise Thresholds

Traffic noise impacts occur when the predicted traffic noise levels either: (a) approach or exceed the FHWA noise abatement criteria (“approach” meaning within 1 dBA of the value listed in Table 2), or (b) substantially exceed the existing noise levels. According to the SCDOT Traffic Noise Abatement Policy, a 15 dBA increase is deemed to be a “substantial increase.” Consideration for noise abatement measures must be given to receivers that fall in either category. The results of the noise analysis indicate that traffic related noise impacts would occur to 49 receivers under the 2040 Build Alternative. However, 48 receivers would be impacted under the 2040 No-Build Alternative. No receivers in the project area would substantially exceed the FHWA noise abatement criteria. Table 10 summarizes the noise analysis results.

Table 10: Noise Impact Analysis

ROADWAY LOCATION	TOTAL NO. OF RECEIVERS	APPROXIMATE # OF IMPACTED RECEIVERS ACCORDING TO TITLE 23 CFR PART 772 / SCDOT POLICY				
		A	B	C	D	E
2040 Year No-Build Alternative						
I-85	114	---	35	2	---	11
2040 Year Build Alternative						
I-85	114	---	36	2	---	11

II. TRAFFIC NOISE ABATEMENT MEASURES

If traffic noise impacts are predicted, noise abatement measures for reducing or eliminating the noise impacts must be considered. Consideration for noise abatement measures have been given to impacted receivers along each alternative. The following discussion addresses the applicability of these measures to the proposed project.

A. Noise Barriers

Physical measures to abate anticipated traffic noise levels are often applied on fully controlled facilities using solid mass berms or walls strategically placed between the traffic sound source and the receivers to diffract, absorb, and reflect highway traffic noise emissions. To be effective, a noise barrier must be long enough and tall enough to shield the impacted receiver(s). Generally, the noise wall length must be eight times the distance from the barrier to the receiver. For example, if a receiver is 200 feet from the roadway, an effective barrier would be approximately 1,600 feet long with the receiver in the horizontal center. Due to the requisite lengths for effectiveness, noise walls are typically not economical for isolated or most low-density areas, or for most uncontrolled access facilities. On facilities where access is allowed for driveways, openings will be needed in the walls. An access opening of 40 feet in a 400-foot wall will make the wall ineffective.

According to the SCDOT's Traffic Noise Abatement Policy, a noise wall must be considered both feasible and reasonable. The feasibility of a wall is determined by constructability of the wall given the topography, presence of other dominant noise sources, and at least a 5 dBA noise reduction must be achieved for 75% of the impacted receivers. There are three mandatory factors that must be met for a noise abatement measure to be considered reasonable. All three factors must collectively be achieved for a noise abatement measure to be deemed reasonable. These three factors include; viewpoints of the property owners and residents of the benefitted receivers, cost effectiveness (cost per benefitted receiver is less than \$30,000), and a noise reduction design goal of at least 8 dBA for 80% of those receivers determined to be in the first two building rows and considered benefitted.

B. Highway Alignment Selection

Highway alignment selection involves the horizontal or vertical orientation of the proposed improvements in such a way as to minimize impacts and costs. The selection of alternative alignments for noise abatement purposes must consider the balance between noise impacts and other engineering and environmental parameters. For noise abatement, horizontal alignment selection is primarily a matter of constructing the proposed roadway at a sufficient distance from noise sensitive areas. The preferred alternative has been located to minimize impacts to human and natural resources. Raising or lowering of the

roadway grade is not feasible or practical as a change in grade would require additional new right-of-way and constitute a large cost versus small benefit in reduced noise levels. Alignment shifts are not practical due to safety considerations and potential displacements.

C. Traffic System Management Measures

Traffic System Management (TSM) measures, which limit vehicle type, speed, volume and time of operation are often effective noise abatement measures. Past project experience has shown that a reduction in the speed limit of 10 mph would result in a noise level reduction of approximately 1 to 2 dBA. Further reducing the speed limit would not be appropriate for the functional classification for this project. Truck lane designation is not a viable alternative of noise abatement on this project, given the limited scope of the proposed improvements.

D. Other Mitigation Measures Considered

The acquisition of property in order to provide buffer zones to minimize noise impacts is not considered to be a feasible noise mitigation measure. The cost to acquire impacted receivers for buffer zones would exceed the abatement threshold of \$30,000 per benefited receiver. The use of buffer zones to minimize impacts to future sensitive areas is not recommended because this could be accomplished through land use controls and the noise critical distances as predicted in Table 7. The use of vegetation for noise mitigation is not considered reasonable for projects such as this one due to the substantial amount of right-of-way necessary to make vegetative barriers effective. FHWA research has shown that a vegetative barrier should be approximately 100 feet wide to provide a 3 dBA reduction in noise levels.

E. Barrier Analysis

The use of structural barriers (i.e. noise walls) is considered as an abatement measure at locations that contain a high density of impacted receivers. Noise barriers are most effective along a dense concentration of impacted receivers that are located adjacent to the roadway. An evaluation of the project corridor identified four locations where the density of receivers warranted a barrier analysis (Sheet 1-11 of 2040 Build Noise Levels in appendices). A barrier analysis was completed at these locations to determine if a barrier would be reasonable and feasible. All four sites were determined to be either not feasible and/or not reasonable according to SCDOT noise abatement criteria. A sample barrier analysis was also completed on an isolated receiver (Receiver 5) that was found feasible but not reasonable due to costs. This result also applies to Receivers 36, 39, 41, 45, 48, 87, and 94. In addition, a two isolated receiver calculation was completed on receivers 46 and 47 that were found to be not feasible or reasonable. This result also

applies to Barriers 37 and 38 (see SCDOT Feasibility and Reasonableness Worksheet in Appendix H).

Barrier A (Receivers 80-86)

Barrier A was modeled to abate noise impacts along Shaman Road between Rock Springs Road and Lyman Road at Exit 104. Barrier A would be located along the shoulder of northbound I-85. The total length of the barrier would be 2,000 feet with a uniform height of 16 feet and a total area of 32,000 square feet. Under the future build scenario, a total of seven (7) receivers would be impacted with three (3) receivers being benefitted. The percentage of impacted receivers that would achieve at least a 5 dBA reduction is 43% which makes the barrier acoustically not feasible.

Barrier B (Receivers 95-110)

Barrier B was modeled to abate noise impacts along Henson Road just east of the Henson Road/Phelps Road intersection at Exit 102. Barrier B would be located along the shoulder of northbound I-85. The total length of the barrier would be 2,000 feet with a uniform height of 16 feet and a total area of 32,000 square feet. Under the future build scenario, a total of fourteen (14) receivers would be impacted with ten (10) receivers being benefitted. The percentage of impacted receivers that would achieve at least a 5 dBA reduction is 71% which makes the barrier acoustically not feasible

Barrier C (Receivers 22-28)

Barrier B was modeled to abate noise impacts along Gibbons Road east of I-85 across from the Welcome Center between Exit 102 and 104. Barrier C would be located along the shoulder of southbound I-85. Under the future build scenario, a total of four (4) receivers would be impacted with five (5) receivers being benefitted. The percentage of impacted receivers that would achieve at least a 5 dBA reduction is 75% which makes the barrier acoustically feasible. Four (4) of the benefitted receivers would achieve at least an 8dBa reduction from the proposed barrier (80%) which meets the noise reduction design goal for reasonableness. The proposed barrier would be approximately 2000 feet in length and 16 feet tall with total costs of \$1,120,000 dollars. This would equate to a total cost of \$224,000 dollars per benefitted receiver which does not meet the goal for cost effectiveness, and is therefore, not reasonable.

Barrier D (Receivers 54-57)

Barrier D was modeled to abate noise impacts near St. Peters Missionary Baptist Church north of US 29 at the SC/NC state line. Barrier D would be located along the shoulder of southbound I-85. The total length of the barrier would be 1,000 feet with a uniform height of 16 feet and a total area of 16,000 square feet.

Under the future build scenario, a total of two (2) receivers would be impacted with no receivers being benefitted. The percentage of impacted receivers that would achieve at least a 5 dBA reduction is zero which makes the barrier acoustically not feasible.

Barrier E (Receiver 5)

This is a single isolated receiver. Typically a single isolated receiver would likely meet the feasibility requirement but not the reasonableness requirement. In order to avoid numerous single isolated receiver analyses, this barrier was modeled as an example run for other isolated receivers.

Feasibility:

Acoustic Feasibility: SCDOT noise policy states that a noise reduction of at least 5 dBA must be achieved for 75 percent of the impacted receivers. This was achieved for 1 of the 1 impacted receivers (100%). This meets the SCDOT allowable percentage (75%) per impacted receiver.

Engineering Feasibility: No known issues at this time.

Reasonableness:

Noise Reduction Design Goal: SCDOT noise policy states that at least 8 dBA must be achieved for 80 percent of the benefitted receivers. There was 0 of 1 benefitted receiver that achieved the 8 dBA reduction (100%). This did not meet the SCDOT allowable percentage (80%) of the benefitted receivers.

Cost Effectiveness: The analyzed feature was deemed not to be reasonable as the estimated cost per benefitted receiver exceeded the SCDOT allowable cost (\$30,000) per benefitted receiver. ($\sim \$369,431 / 1 \text{ benefitted receiver} = \$369,431$).

Public Viewpoints: The public involvement process is not applicable since the analyzed feature does not meet the SCDOT noise policy criteria.

Conclusion: Based on the above results, this abatement feature is not reasonable. Additionally, this single isolated receiver calculation was used as the sample mitigation run for all other single isolated residential receivers. This result applies to Receivers 36, 41, 45, 87, and 94.

Barrier F (Receivers 46 – 47)

There are 2 isolated receivers in this group. Typically, a few isolated receivers (two, in this case) might meet the feasibility requirement, but not the cost reasonableness requirement. In order to avoid numerous isolated receiver analyses where there are only

two receivers, this barrier was modeled as an example run for other similar isolated receivers as will be identified later in this section.

Feasibility:

Acoustic Feasibility: SCDOT noise policy states that a noise reduction of at least 5 dBA must be achieved for 75 percent of the impacted receivers. This was achieved for 0 of the 2 impacted receivers (0%). This does not meet the SCDOT allowable percentage (75%) per impacted receiver.

Engineering Feasibility: Does not meet criteria.

Reasonableness:

Noise Reduction Design Goal: SCDOT noise policy states that at least 8 dBA must be achieved for 80 percent of the benefitted receivers. There were 0 of the 2 benefitted receivers that achieved the 8 dBA reduction (0%). This did not meet the SCDOT allowable percentage (80%) of the benefitted receivers.

Cost Effectiveness: The analyzed feature was deemed not to be reasonable as the estimated cost per benefitted receiver exceeded the SCDOT allowable cost (\$30,000) per benefitted receiver. ($\sim \$540,158 / 2$ benefitted receivers = \$270,079).

Public Viewpoints: The public involvement process is not applicable since the analyzed feature does not meet the SCDOT noise policy criteria.

Conclusion: Based on the above results, this abatement feature is not feasible or reasonable. This result applies to Receivers 37 and 38.

III. CONSTRUCTION NOISE

The major construction elements of this project are expected to be earth removal, hauling, grading, and paving. General construction noise impacts, such as temporary speech interference for passers-by and those individuals living or working near the project, can be expected particularly from paving operations and earth moving equipment during construction. However, considering the relatively short-term nature of construction noise and the likely limitation of construction to daytime hours, these impacts are not expected to be substantial. To minimize construction noise, the contractor would be required to comply with the *SCDOT 2007 Standard Specifications for Highway Construction*, which includes specifications regarding nuisance noise avoidance. In addition, the contractor would be required to comply with applicable local noise ordinances and OSHA regulations concerning noise attenuation devices on construction equipment.

IV. Notification of Local Planning Officials

SCDOT has no control over land use adjacent to the I-85 corridor per 23 CFR 771.17. SCDOT must inform local officials of future design noise levels from the edge of the nearest travel lane to encourage noise compatible land use planning. Table 11 lists the distances where noise impacts may occur based on NAC categories. Since there are no specific planning officials for Cherokee County; therefore, the available information on future sound levels would be sent to the following:

CHEROKEE COUNTY ADMINISTRATOR

Mr. Holland Belue
110 Railroad Avenue
Gaffney, S.C. 29340

Table 11: Approximate Sound Level Contours for Various NAC Categories from Edge of Nearest travel Lane Centerline

NAC Land Use	Impact Criteria	Worst-Case Approximate Distances From Travel Lane Centerline
B - C	66 dBA	~544 feet
E	71 dBA	~324 feet

V. SUMMARY

The results of the noise analysis indicate that traffic related noise impacts would occur to 49 receivers under the 2040 Build Alternative and 47 receivers would be impacted under the 2040 No-Build Alternative. No receivers in the project area would substantially exceed the FHWA noise abatement criteria. Four areas were identified where a barrier analysis was warranted due to the density of receivers. All four sites were found to be not feasible or reasonable according to SCDOT noise abatement criteria. A sample barrier analysis was also completed on an isolated receiver (Receiver 5) that was found feasible but not reasonable due to cost effectiveness. This result also applies to Barriers 36, 39, 41, 45, 48, 87, and 94. In addition, a two isolated receiver calculation was completed on receivers 46 and 47 that were found to be not feasible or reasonable. This result also applies to Barriers 37 and 38.

This evaluation completes the highway traffic noise requirements of Title 23 CFR Part 772.

APPENDIX

Traffic Noise Impacts and Locations

Predicted Traffic Noise Levels - Interstate 85 - Cherokee County - Milemarker 96 to 106

RECEIVER INFORMATION					2015 EXISTING		2040 NO-BUILD ALTERNATIVE		2040 BUILD ALTERNATIVE		DIFFERENCE
Receiver ID #	LAND USE	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) CATEGORY	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) (dBA)	EQUIVALENT NO. OF RECEIVERS	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	2040 BUILD - 2015 EXIST [Leq (dBA)]
1	Commercial	E	72	1	73	Yes	75	Yes	73	Yes	0
2	Commercial	E	72	1	74	Yes	76	Yes	77	Yes	3
3	Residential	B	67	1	60	No	61	No	61	No	1
4	Residential	B	67	1	62	No	63	No	65	No	3
5	Residential	B	67	1	72	Yes	74	Yes	74	Yes	2
6	Residential	B	67	1	61	No	63	No	61	No	0
7	Residential	B	67	1	66	Yes	68	Yes	66	Yes	0
8	Residential	B	67	1	62	No	64	No	63	No	1
9	Residential	B	67	1	63	No	65	No	63	No	0
10	Residential	B	67	1	63	No	65	No	64	No	1
11	Residential	B	67	1	62	No	63	No	62	No	0
12	Residential	B	67	1	62	No	64	No	63	No	1
13	Residential	B	67	1	60	No	62	No	61	No	1
14	Residential	B	67	1	60	No	62	No	62	No	2
15	Residential	B	67	1	60	No	62	No	63	No	3
16	Residential	B	67	1	56	No	57	No	61	No	5
17	Commercial	E	72	1	57	No	58	No	59	No	2
18	Residential	B	67	1	59	No	60	No	61	No	2
19	Commercial	E	72	1	71	Yes	73	Yes	69	No	-2
20	Commercial	E	72	1	73	Yes	74	Yes	75	Yes	2
21	Commercial	E	72	1	68	No	70	No	72	Yes	4
22	Residential	B	67	1	63	Yes	65	No	65	No	2
23	Residential	B	67	1	68	Yes	69	Yes	71	Yes	3
24	Residential	B	67	1	74	Yes	76	Yes	74	Yes	0
25	Residential	B	67	1	64	No	65	No	65	No	1
26	Residential	B	67	1	63	No	65	No	65	No	2
27	Residential	B	67	1	67	Yes	69	Yes	69	Yes	2
28	Residential	B	67	1	70	Yes	71	Yes	72	Yes	2
29	Commercial	E	72	1	66	No	68	No	67	No	1
30	Residential	B	67	1	54	No	56	No	58	No	4
31	Residential	B	67	1	60	No	61	No	62	No	2
32	Residential	B	67	1	60	No	61	No	61	No	1
33	Residential	B	67	1	61	No	63	No	63	No	2
34	Commercial	E	72	1	62	Yes	64	No	63	No	1
35	Commercial	E	72	1	71	Yes	72	Yes	72	Yes	1
36	Residential	B	67	1	72	Yes	73	Yes	72	Yes	0
37	Residential	B	67	1	73	Yes	75	Yes	73	Yes	0
38	Residential	B	67	1	67	Yes	69	Yes	68	Yes	1
39	Commercial	E	72	1	67	Yes	69	Yes	68	Yes	1
40	Residential	B	67	1	58	No	60	No	59	No	1
41	Residential	B	67	1	65	No	67	Yes	66	Yes	2
42	Residential	B	67	1	59	No	61	No	59	No	0
43	Residential	B	67	1	56	No	58	No	57	No	1

Predicted Traffic Noise Levels - Interstate 85 - Cherokee County - Milemarker 96 to 106

RECEIVER INFORMATION					2015 EXISTING		2040 NO-BUILD ALTERNATIVE		2040 BUILD ALTERNATIVE		DIFFERENCE
Receiver ID #	LAND USE	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) CATEGORY	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) (dBA)	EQUIVALENT NO. OF RECEIVERS	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	2040 BUILD - 2015 EXIST [Leq (dBA)]
44	Residential	B	67	1	55	No	57	No	57	No	2
45	Residential	B	67	1	63	No	65	No	66	Yes	3
46	Residential	B	67	1	67	Yes	69	Yes	70	Yes	3
47	Residential	B	67	1	66	Yes	67	Yes	69	Yes	3
48	Commercial	E	72	1	70	Yes	71	Yes	72	Yes	2
49	Commercial	E	72	1	66	No	67	No	62	No	-4
50	Commercial	E	72	1	68	No	70	No	68	No	0
51	Commercial	E	72	1	68	No	70	No	68	No	0
52	Commercial	E	72	1	65	No	67	No	65	No	0
53	Commercial	E	72	1	64	No	66	No	63	No	-1
54	Commercial	E	72	1	65	No	67	No	65	No	0
55	Commercial	E	72	1	67	No	69	No	68	No	1
56	Place of Worship	C	67	1	75	Yes	77	Yes	75	Yes	0
57	Place of Worship	C	67	1	72	Yes	74	Yes	71	Yes	-1
58	Commercial	E	72	1	63	No	65	No	63	No	0
59	Commercial	E	72	1	62	No	64	No	62	No	0
60	Commercial	E	72	1	66	No	68	No	66	No	0
61	Residential	B	67	1	63	No	65	No	63	No	0
62	Commercial	E	72	1	62	No	64	No	62	No	0
63	Residential	B	67	1	63	No	65	No	63	No	0
64	Residential	B	67	1	62	Yes	63	Yes	62	No	0
65	Residential	B	67	1	59	No	61	No	60	No	1
66	Residential	B	67	1	59	No	60	No	60	No	1
67	Residential	B	67	1	56	No	58	No	58	No	2
68	Residential	B	67	1	55	No	57	No	58	No	3
69	Residential	B	67	1	57	No	58	Yes	58	No	1
70	Commercial	E	72	1	60	No	62	Yes	60	No	0
71	Residential	B	67	1	65	No	67	Yes	64	No	-1
72	Commercial	E	72	1	67	No	69	No	67	No	0
73	Commercial	E	72	1	66	No	68	No	66	No	0
74	Commercial	E	72	1	70	No	71	Yes	69	No	-1
75	Residential	B	67	1	56	No	58	No	58	No	2
76	Residential	B	67	1	57	No	59	No	59	No	2
77	Residential	B	67	1	56	No	57	No	58	No	2
78	Commercial	E	72	1	61	No	62	No	62	No	1
79	Commercial	E	72	1	71	Yes	73	Yes	72	Yes	1
80	Residential	B	67	1	67	Yes	69	Yes	69	Yes	2
81	Residential	B	67	1	68	Yes	70	Yes	69	Yes	1
82	Residential	B	67	1	72	Yes	73	Yes	73	Yes	1
83	Residential	B	67	1	66	Yes	68	Yes	67	Yes	1
84	Residential	B	67	1	69	Yes	71	Yes	71	Yes	2
85	Residential	B	67	1	72	Yes	74	Yes	74	Yes	2
86	Residential	B	67	1	73	Yes	75	Yes	74	Yes	1
87	Residential	B	67	1	70	Yes	72	Yes	71	Yes	1
88	Commercial	E	72	1	67	No	69	No	71	Yes	4

Predicted Traffic Noise Levels - Interstate 85 - Cherokee County - Milemarker 96 to 106

RECEIVER INFORMATION					2015 EXISTING		2040 NO-BUILD ALTERNATIVE		2040 BUILD ALTERNATIVE		DIFFERENCE
Receiver ID #	LAND USE	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) CATEGORY	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) (dBA)	EQUIVALENT NO. OF RECEIVERS	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	2040 BUILD - 2015 EXIST [Leq (dBA)]
89	Commercial	E	72	1	61	No	63	No	62	No	1
90	Residential	B	67	1	62	No	63	No	62	No	0
91	Residential	B	67	1	62	No	63	No	63	No	1
92	Residential	B	67	1	62	No	63	No	62	No	0
93	Commercial	E	72	1	69	No	71	Yes	67	No	-2
94	Residential	B	67	1	67	Yes	69	Yes	67	Yes	0
95	Residential	B	67	1	63	No	64	No	68	Yes	5
96	Residential	B	67	1	78	Yes	79	Yes	79	Yes	1
97	Residential	B	67	1	76	Yes	78	Yes	78	Yes	2
98	Residential	B	67	1	67	Yes	69	Yes	72	Yes	5
99	Residential	B	67	1	78	Yes	80	Yes	79	Yes	1
100	Residential	B	67	1	60	No	62	No	64	No	4
101	Residential	B	67	1	60	No	62	No	64	No	4
102	Residential	B	67	1	61	No	62	No	66	Yes	5
103	Residential	B	67	1	64	No	66	Yes	70	Yes	6
104	Residential	B	67	1	70	Yes	72	Yes	72	Yes	2
105	Residential	B	67	1	69	Yes	70	Yes	71	Yes	2
106	Residential	B	67	1	67	Yes	69	Yes	68	Yes	1
107	Residential	B	67	1	65	No	67	Yes	67	Yes	2
108	Residential	B	67	1	71	Yes	73	Yes	74	Yes	3
109	Residential	B	67	1	71	Yes	73	Yes	74	Yes	3
110	Residential	B	67	1	71	Yes	72	Yes	74	Yes	3
111	Commercial	E	72	1	66	No	67	No	71	Yes	0
112	Residential	B	67	1	59	No	61	No	57	No	-2
113	Commercial	E	72	1	76	Yes	77	Yes	78	Yes	2
114	Commercial	E	72	1	72	Yes	74	Yes	74	Yes	2

2015 Existing Noise Level Impacts

I-85 MM 96-106
NOISE STUDY
2015 EXISTING
CONDITION
SHEET 1 OF 11

I-85

114

113

1"=300'



IMPACTED

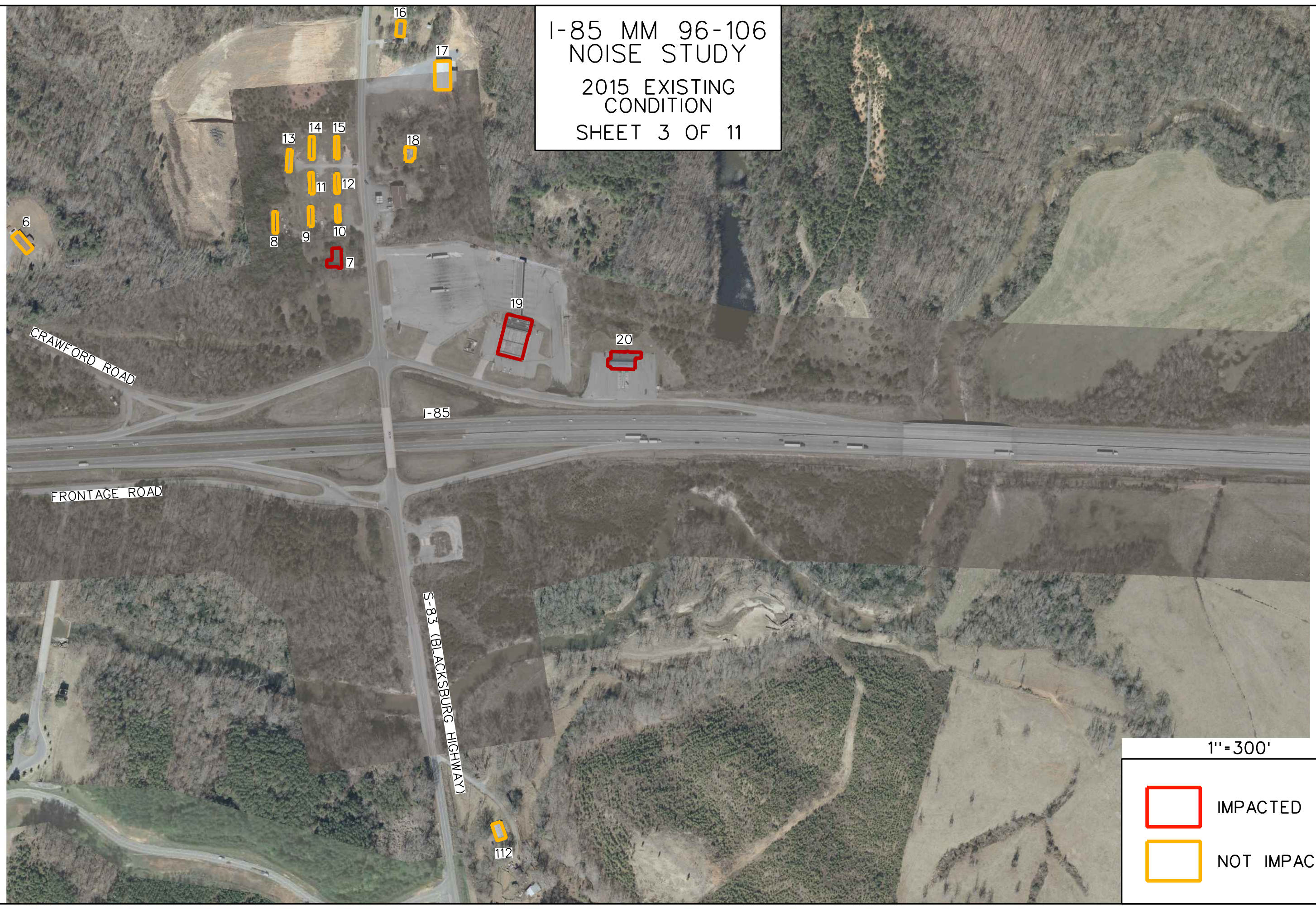


NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2015 EXISTING
CONDITION
SHEET 2 OF 11



I-85 MM 96-106
NOISE STUDY
2015 EXISTING
CONDITION
SHEET 3 OF 11



1" = 300'

-  IMPACTED
-  NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2015 EXISTING
CONDITION
SHEET 4 OF 11

I-85

HENSON ROAD

11

BEAR DEN ROAD

1" = 300'

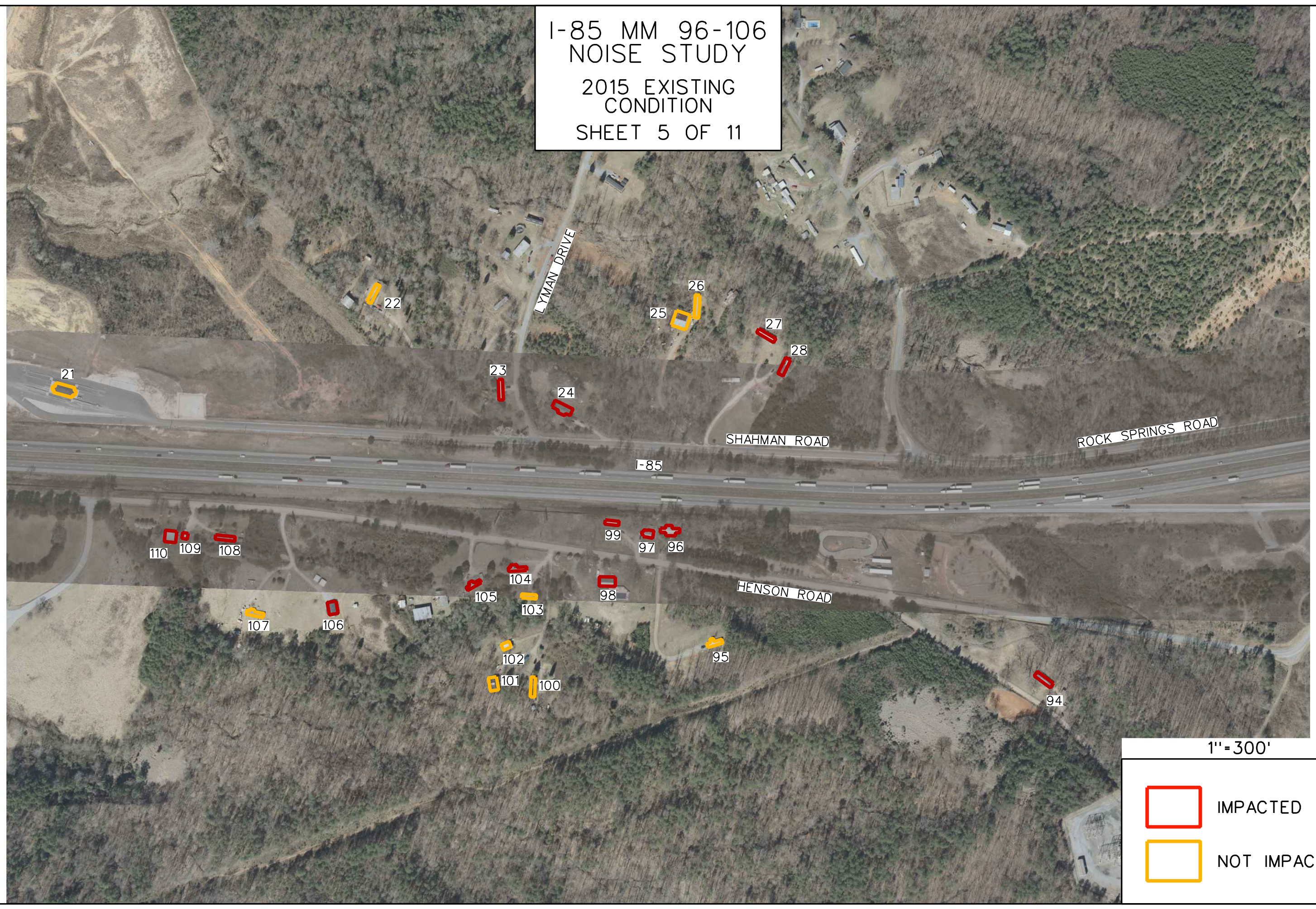


IMPACTED



NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2015 EXISTING
CONDITION
SHEET 5 OF 11



1" = 300'

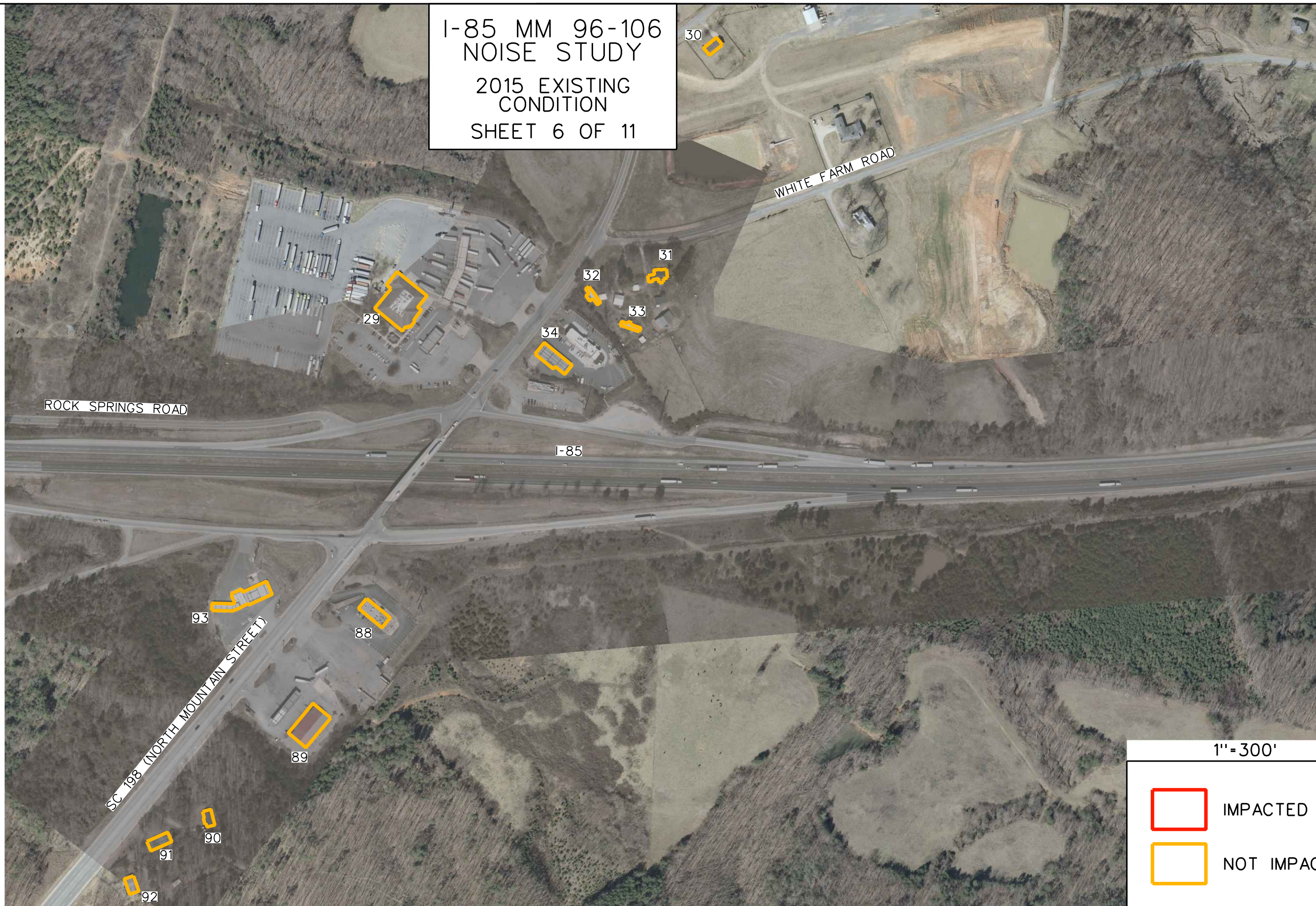


IMPACTED



NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2015 EXISTING
CONDITION
SHEET 6 OF 11



1" = 300'

- IMPACTED
- NOT IMPACTED

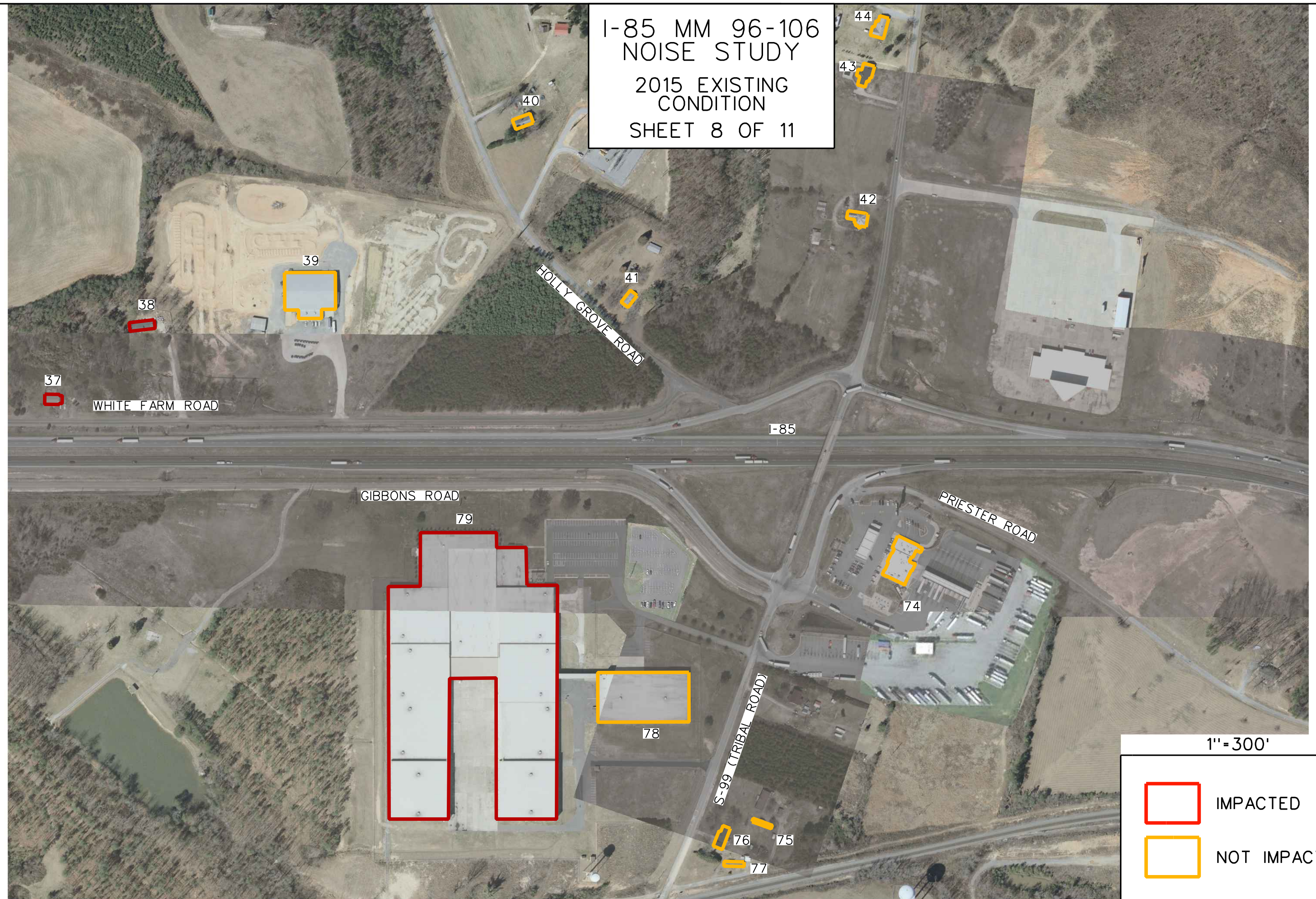
I-85 MM 96-106
NOISE STUDY
2015 EXISTING
CONDITION
SHEET 7 OF 11



1" = 300'

-  IMPACTED
-  NOT IMPACTED

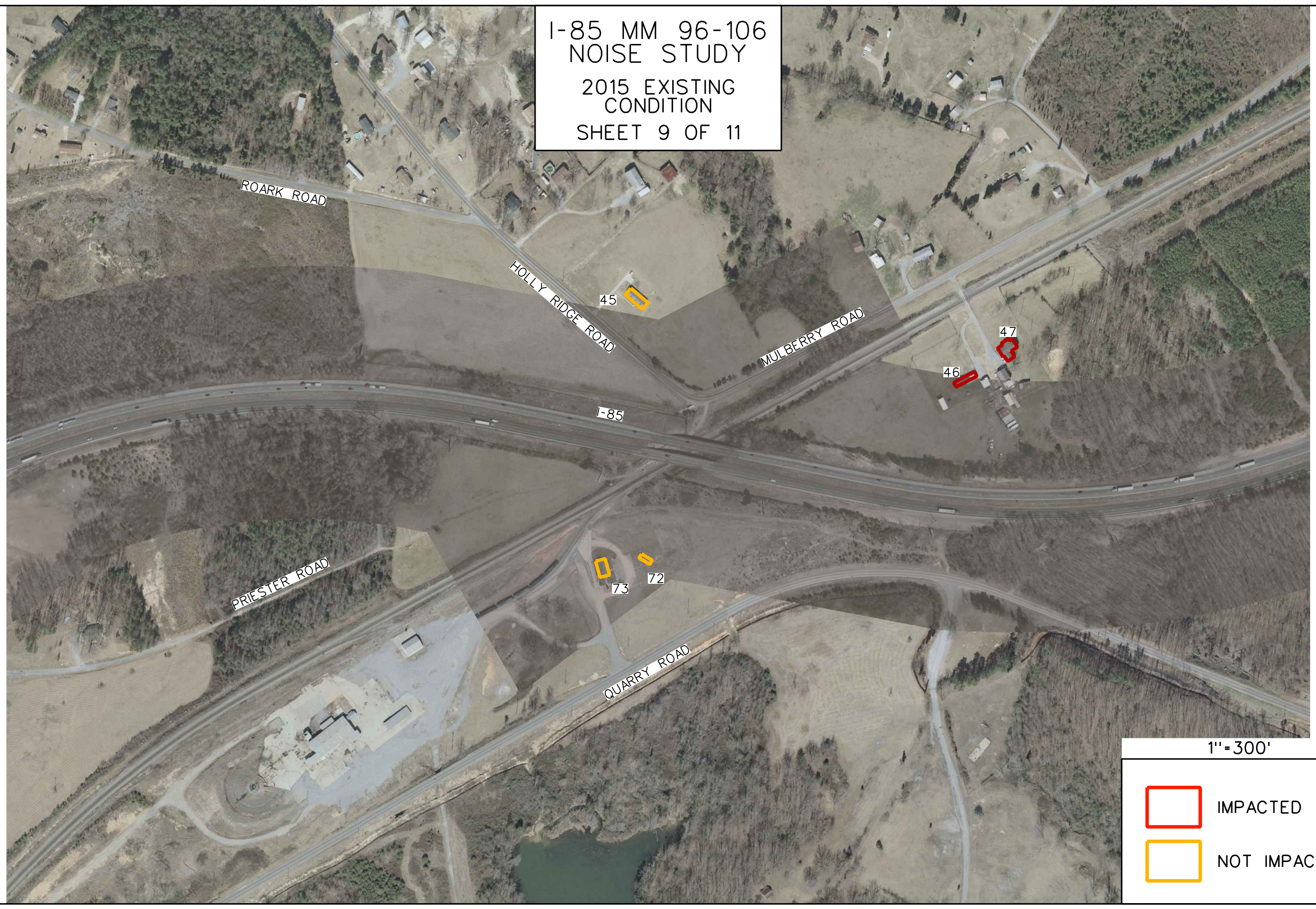
I-85 MM 96-106
NOISE STUDY
2015 EXISTING
CONDITION
SHEET 8 OF 11



1" = 300'

- IMPACTED
- NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2015 EXISTING
CONDITION
SHEET 9 OF 11



ROARK ROAD

HOLLY RIDGE ROAD

MULBERRY ROAD

PRIESTER ROAD

QUARRY ROAD

I-85

45

47

46

73

72

1" = 300'



IMPACTED



NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2015 EXISTING
CONDITION
SHEET 10 OF 11



1" = 300'



IMPACTED



NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2015 EXISTING
CONDITION
SHEET 11 OF 11



IMPACTED



NOT IMPACTED

2040 No-Build Noise Level Impacts

I-85 MM 96-106
NOISE STUDY
2040 NO BUILD
CONDITION
SHEET 1 OF 11

I-85

114

113

1"=300'



IMPACTED

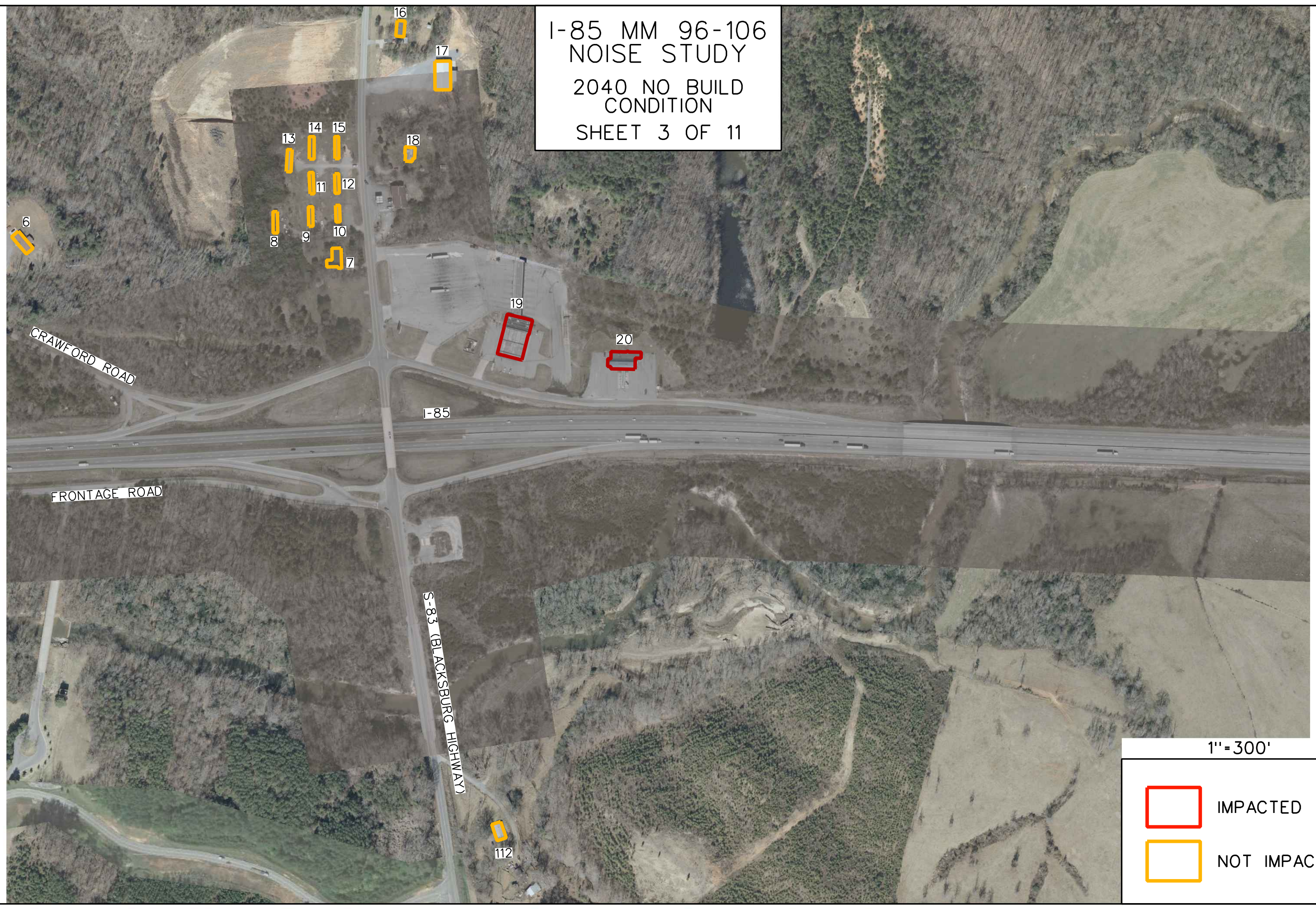


NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 NO BUILD
CONDITION
SHEET 2 OF 11



I-85 MM 96-106
NOISE STUDY
2040 NO BUILD
CONDITION
SHEET 3 OF 11



1" = 300'

-  IMPACTED
-  NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 NO BUILD
CONDITION
SHEET 4 OF 11

I-85

HENSON ROAD

111

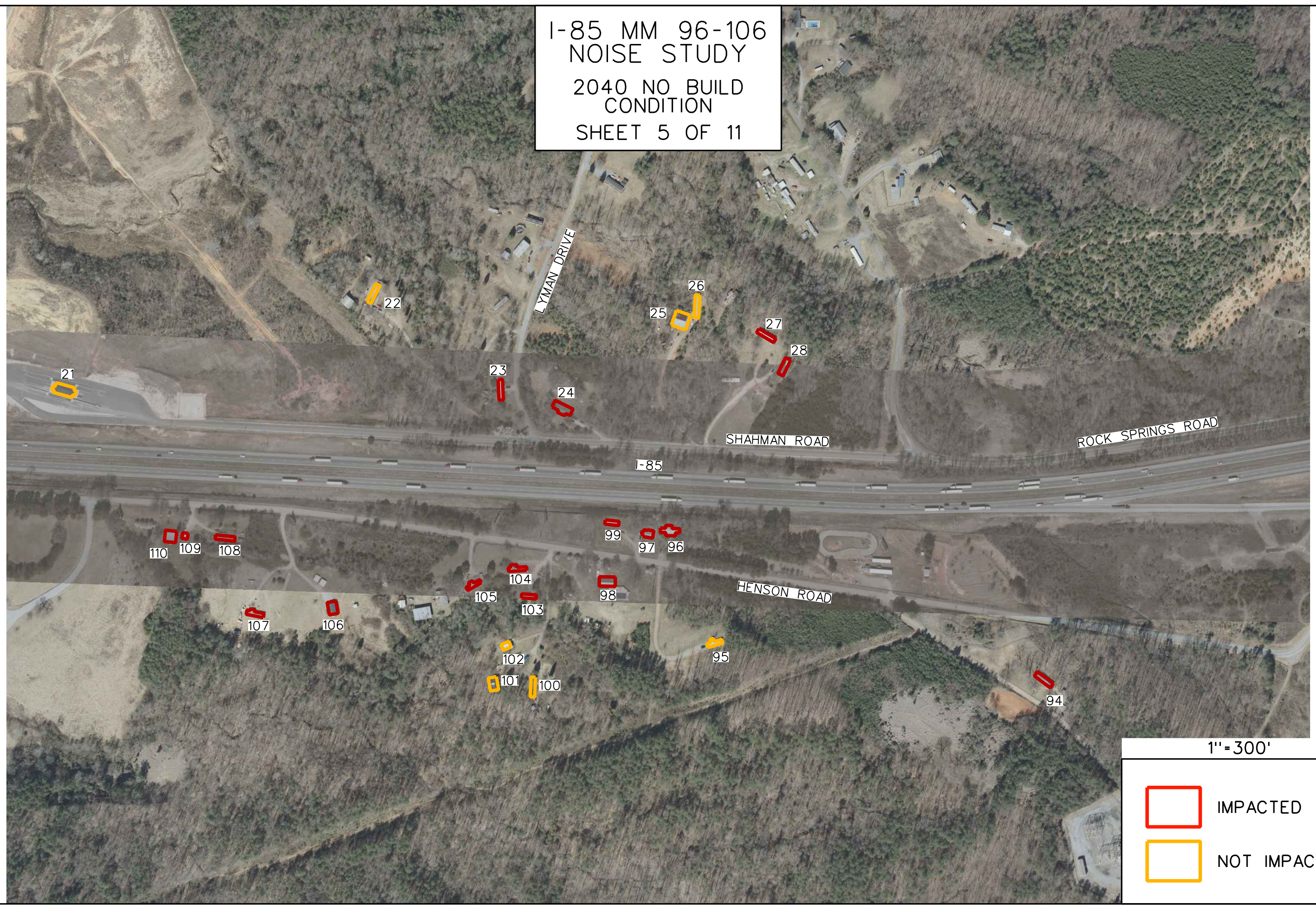
BEAR DEN ROAD

1" = 300'

IMPACTED

NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 NO BUILD
CONDITION
SHEET 5 OF 11

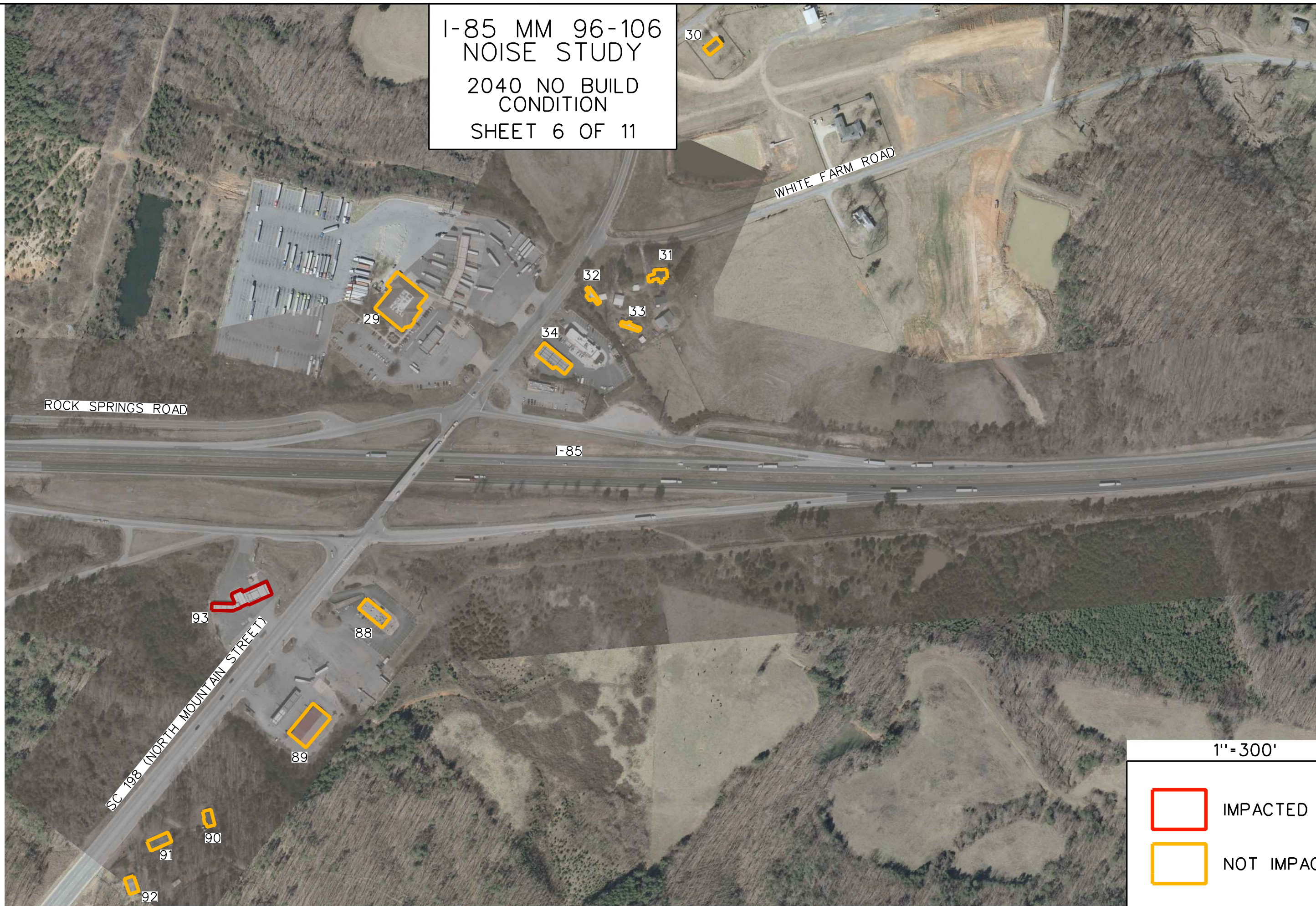


IMPACTED



NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 NO BUILD
CONDITION
SHEET 6 OF 11



- IMPACTED
- NOT IMPACTED

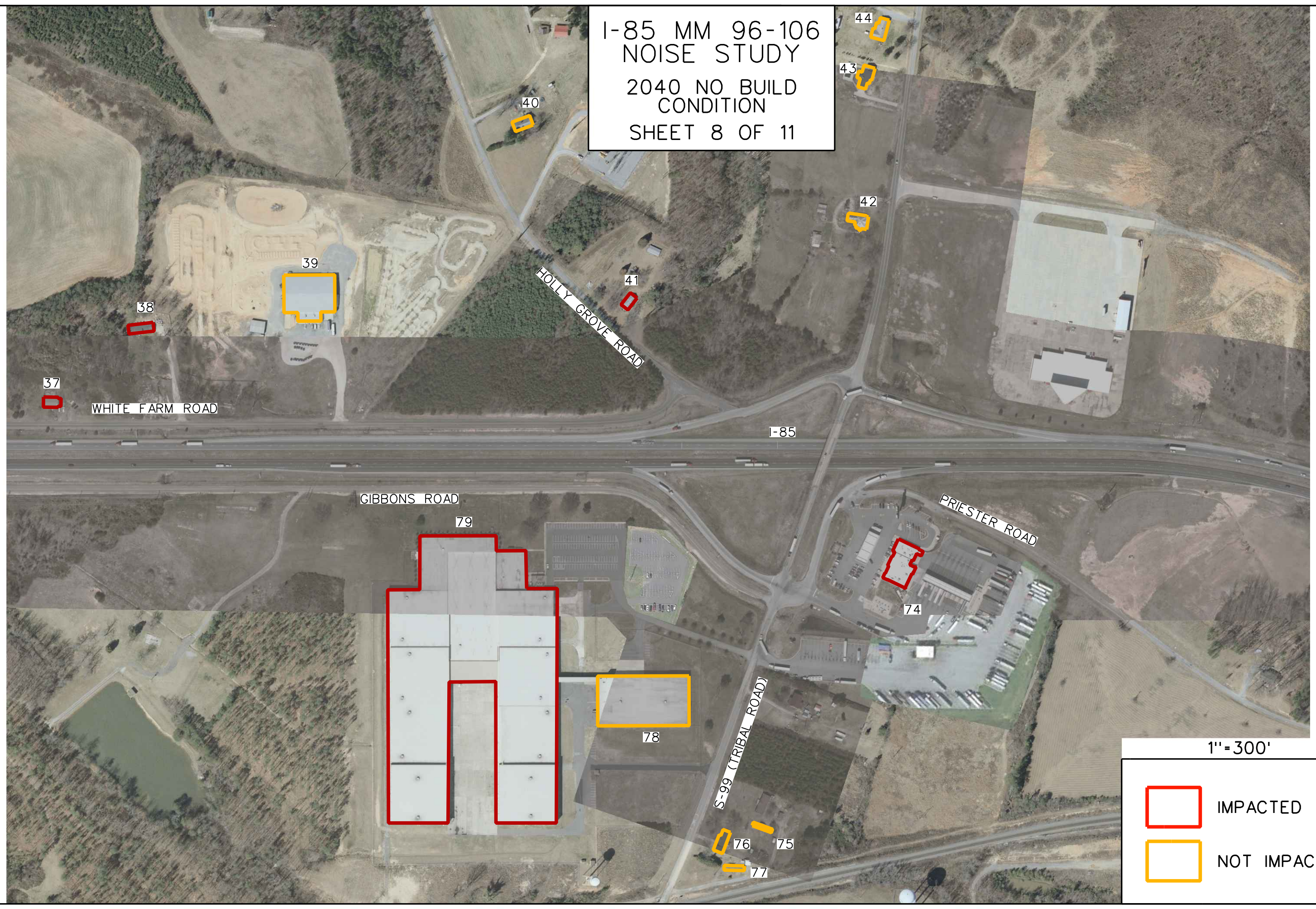
I-85 MM 96-106
NOISE STUDY
2040 NO BUILD
CONDITION
SHEET 7 OF 11



1" = 300'

-  IMPACTED
-  NOT IMPACTED

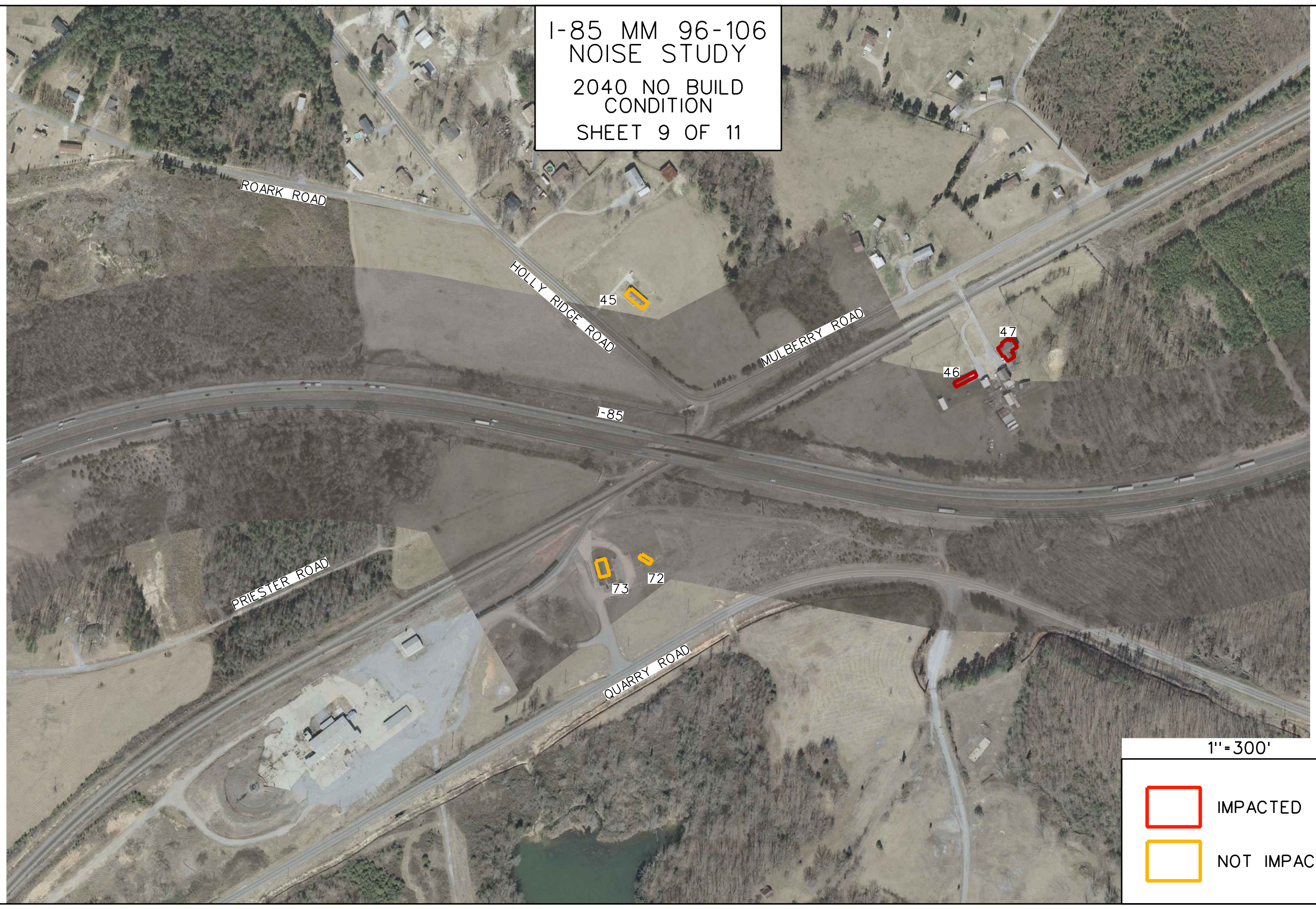
I-85 MM 96-106
NOISE STUDY
2040 NO BUILD
CONDITION
SHEET 8 OF 11



1" = 300'

-  IMPACTED
-  NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 NO BUILD
CONDITION
SHEET 9 OF 11



1" = 300'

-  IMPACTED
-  NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 NO BUILD
CONDITION
SHEET 10 OF 11



1" = 300'

- IMPACTED
- NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 NO BUILD
CONDITION
SHEET 11 OF 11



IMPACTED



NOT IMPACTED

2040 Build Noise Level Impacts

I-85 MM 96-106
NOISE STUDY
2040 BUILD
CONDITION
SHEET 1 OF 11

I-85

114

113

1"=300'



IMPACTED

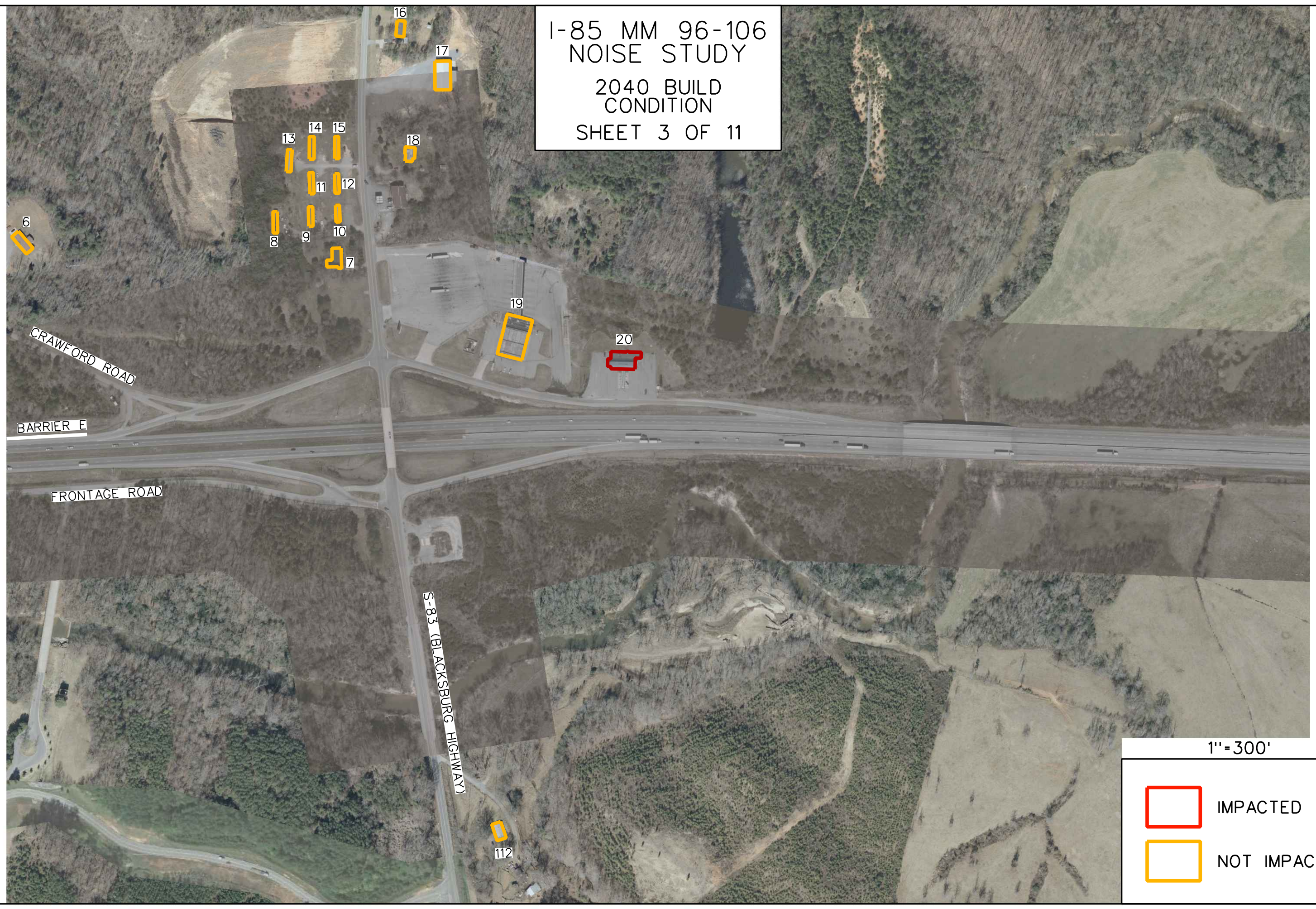


NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 BUILD
CONDITION
SHEET 2 OF 11



I-85 MM 96-106
NOISE STUDY
2040 BUILD
CONDITION
SHEET 3 OF 11



1" = 300'

-  IMPACTED
-  NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 BUILD
CONDITION
SHEET 4 OF 11

I-85

HENSON ROAD

111

BEAR DEN ROAD

1" = 300'

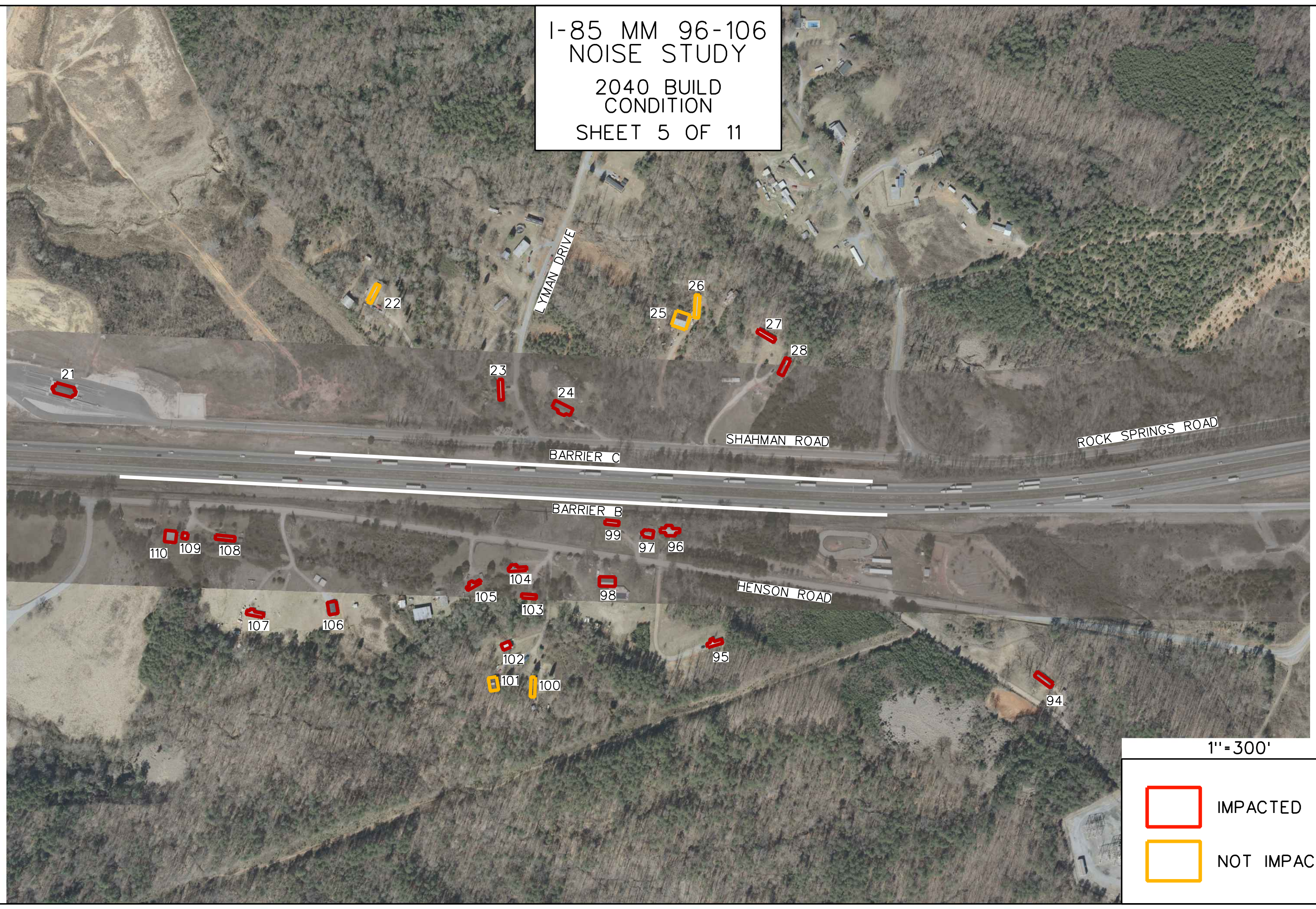


IMPACTED



NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 BUILD
CONDITION
SHEET 5 OF 11



1" = 300'

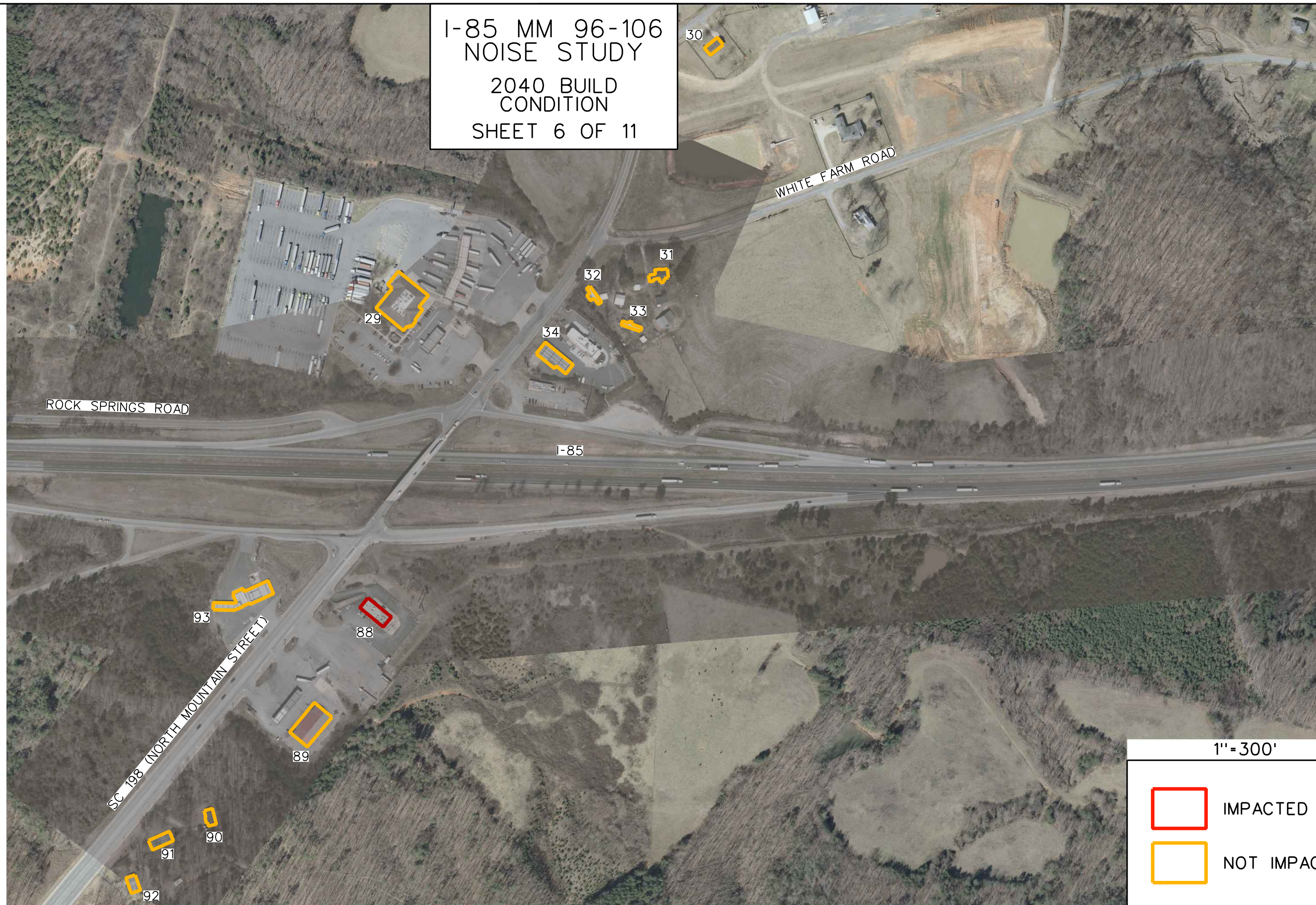


IMPACTED



NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 BUILD
CONDITION
SHEET 6 OF 11



- IMPACTED
- NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 BUILD
CONDITION
SHEET 7 OF 11

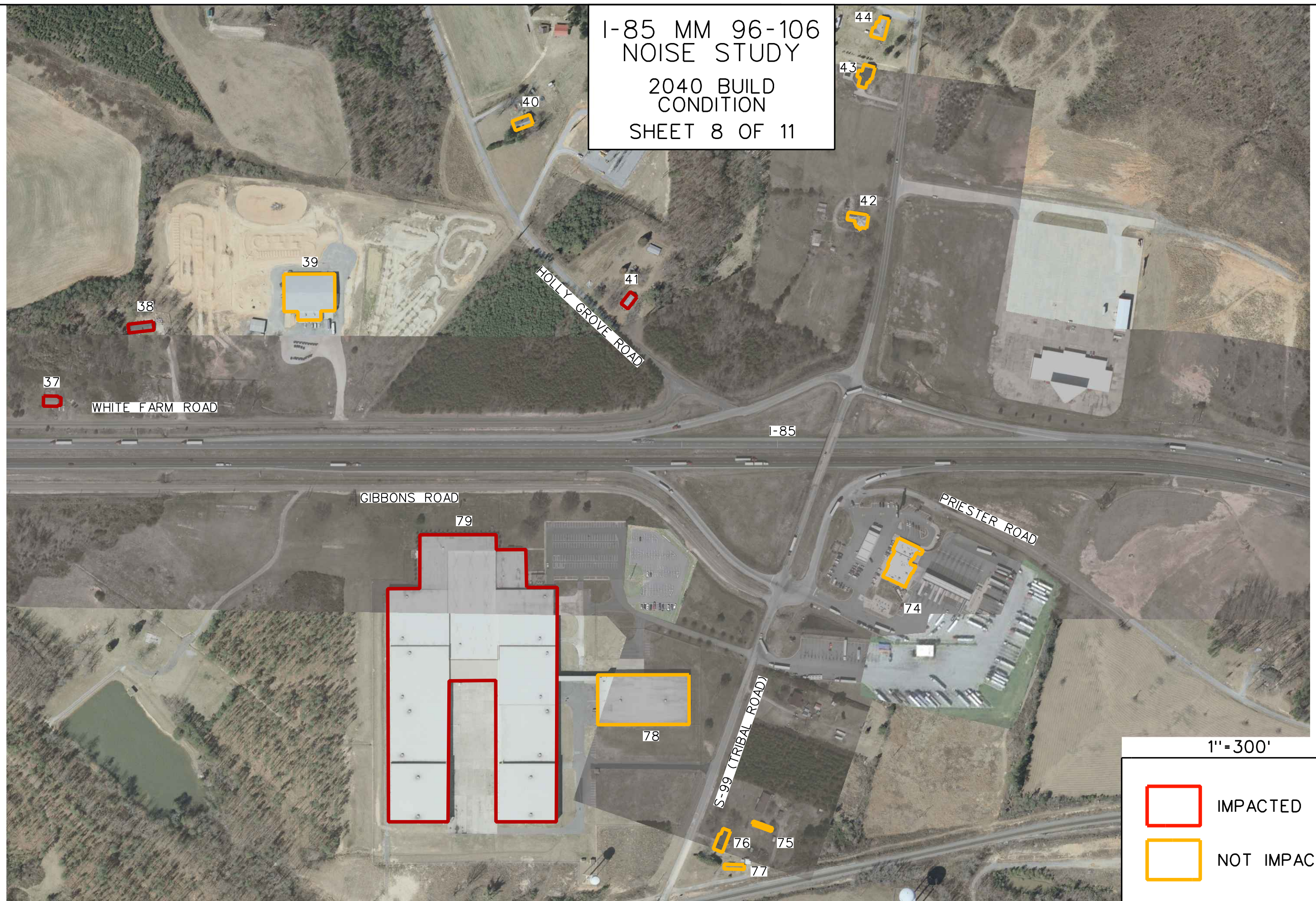


IMPACTED



NOT IMPACTED

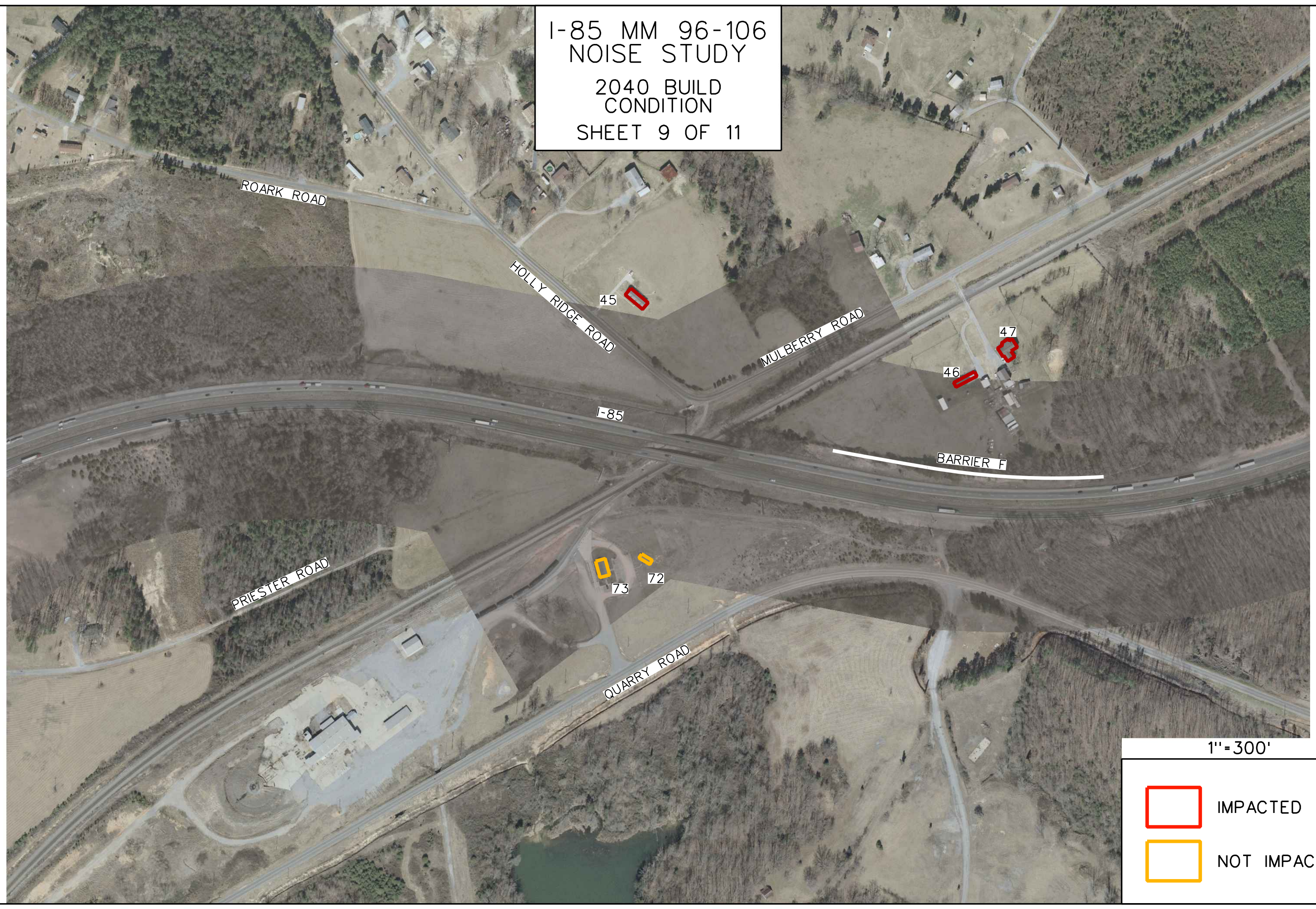
I-85 MM 96-106
NOISE STUDY
2040 BUILD
CONDITION
SHEET 8 OF 11



1" = 300'

-  IMPACTED
-  NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 BUILD
CONDITION
SHEET 9 OF 11



1" = 300'

-  IMPACTED
-  NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 BUILD
CONDITION
SHEET 10 OF 11



- IMPACTED
- NOT IMPACTED

I-85 MM 96-106
NOISE STUDY
2040 BUILD
CONDITION
SHEET 11 OF 11



FRONTAGE ROAD (2)

BARRIER D

1" = 300'

- IMPACTED
- NOT IMPACTED

Noise Measurement Data Sheets

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: I-85 Widening		Site #: 1	Date: August 24, 2016
Site Description: Residential		Site Location: 1319 Blacksburg Highway	
Start Time: 9:52 am	10:07 am	Duration: 15 minutes	L _{eq} : 58.9

Site Sketch:



Notes: Across from truck stop; air brakes, birds

Traffic Counts	I-85
Autos:	Northbound – 251, Southbound – 230
Medium Trucks:	Northbound – 17, Southbound – 16
Heavy Trucks:	Northbound – 82, Southbound – 113
Buses:	Northbound – 1, Southbound – 0
Motorcycles:	Northbound – 1, Southbound – 1

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: I-85 Widening		Site #: 2	Date: August 24, 2016
Site Description: Residential		Site Location: 338 Henson Road	
Start Time: 10:21 am	10:36 am	Duration: 15 minutes	L _{eq} : 66.7

Site Sketch:



Notes: Approximately 20 feet above roadway

Traffic Counts	I-85
Autos:	Northbound – 238, Southbound – 244
Medium Trucks:	Northbound – 18, Southbound – 14
Heavy Trucks:	Northbound – 112, Southbound – 84
Buses:	Northbound – 0, Southbound – 2
Motorcycles:	Northbound – 1, Southbound – 1

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: I-85 Widening		Site #: 3	Date: August 24, 2016
Site Description: Residential		Site Location: 360 Shaman Road	
Start Time: 10:49 am	11:04 am	Duration: 15 minutes	L _{eq} : 62.2

Site Sketch:



Notes: Raised berm between I-85 and receiver; quarry at end of road; air conditioner

Traffic Counts	I-85
Autos:	Northbound – 195, Southbound – 227
Medium Trucks:	Northbound – 17, Southbound – 19
Heavy Trucks:	Northbound – 104, Southbound – 131
Buses:	Northbound – 1, Southbound – 1
Motorcycles:	Northbound – 1, Southbound – 0

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: I-85 Widening		Site #: 4	Date: August 24, 2016
Site Description: Residential		Site Location: 108 White Farm Road	
Start Time: 11:18 am	11:33 am	Duration: 15 minutes	L _{eq} : 54.5

Site Sketch:



Notes: Birds

Traffic Counts	I-85
Autos:	Northbound – 203, Southbound – 249
Medium Trucks:	Northbound – 17, Southbound – 16
Heavy Trucks:	Northbound – 78, Southbound – 102
Buses:	Northbound – 1, Southbound – 2
Motorcycles:	Northbound – 0, Southbound – 2

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: I-85 Widening		Site #: 5		Date: August 24, 2016	
Site Description: Residential			Site Location: 248 Cherokee Creek Road		
Start Time: 11:45 am	12:00 pm	Duration: 15 minutes	L _{eq} : 64.2		

Site Sketch:



Notes: Barking dogs

Traffic Counts	I-85
Autos:	Northbound – 231, Southbound – 219
Medium Trucks:	Northbound – 15, Southbound – 11
Heavy Trucks:	Northbound – 107, Southbound – 120
Buses:	Northbound – 1, Southbound – 2
Motorcycles:	Northbound – 1, Southbound – 1

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: I-85 Widening		Site #: 6	Date: August 24, 2016
Site Description: Residential		Site Location: 571 White Farm Road	
Start Time: 1:05 pm	1:20 pm	Duration: 15 minutes	L _{eq} : 65.3

Site Sketch:



Notes: I-85 elevated approximately 12 feet above receiver

Traffic Counts	I-85
Autos:	Northbound – 200, Southbound – 259
Medium Trucks:	Northbound – 18, Southbound – 14
Heavy Trucks:	Northbound – 89, Southbound – 120
Buses:	Northbound – 1, Southbound – 1
Motorcycles:	Northbound – 2, Southbound – 1

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: I-85 Widening		Site #: 7		Date: August 24, 2016	
Site Description: Residential			Site Location: 148 Mulberry Road		
Start Time: 1:43 pm	1:58 pm	Duration: 15 minutes	L _{eq} : 60.5		

Site Sketch:



Notes:

Traffic Counts	I-85
Autos:	Northbound – 272, Southbound – 198
Medium Trucks:	Northbound – 23, Southbound – 10
Heavy Trucks:	Northbound – 94, Southbound – 108
Buses:	Northbound – 2, Southbound – 0
Motorcycles:	Northbound – 3, Southbound – 2

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: I-85 Widening		Site #: 8	Date: August 24, 2016
Site Description: St. Peters Missionary Baptist Church		Site Location: 116 Poplar Drive	
Start Time: 2:50 pm	3:05 pm	Duration: 15 minutes	L _{eq} : 63.9

Site Sketch:



Notes:

Traffic Counts	I-85
Autos:	Northbound – 295, Southbound – 227
Medium Trucks:	Northbound – 14, Southbound – 9
Heavy Trucks:	Northbound – 94, Southbound – 99
Buses:	Northbound – 4, Southbound – 0
Motorcycles:	Northbound – 1, Southbound – 1

Traffic Data

Noise Study Volumes

	Exit 100		
Roadway Section	2015	2040	Speed Limit (mph)
NB off Ramp	1620	2351	25
NB on Ramp	812	1178	-
SB off Ramp (Simper Road)	885	1284	45
SB on Ramp	1766	2562	-
Crawford Road	1919	2784	25
Orlando Drive ³	-	-	-
Blacksburg Hwy north of I-85	2500 ²	4635	35
Blacksburg Hwy south of I-85	4300 ²	7972	35

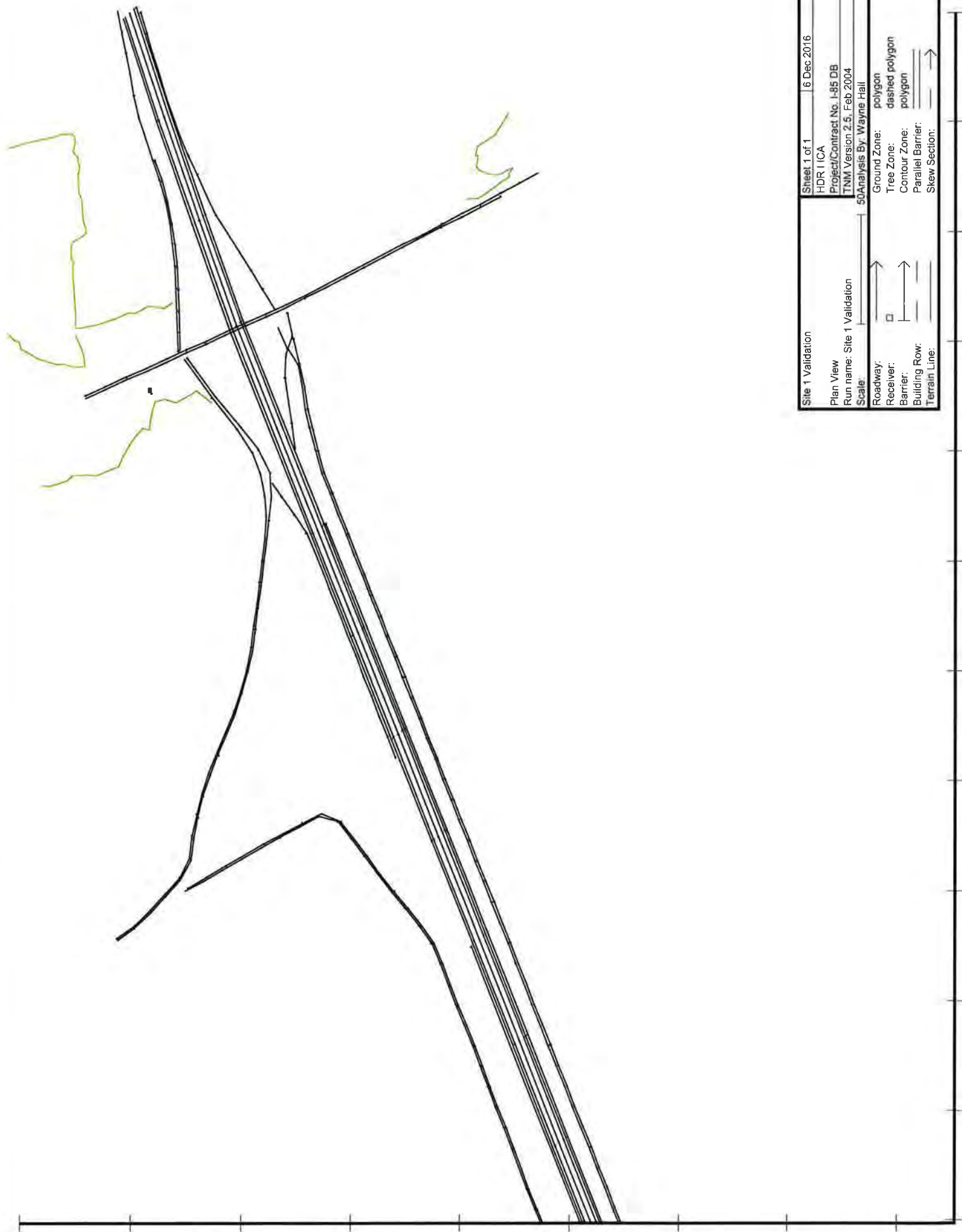
	Exit 102		
Roadway Section	2015	2040	Speed Limit (mph)
NB off Ramp	4686	6799	25
NB on Ramp	2448	3552	-
SB off Ramp	2608	3784	40
SB on Ramp	5161	7488	-
Rock Springs Road	5879	8530	45
Henson Road	4910	7124	35
N. Mountain Street north of I-85	2500 ²	3206	35
N. Mountain Street south of I-85	7200 ²	9234	35

	Exit 104		
Roadway Section	2015	2040	Speed Limit (mph)
NB off Ramp	3170	4599	45
NB on Ramp	2709	3931	-
SB off Ramp	2638	3828	35
SB on Ramp	2631	3817	-
White Farm Road ³	-	-	45
Priester Road	2574	3735	-
Road S-52 (Holly Grove)	3110	4512	45
Tribal Road north of I-85	650 ²	834	45
Tribal Road south of I-85			45

	Exit 106		
Roadway Section	2015	2040	Speed Limit (mph)
NB off Ramp	1378	1999	20
NB on Ramp	1490	2126	-
SB off Ramp	2973	4314	40
SB on Ramp	2835	4113	-
Road S-658 (at US 29)	1899	2755	45
US 29 north of I-85	6100 ²	8851	35
US 29 south of I-85	2300 ²	2950	35

1. ADT 2015 count data provided by Stantec
2. AADT 2015 count data provided by SCDOT
3. Orlando Drive and White Farm Road (at Holly Grove Road) count data is unavailable
 - Design year volumes for ramps and roads intersecting aforementioned ramps grown at 1.5%
 - Blacksburg Highway – 2.5%
 - N Mountain Street – 1.0%
 - Tribal Road – 1.5%
 - E Cherokee Street – 1.0%

TNM Validations



Site 1 Validation	Sheet 1 of 1	6 Dec 2016
Plan View	HDR I ICA	
Run name: Site 1 Validation	Project/Contract No. L-85 DB	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	50 Analysis By: Wayne Hall	
Receiver:	Ground Zone:	polygon
Barrier:	Tree Zone:	dashed polygon
Building Row:	Contour Zone:	polygon
Terrain Line:	Parallel Barrier:	
	Skew Section:	→

1831500 1832000 1832500 1833000 1833500 1834000 1834500 1835000 1835500 1836000 1836500

RESULTS: SOUND LEVELS

I-85 DB

HDR IICA
Wayne Hall

22 September 2016

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:
RUN: I-85 DB
BARRIER DESIGN: Site 1 Validation
INPUT HEIGHTSAverage pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver														
Name	No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Noise Reduction Calculated	Goal	Calculated minus Goal
				Calculated	Crit'n	Calculated	Crit'n	Sub'l Inc		Calculated	Goal			



Site 2 Validation	Sheet 1 of 1	6 Dec 2016
Plan View	HDR 1 ICA	
Run name: Site 2 Validation	Project/Contract No. I-85 DB	
Scale: 500 feet	TNM Version 2.5, Feb 2004	
Roadway: polygon	Ground Zone: polygon	
Receiver: dashed polygon	Tree Zone: dashed polygon	
Barrier: polygon	Contour Zone: polygon	
Building Row: polygon	Parallel Barrier: polygon	
Terrain Line: polygon	Skew Section: --- -->	

RESULTS: SOUND LEVELS

I-85 DB

HDR IICA
Wayne Hall

22 September 2016
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN:

BARRIER DESIGN:

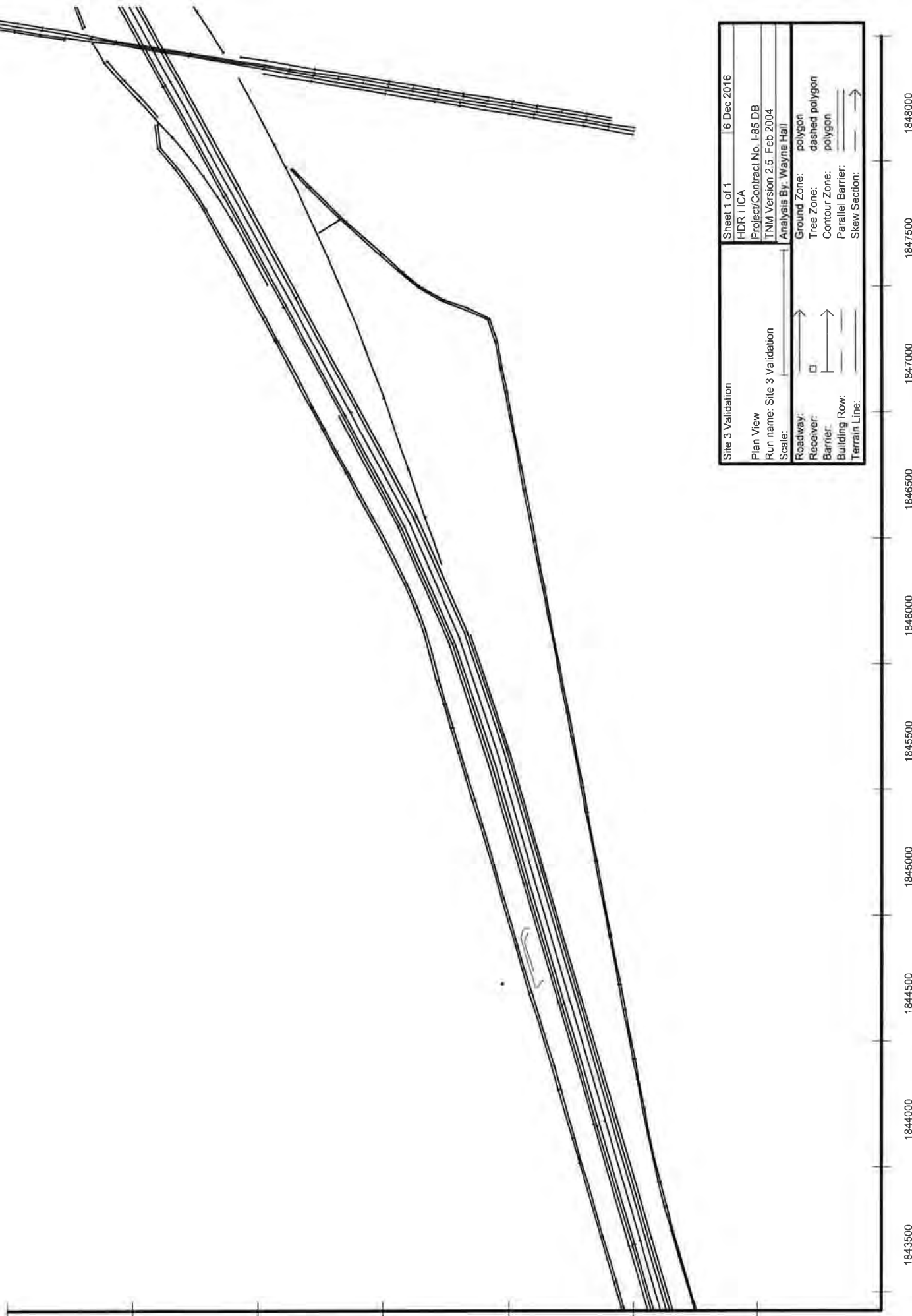
I-85 DB
Site 2 Validation
INPUT HEIGHTS

68 deg F, 50% RH

ATMOSPHERICS:

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver													
Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal	
R157	38	1	0.0	69.5	66	69.5	dB	15	69.5	0.0	8	-8.0	
Dwelling Units													
# DUs			Noise Reduction										
			Min dB	Avg dB	Max dB								
All Selected		1	0.0	0.0	0.0								
All Impacted		1	0.0	0.0	0.0								
All that meet NR Goal		0	0.0	0.0	0.0								



Site 3 Validation	Sheet 1 of 1	6 Dec 2016
Plan View	HDR 1 ICA	
Run name: Site 3 Validation	Project/Contract No. I-85 DB	
Scale:	TNM Version 2.5 Feb 2004	
Roadway:	Ground Zone:	polygon
Receiver:	Tree Zone:	dashed polygon
Barrier:	Contour Zone:	polygon
Building Row:	Parallel Barrier:	
Terrain Line:	Skew Section:	→

RESULTS: SOUND LEVELS

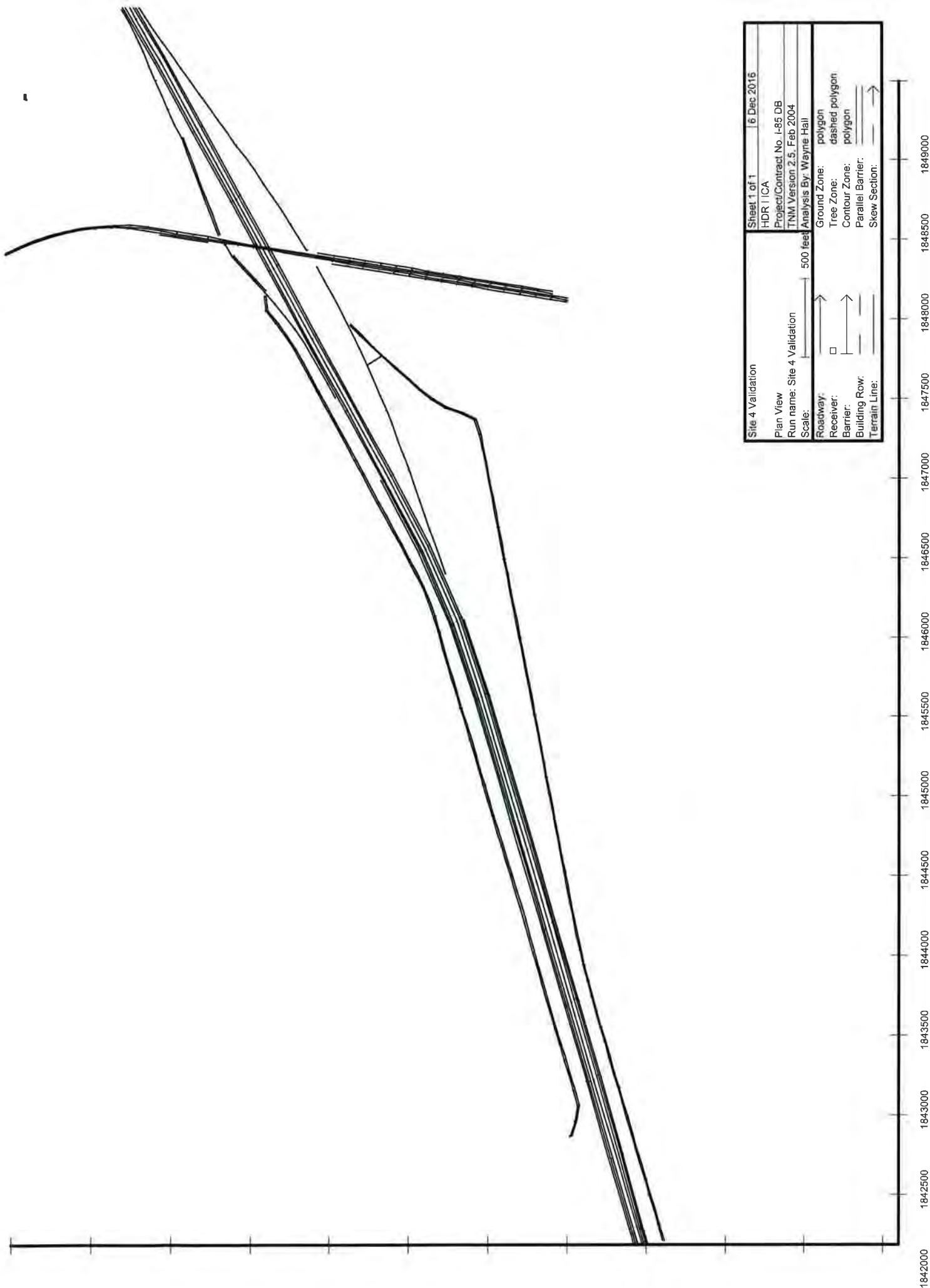
I-85 DB

HDR I ICA
Wayne Hall22 September 2016
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:
RUN:
BARRIER DESIGN:
ATMOSPHERICS:I-85 DB
Site 3 Validation
INPUT HEIGHTS
68 deg F, 50% RHAverage pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver		No.	#DUs	Existing		No Barrier		Increase over existing		Type		With Barrier		Noise Reduction		Calculated minus Goal dB
Name				LAeq1h		LAeq1h		Calculated	Crit'n	Calculated	dB	Calculated	LAeq1h	Calculated	Goal	
				dB		dB										
R32		5	1	0.0		65.1		66	65.1	15	----	65.1		0.0	8	-8.0
Dwelling Units		# DUs	Noise Reduction				Max dB									
			Min dB	Avg dB												
All Selected		1	0.0	0.0		0.0										
All Impacted		0	0.0	0.0		0.0										
All that meet NR Goal		0	0.0	0.0		0.0										



Site 4 Validation		Sheet 1 of 1	6 Dec 2016
Plan View		HDR ICA	
Run name: Site 4 Validation		Project/Contract No. I-85 DB	
Scale: 500 feet		TNM Version 2.5, Feb 2004	
Roadway:		Analysis By: Wayne Hall	
Receiver:	□	Ground Zone:	polygon
Barrier:	—	Tree Zone:	dashed polygon
Building Row:	—	Contour Zone:	polygon
Terrain Line:	—	Parallel Barrier:	—
		Skew Section:	→

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA

Wayne Hall

23 September 2016

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN:

BARRIER DESIGN:

I-85 DB

Site 4 Validation

INPUT HEIGHTS

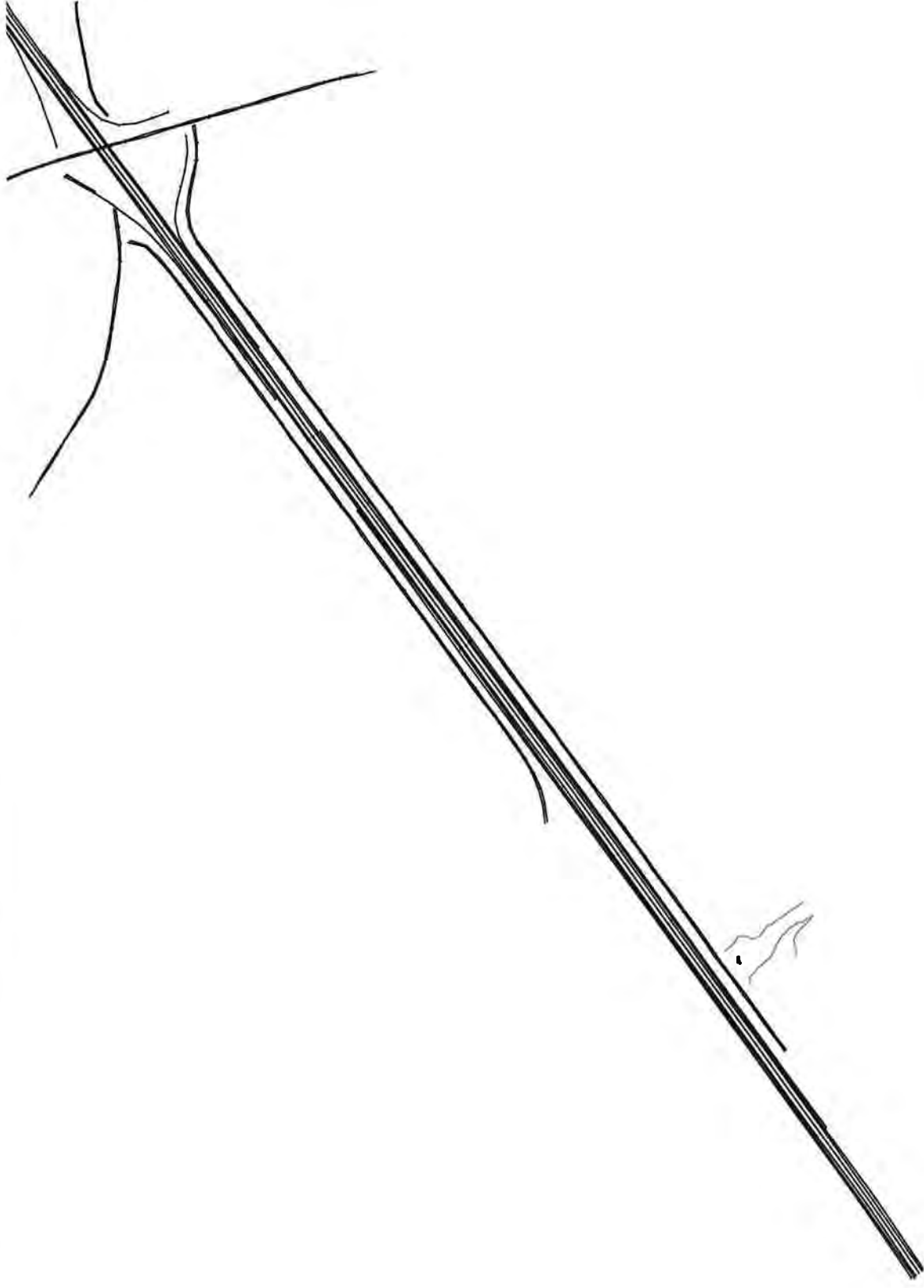
Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

68 deg F, 50% RH

ATMOSPHERICS:

Receiver

Receiver Name	No.	#DUs	No Barrier			With Barrier				Calculated minus Goal dB		
			Existing LAeq1h	LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	Calculated LAeq1h		Noise Reduction Calculated	Goal
			dBA	dBA	dBA	dB	dB	dB	dBA	dB	dB	
R178	57	1	0.0	48.8	66	48.8	15	48.8	0.0	8	-8.0	
Dwelling Units												
		# DUs	Noise Reduction									
			Min dB	Avg dB	Max dB							
All Selected		1	0.0	0.0	0.0							
All Impacted		0	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							



Site 5 Validation	Sheet 1 of 1	6 Dec 2016
Plan View	HDR ICA	
Run name: Site 5 Validation	Project/Contract No. I-85 DB	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: Wayne Hall	
Receiver:	Ground Zone:	polygon
Barrier:	Tree Zone:	dashed polygon
Building Row:	Contour Zone:	polygon
Terrain Line:	Parallel Barrier:	
	Skew Section:	→

1850000 1851000 1852000 1853000 1854000 1855000 1856000 1857000 1858000

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA

Wayne Hall

22 September 2016

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN: Site 5 Validation

BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS:

68 deg F, 50% RH

I-85 DB

Site 5 Validation

INPUT HEIGHTS

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver

Name	No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Calculated minus Goal dB
				LAeq1h Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Calculated LAeq1h		Noise Reduction Calculated	Goal	
			dBA	dBA	dBA	dB	dB	dB		dBA	dB	dB
R141	40	1	0.0	66.3	66	66.3	15	Snd Lvl	66.3	0.0	8	-8.0
Dwelling Units												
		# DUs	Noise Reduction									
			Min dB	Avg dB	Max dB							
All Selected		1	0.0	0.0	0.0							
All Impacted		1	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							



Site 6 Validation		Sheet 1 of 1	16 Dec 2016
Plan View		HDR IICA	
Run name: Site 6 Validation		Project/Contract No. I-85 DB	
Scale:		TNM Version 2.5, Feb 2004	
Roadway:		Analysis By: Wayne Hall	
Receiver:		Ground Zone:	polygon
Barrier:		Tree Zone:	dashed polygon
Building Row:		Contour Zone:	polygon
Terrain Line:		Parallel Barrier:	
		Skew Section:	→

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA
Wayne Hall

23 September 2016
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN:

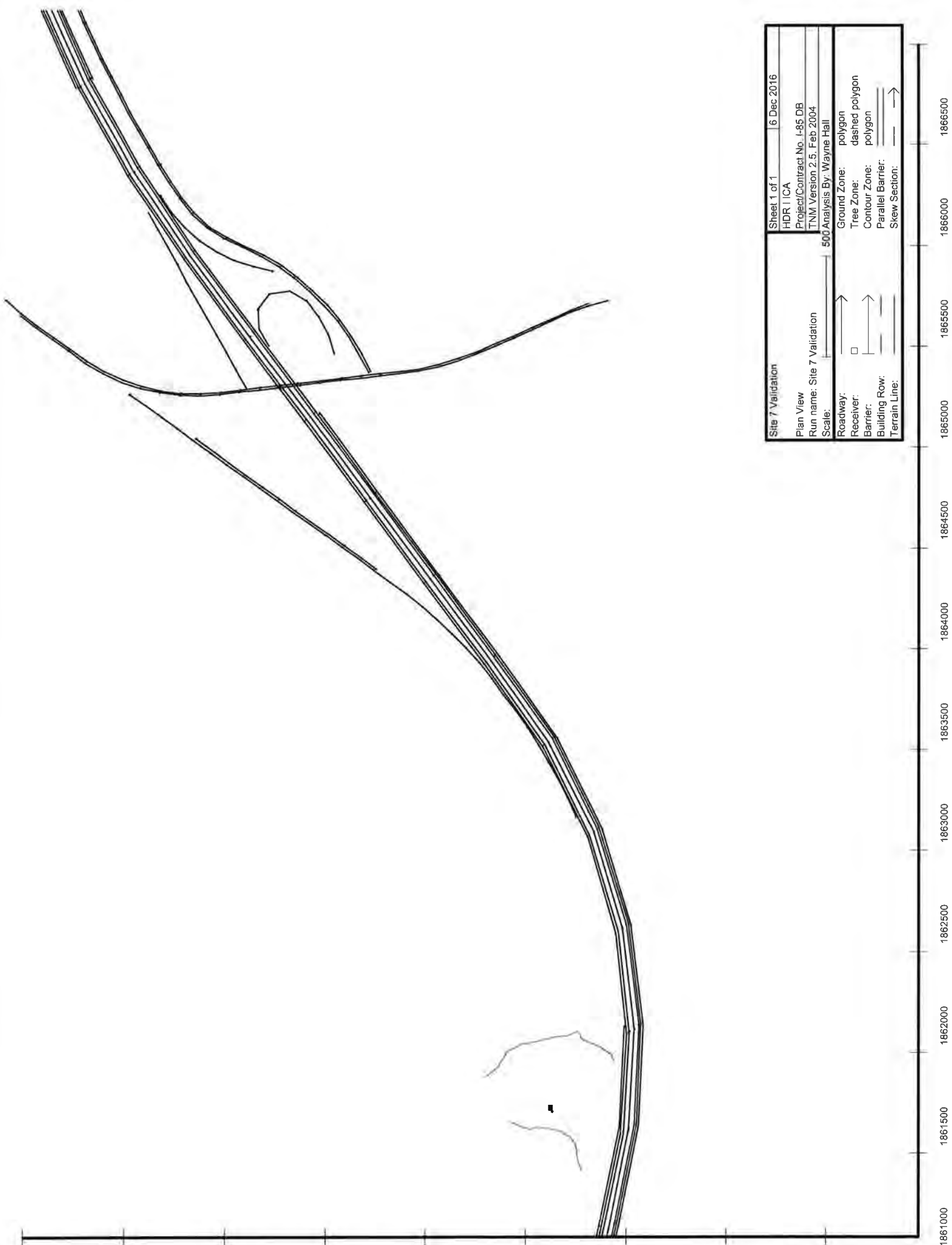
BARRIER DESIGN:

ATMOSPHERICS:

I-85 DB
Site 6 Validation
INPUT HEIGHTS
68 deg F, 50% RH

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver													
Name	No.	#DUs	Existing LAeq1h	No Barrier		With Barrier							
				Calculated LAeq1h	Crit'n	Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	Calculated LAeq1h	Noise Reduction Calculated	Goal
			dBa	dBa	dBa	dB	dB	dB	dB	dB	dB	dB	dB
R54		43	1	0.0	65.8	66	65.8	15	----	65.8	0.0	8	-8.0
Dwelling Units													
		# DUs	Noise Reduction										
			Min dB	Avg dB	Max dB								
All Selected		1	0.0	0.0	0.0	0.0							
All Impacted		0	0.0	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0	0.0							



Site 7 Validation	Sheet 1 of 1	16 Dec 2016
Plan View	HDR IICA	
Run name: Site 7 Validation	Project/Contract No. I-85 DB	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	500 Analysis By: Wayne Hall	
Receiver:	Ground Zone:	polygon
Barrier:	Tree Zone:	dashed polygon
Building Row:	Contour Zone:	polygon
Terrain Line:	Parallel Barrier:	
	Skew Section:	→

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA
Wayne Hall22 September 2016
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN:

BARRIER DESIGN:

ATMOSPHERICS:

I-85 DB
Site 7 Validation
INPUT HEIGHTS
68 deg F, 50% RHAverage pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver											
Name	No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing	Type Impact	With Barrier		Noise Reduction	Calculated minus Goal dB
				LAeq1h Calculated	Crit'n			Calculated LAeq1h	Calculated		
R71		2	1	0.0	62.4	66	62.4	15	62.4	0.0	8
Dwelling Units											
			# DUs	Noise Reduction							
				Min	Avg	Max					
				dB	dB	dB					
All Selected			1	0.0	0.0	0.0					
All Impacted			0	0.0	0.0	0.0					
All that meet NR Goal			0	0.0	0.0	0.0					



Site 8 Validation		Sheet 1 of 1	6 Dec 2016
Plan View		HDR ICA	
Run name: Site 9 Validation		Project/Contract No. I-85 DB	
Scale:		TNM Version 2.5, Feb 2004	
Roadway:	500 Analysis By: Wayne Hall	Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	→

1-85 DB

HDR | ICA
Wayne Hall

23 September 2016
TNM 2.5
Calculated with TNM

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: I-85 DB
RUN: Site 8 Validation
BARRIER DESIGN: INPUT HEIGHTS

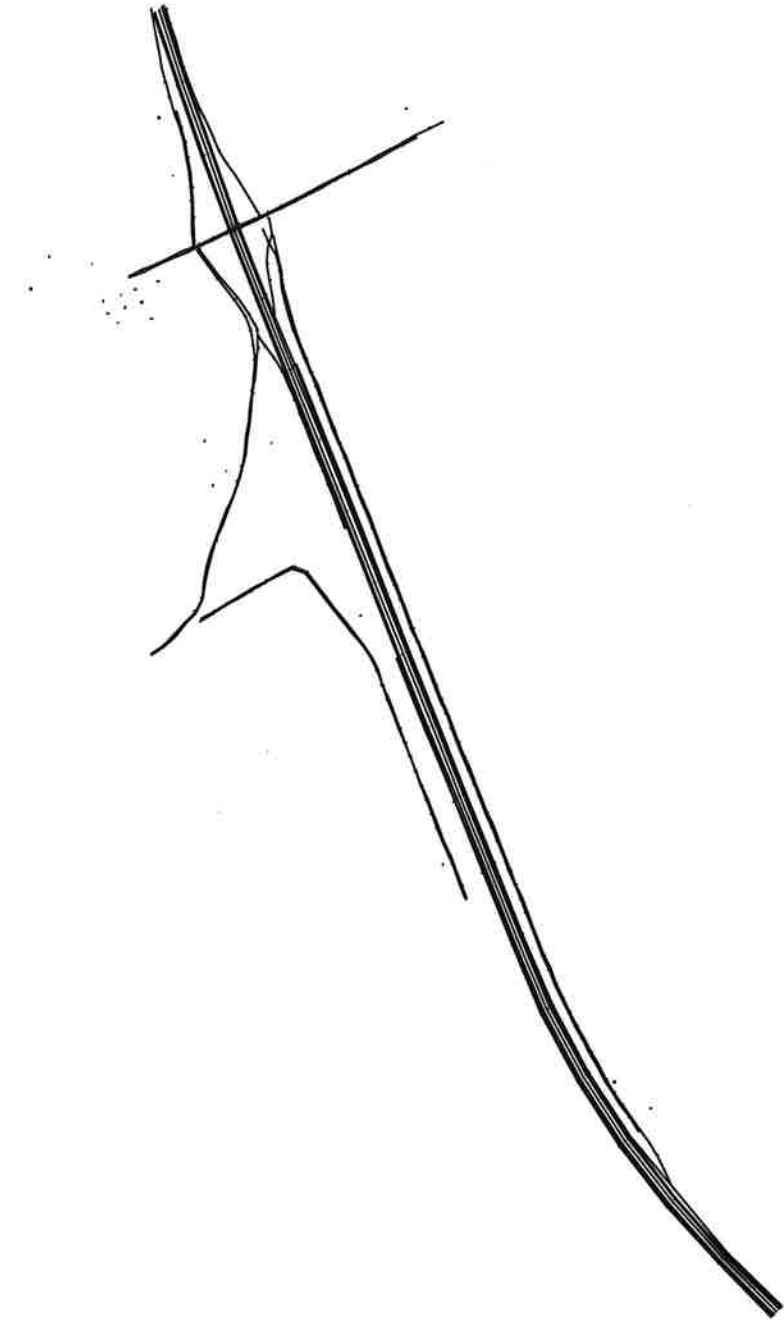
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS:
68 deg F, 50% RH

Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Calculated minus Goal dB
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Calculated LAeq1h		Noise Reduction Calculated	Goal	
			dBA	dBA	dBA	dB	dB	dBA	dBA	dB	dB	
R91	22	1	0.0	64.8	66	64.8	15	64.8	0.0	8	-8.0	
Dwelling Units												
		# DUs	Noise Reduction									
			Min dB	Avg dB	Max dB							
All Selected		1	0.0	0.0	0.0							
All Impacted		0	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

Section 1 Noise Analysis Area

Existing Conditions, No Build, Build



Exit 100 Existing Conditions		Sheet 1 of 1	12 Feb 2017
Plan View		HDR ICA	
Run name: Exit 100		Project/Contract No. I-85 DB	
Scale: 1000 Analysis By: Wayne Hall		TNM Version 2.5, Feb 2004	
Roadway:	polyline	Ground Zone:	polyline
Receiver:	square	Tree Zone:	dashed polyline
Barrier:	polyline	Contour Zone:	polyline
Building Row:	polyline	Parallel Barrier:	polyline
Terrain Line:	polyline	Skew Section:	polyline

1828000 1829000 1830000 1831000 1832000 1833000 1834000 1835000 1836000 1837000 1838000 1839000 1840000

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

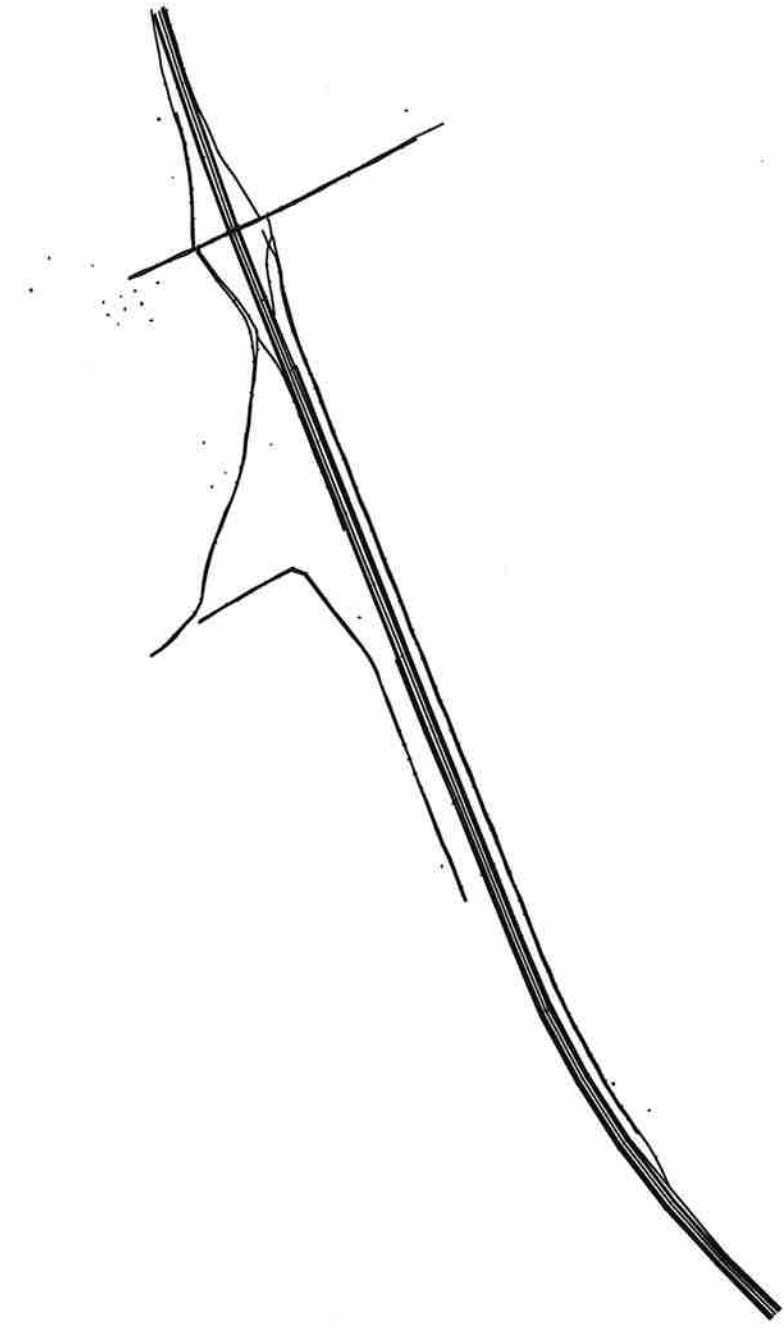
RUN: Exit 100 Existing Conditions
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

I-85 DB

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver		#DUs	Existing LAeq1h dBA	No Barrier		Increase over existing		Type Impact	With Barrier		Noise Reduction Calculated	Goal	Calculated minus Goal
Name	No.			LAeq1h Calculated	Crit'n	Calculated	Crit'n Sub'l Inc		Calculated LAeq1h dBA	dBA			
1	66	1	0.0	72.8	71	72.8	15	Snd Lvl	72.8	0.0	8	8	-8.0
2	67	1	0.0	74.0	71	74.0	15	Snd Lvl	74.0	0.0	8	8	-8.0
3	68	1	0.0	59.7	66	59.7	15	****	59.7	0.0	8	8	-8.0
4	69	1	0.0	61.6	66	61.6	15	****	61.6	0.0	8	8	-8.0
5	70	1	0.0	71.7	66	71.7	15	Snd Lvl	71.7	0.0	8	8	-8.0
6	71	1	0.0	60.9	66	60.9	15	****	60.9	0.0	8	8	-8.0
7	72	1	0.0	65.5	66	65.5	15	****	65.5	0.0	8	8	-8.0
8	73	1	0.0	62.3	66	62.3	15	****	62.3	0.0	8	8	-8.0
9	74	1	0.0	63.2	66	63.2	15	****	63.2	0.0	8	8	-8.0
10	75	1	0.0	63.3	66	63.3	15	****	63.3	0.0	8	8	-8.0
11	76	1	0.0	61.6	66	61.6	15	****	61.6	0.0	8	8	-8.0
12	77	1	0.0	61.7	66	61.7	15	****	61.7	0.0	8	8	-8.0
13	78	1	0.0	60.0	66	60.0	15	****	60.0	0.0	8	8	-8.0
14	79	1	0.0	59.7	66	59.7	15	****	59.7	0.0	8	8	-8.0
15	80	1	0.0	60.0	66	60.0	15	****	60.0	0.0	8	8	-8.0
16	81	1	0.0	55.5	66	55.5	15	****	55.5	0.0	8	8	-8.0
17	82	1	0.0	56.5	71	56.5	15	****	56.5	0.0	8	8	-8.0
18	83	1	0.0	58.5	66	58.5	15	****	58.5	0.0	8	8	-8.0
19	84	1	0.0	71.2	71	71.2	15	Snd Lvl	71.2	0.0	8	8	-8.0
20	85	1	0.0	72.7	71	72.7	15	Snd Lvl	72.7	0.0	8	8	-8.0
112	86	1	0.0	59.1	66	59.1	15	****	59.1	0.0	8	8	-8.0
113	87	1	0.0	75.5	71	75.5	15	Snd Lvl	75.5	0.0	8	8	-8.0
114	88	1	0.0	71.8	71	71.8	15	Snd Lvl	71.8	0.0	8	8	-8.0
Dwelling Units		# DUs	Noise Reduction		Max								
			Min	Avg	dB								
			dB	dB	dB								
All Selected		23	0.0	0.0	0.0								
All Impacted		7	0.0	0.0	0.0								
All that meet NR Goal		0	0.0	0.0	0.0								



Exit: 100 Future No Build	Sheet 1 of 1	2 Feb 2017
Plan View	HDR I ICA	
Run name: 100FNB	Project/Contract No. I-85 DB	
Scale: 1000 Analysis By: Wayne Hall	TNM Version 2.5, Feb 2004	
Roadway:	Ground Zone:	polygon
Receiver:	Tree Zone:	dashed polygon
Barrier:	Contour Zone:	polygon
Building Row:	Parallel Barrier:	—
Terrain Line:	Skew Section:	—



RESULTS: SOUND LEVELS

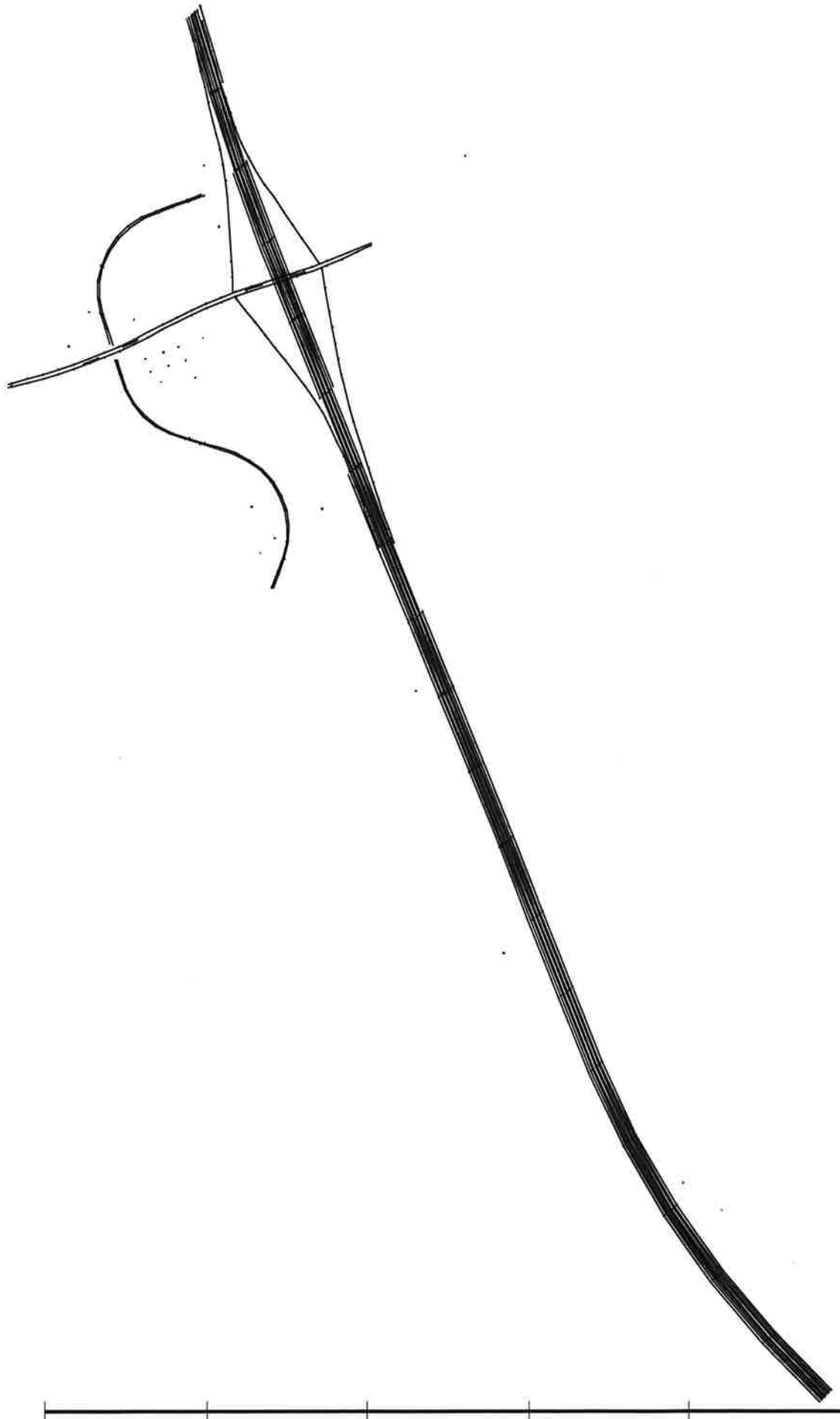
I-85 DB

HDR I ICA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5RESULTS: SOUND LEVELS
PROJECT/CONTRACT:RUN: I-85 DB
Exit 100 Future No Build
BARRIER DESIGN: INPUT HEIGHTS

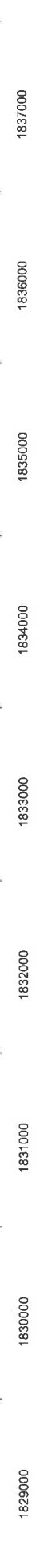
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing	Type Impact	With Barrier		Noise Reduction	Calculated minus Goal
				LAeq1h Calculated	Crit'n	Calculated		LAeq1h Calculated	Goal		
			dB	dB	dB	dB		dB	dB	dB	dB
1	63	1	0.0	74.5	71	74.5	15	74.5	0.0	8	-8.0
2	64	1	0.0	75.7	71	75.7	15	75.7	0.0	8	-8.0
3	65	1	0.0	61.4	66	61.4	15	61.4	0.0	8	-8.0
4	66	1	0.0	63.3	66	63.3	15	63.3	0.0	8	-8.0
5	67	1	0.0	73.5	66	73.5	15	73.5	0.0	8	-8.0
6	68	1	0.0	62.6	66	62.6	15	62.6	0.0	8	-8.0
7	69	1	0.0	67.5	66	67.5	15	67.5	0.0	8	-8.0
8	70	1	0.0	64.1	66	64.1	15	64.1	0.0	8	-8.0
9	71	1	0.0	65.0	66	65.0	15	65.0	0.0	8	-8.0
10	72	1	0.0	65.2	66	65.2	15	65.2	0.0	8	-8.0
11	73	1	0.0	63.4	66	63.4	15	63.4	0.0	8	-8.0
12	74	1	0.0	63.6	66	63.6	15	63.6	0.0	8	-8.0
13	75	1	0.0	61.8	66	61.8	15	61.8	0.0	8	-8.0
14	76	1	0.0	61.5	66	61.5	15	61.5	0.0	8	-8.0
15	77	1	0.0	61.8	66	61.8	15	61.8	0.0	8	-8.0
16	78	1	0.0	57.3	66	57.3	15	57.3	0.0	8	-8.0
17	79	1	0.0	58.2	71	58.2	15	58.2	0.0	8	-8.0
18	80	1	0.0	60.4	66	60.4	15	60.4	0.0	8	-8.0
19	81	1	0.0	73.0	71	73.0	15	73.0	0.0	8	-8.0
20	82	1	0.0	74.4	71	74.4	15	74.4	0.0	8	-8.0
112	83	1	0.0	61.4	66	61.4	15	61.4	0.0	8	-8.0
113	84	1	0.0	77.2	71	77.2	15	77.2	0.0	8	-8.0
114	85	1	0.0	73.5	71	73.5	15	73.5	0.0	8	-8.0
Dwelling Units											
# DUs			Noise Reduction								
			Min	Avg							
			dB	dB							
All Selected			23	0.0	0.0	0.0	0.0				
All Impacted			8	0.0	0.0	0.0	0.0				
All that meet NIR Goal			0	0.0	0.0	0.0	0.0				



Exit 100 - Alt. 1	Sheet 1 of 1	2 Feb 2017
Plan View	HDR IICA	
Run name: Alt. 1	Project/Contract No. I-85 DB Prep	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Ground Zone:	polygon
Receiver:	Tree Zone:	dashed polygon
Barrier:	Contour Zone:	polygon
Building Row:	Parallel Barrier:	
Terrain Line:	Skew Section:	↔



RESULTS: SOUND LEVELS

I -85 DB Prep

HDR I ICA

Wayne Hall

20 February 2017

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN: I -85 DB Prep

BARrier DESIGN: Exit 100 - Alt. 1

ATMOSPHERICS: INPUT HEIGHTS

68 deg F, 50% RH

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name		No.	#DUs	Existing LAeq1h	No Barrier LAeq1h	Increase over existing			Type Impact	With Barrier		Calculated minus Goal
						Crit'n	Calculated	Crit'n Sub'l Inc		Calculated LAeq1h	Noise Reduction Calculated	Goal
				dBA	dBA	dBA	dB	dB		dBA	dB	dB
1		63	1	0.0	72.7	71	72.7	15	Snd Lvl	72.7	0.0	8
2		64	1	0.0	76.6	71	76.6	15	Snd Lvl	76.6	0.0	8
3		65	1	0.0	61.1	66	61.1	15	*****	61.1	0.0	8
4		66	1	0.0	64.8	66	64.8	15	*****	64.8	0.0	8
5		67	1	0.0	74.3	66	74.3	15	Snd Lvl	74.3	0.0	8
6		68	1	0.0	60.8	66	60.8	15	*****	60.8	0.0	8
7		69	1	0.0	65.2	66	65.2	15	*****	65.2	0.0	8
8		70	1	0.0	63.0	66	63.0	15	*****	63.0	0.0	8
9		71	1	0.0	63.0	66	63.0	15	*****	63.0	0.0	8
10		72	1	0.0	63.9	66	63.9	15	*****	63.9	0.0	8
11		73	1	0.0	62.6	66	62.6	15	*****	62.6	0.0	8
12		74	1	0.0	62.5	66	62.5	15	*****	62.5	0.0	8
13		75	1	0.0	60.8	66	60.8	15	*****	60.8	0.0	8
14		76	1	0.0	61.8	66	61.8	15	*****	61.8	0.0	8
15		77	1	0.0	62.1	66	62.1	15	*****	62.1	0.0	8
16		78	1	0.0	61.4	66	61.4	15	*****	61.4	0.0	8
17		79	1	0.0	59.1	71	59.1	15	*****	59.1	0.0	8
18		80	1	0.0	61.3	66	61.3	15	*****	61.3	0.0	8
19		81	1	0.0	68.5	71	68.5	15	*****	68.5	0.0	8
20		82	1	0.0	74.8	71	74.8	15	Snd Lvl	74.8	0.0	8
112		83	1	0.0	57.1	66	57.1	15	*****	57.1	0.0	8
113		84	1	0.0	77.8	71	77.8	15	Snd Lvl	77.8	0.0	8
114		85	1	0.0	74.1	71	74.1	15	Snd Lvl	74.1	0.0	8
Dwelling Units		# DUs	Noise Reduction			Max						
				Min	Avg	dB						
All Selected		23	0.0	0.0	0.0	0.0						
All Impacted		6	0.0	0.0	0.0	0.0						
All that meet NR Goal		0	0.0	0.0	0.0	0.0						



Exit 100 - Alt. 2	Sheet 1 of 1	12 Feb 2017
Plan View	HDR 11 CA	
Run name: ALT. 2	Project/Contract No. I-85 DB Prep	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Ground Zone:	polygon
Receiver:	Tree Zone:	dashed polygon
Barrier:	Contour Zone:	polygon
Building Row:	Parallel Barrier:	
Terrain Line:	Skew Section:	→

1829000 1830000 1831000 1832000 1833000 1834000 1835000 1836000 1837000

RESULTS: SOUND LEVELS

I-85 DB Prep

HDR I ICA
Wayne Hall

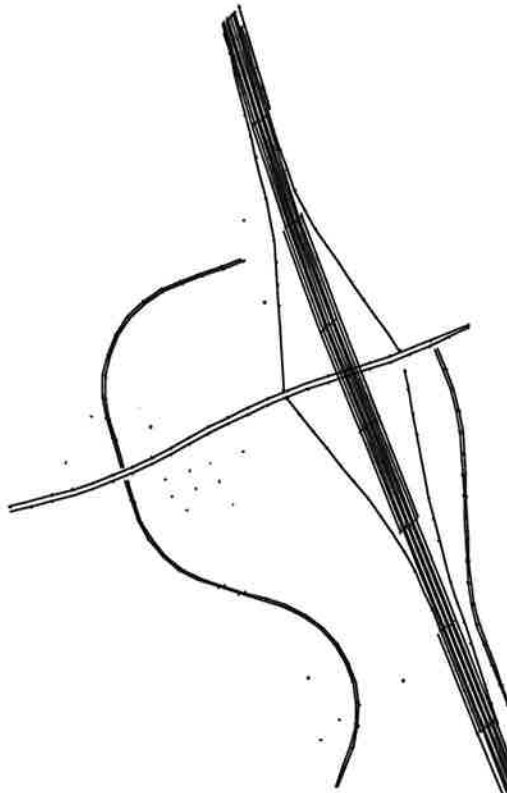
20 February 2017
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:
Exit 100 - Alt. 2
BARRIER DESIGN:
INPUT HEIGHTS
ATMOSPHERICS:
68 deg F, 50% RH

I-85 DB Prep
Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name													
No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing				Type Impact	With Barrier		Calculated minus Goal	
			Calculated	Crit'n	Calculated	Crit'n	Sub'l Inc	Calculated LAeq1h		Noise Reduction			
			dBA	dBA	dB	dBA	dB	dB		dBA	dB	dB	dB
1	65	1	0.0	84.8	71	84.8	84.8	15	Snd Lvl	84.8	0.0	8	-8.0
2	66	1	0.0	84.7	71	84.7	84.7	15	Snd Lvl	84.7	0.0	8	-8.0
3	67	1	0.0	63.3	66	63.3	63.3	15	*****	63.3	0.0	8	-8.0
4	68	1	0.0	60.4	66	60.4	60.4	15	*****	60.4	0.0	8	-8.0
5	69	1	0.0	63.3	66	63.3	63.3	15	*****	63.3	0.0	8	-8.0
6	70	1	0.0	60.2	66	60.2	60.2	15	*****	60.2	0.0	8	-8.0
7	71	1	0.0	65.2	66	65.2	65.2	15	*****	65.2	0.0	8	-8.0
8	72	1	0.0	58.6	66	58.6	58.6	15	*****	58.6	0.0	8	-8.0
9	73	1	0.0	60.1	66	60.1	60.1	15	*****	60.1	0.0	8	-8.0
10	74	1	0.0	56.8	66	56.8	56.8	15	*****	56.8	0.0	8	-8.0
11	75	1	0.0	64.1	66	64.1	64.1	15	*****	64.1	0.0	8	-8.0
12	76	1	0.0	66.5	66	66.5	66.5	15	Snd Lvl	66.5	0.0	8	-8.0
13	77	1	0.0	61.1	66	61.1	61.1	15	*****	61.1	0.0	8	-8.0
14	78	1	0.0	63.4	66	63.4	63.4	15	*****	63.4	0.0	8	-8.0
15	79	1	0.0	79.7	66	79.7	79.7	15	Snd Lvl	79.7	0.0	8	-8.0
16	80	1	0.0	75.4	66	75.4	75.4	15	Snd Lvl	75.4	0.0	8	-8.0
17	81	1	0.0	66.0	71	66.0	66.0	15	*****	66.0	0.0	8	-8.0
18	82	1	0.0	65.2	66	65.2	65.2	15	*****	65.2	0.0	8	-8.0
19	83	1	0.0	53.9	71	53.9	53.9	15	*****	53.9	0.0	8	-8.0
20	84	1	0.0	53.1	71	53.1	53.1	15	*****	53.1	0.0	8	-8.0
112	85	1	0.0	52.4	66	52.4	52.4	15	*****	52.4	0.0	8	-8.0
113	86	1	0.0	74.9	71	74.9	74.9	15	Snd Lvl	74.9	0.0	8	-8.0
114	87	1	0.0	73.8	71	73.8	73.8	15	Snd Lvl	73.8	0.0	8	-8.0
Dwelling Units													
			# DUs		Noise Reduction								
					Min	Avg	Max						
					dB	dB	dB						
All Selected			23	0.0	0.0	0.0	0.0						
All Impacted			7	0.0	0.0	0.0	0.0						
All that meet NR Goal			0	0.0	0.0	0.0	0.0						



Exit 100 - Alt. 3	Sheet 1 of 1	2 Feb 2017
Plan View	HDR I ICA	
Run name: Alt. 3	Project/Contract No. I-85 DB Prep	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: Wayne Hall	
Receiver:	Ground Zone:	polygon
Barrier:	Tree Zone:	dashed polygon
Building Row:	Contour Zone:	polygon
Terrain Line:	Parallel Barrier:	
	Skew Section:	→

1829000 1830000 1831000 1832000 1833000 1834000 1835000 1836000 1837000

RESULTS: SOUND LEVELS

I-85 DB Prep

HDR IICA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5

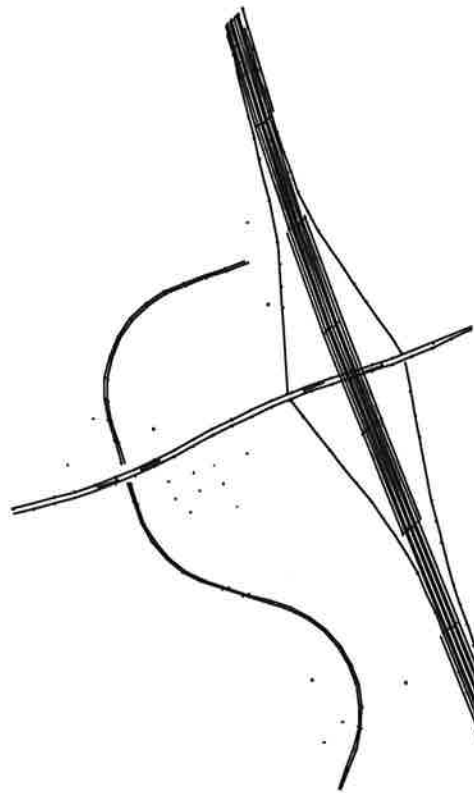
RESULTS: SOUND LEVELS

PROJECT/CONTRACT:
RUN: I-85 DB Prep
Exit 100 - Alt. 3
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name														
No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing				Type Impact	With Barrier		Noise Reduction Calculated	Goal	Calculated minus Goal
			LAeq1h Calculated	Crit'n	Crit'n	Calculated	dB	dBA		dB	LAeq1h Calculated			
			dBA		dBA		dB	dB		dBA		dB		dB
1		34	1	0.0	72.7	71	72.7	15	Snd Lvl	72.7	0.0	8	-8.0	8
2		35	1	0.0	76.7	71	76.7	15	Snd Lvl	76.7	0.0	8	-8.0	8
3		36	1	0.0	61.2	66	61.2	15	----	61.2	0.0	8	-8.0	8
4		37	1	0.0	64.8	66	64.8	15	----	64.8	0.0	8	-8.0	8
5		38	1	0.0	73.8	66	73.8	15	Snd Lvl	73.8	0.0	8	-8.0	8
6		39	1	0.0	60.9	66	60.9	15	----	60.9	0.0	8	-8.0	8
7		40	1	0.0	65.5	66	65.5	15	----	65.5	0.0	8	-8.0	8
8		41	1	0.0	62.8	66	62.8	15	----	62.8	0.0	8	-8.0	8
9		42	1	0.0	63.3	66	63.3	15	----	63.3	0.0	8	-8.0	8
10		43	1	0.0	63.6	66	63.6	15	----	63.6	0.0	8	-8.0	8
11		44	1	0.0	62.8	66	62.8	15	----	62.8	0.0	8	-8.0	8
12		45	1	0.0	62.8	66	62.8	15	----	62.8	0.0	8	-8.0	8
13		46	1	0.0	60.6	66	60.6	15	----	60.6	0.0	8	-8.0	8
14		47	1	0.0	62.0	66	62.0	15	----	62.0	0.0	8	-8.0	8
15		48	1	0.0	62.7	66	62.7	15	----	62.7	0.0	8	-8.0	8
16		49	1	0.0	60.8	66	60.8	15	----	60.8	0.0	8	-8.0	8
17		50	1	0.0	58.9	71	58.9	15	----	58.9	0.0	8	-8.0	8
18		51	1	0.0	61.0	66	61.0	15	----	61.0	0.0	8	-8.0	8
19		52	1	0.0	68.5	71	68.5	15	----	68.5	0.0	8	-8.0	8
20		53	1	0.0	74.8	71	74.8	15	Snd Lvl	74.8	0.0	8	-8.0	8
112		54	1	0.0	57.4	66	57.4	15	----	57.4	0.0	8	-8.0	8
113		55	1	0.0	77.8	71	77.8	15	Snd Lvl	77.8	0.0	8	-8.0	8
114		56	1	0.0	74.1	71	74.1	15	Snd Lvl	74.1	0.0	8	-8.0	8
Dwelling Units														
# DUs			Noise Reduction											
			Min	Avg	Max									
			dB	dB	dB									
All Selected			23	0.0	0.0	0.0								
All Impacted			6	0.0	0.0	0.0								
All that meet NR Goal			0	0.0	0.0	0.0								



Exit 100 - Alt. 4	Sheet 1 of 1	2 Feb 2017
Plan View	HDR IICA	
Run name: Alt. 4	Project/Contract No. 1-85 DB Prep	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Ground Zone:	polygon
Receiver:	Tree Zone:	dashed polygon
Barrier:	Contour Zone:	polygon
Building Row:	Parallel Barrier:	
Terrain Line:	Skew Section:	— — — — —

1829000 1830000 1831000 1832000 1833000 1834000 1835000 1836000 1837000

RESULTS: SOUND LEVELS

I-85 DB Prep

HDR I ICA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: I-85 DB Prep

RUN: Exit 100 - Alt. 4

BARRIER DESIGN: INPUT HEIGHTS

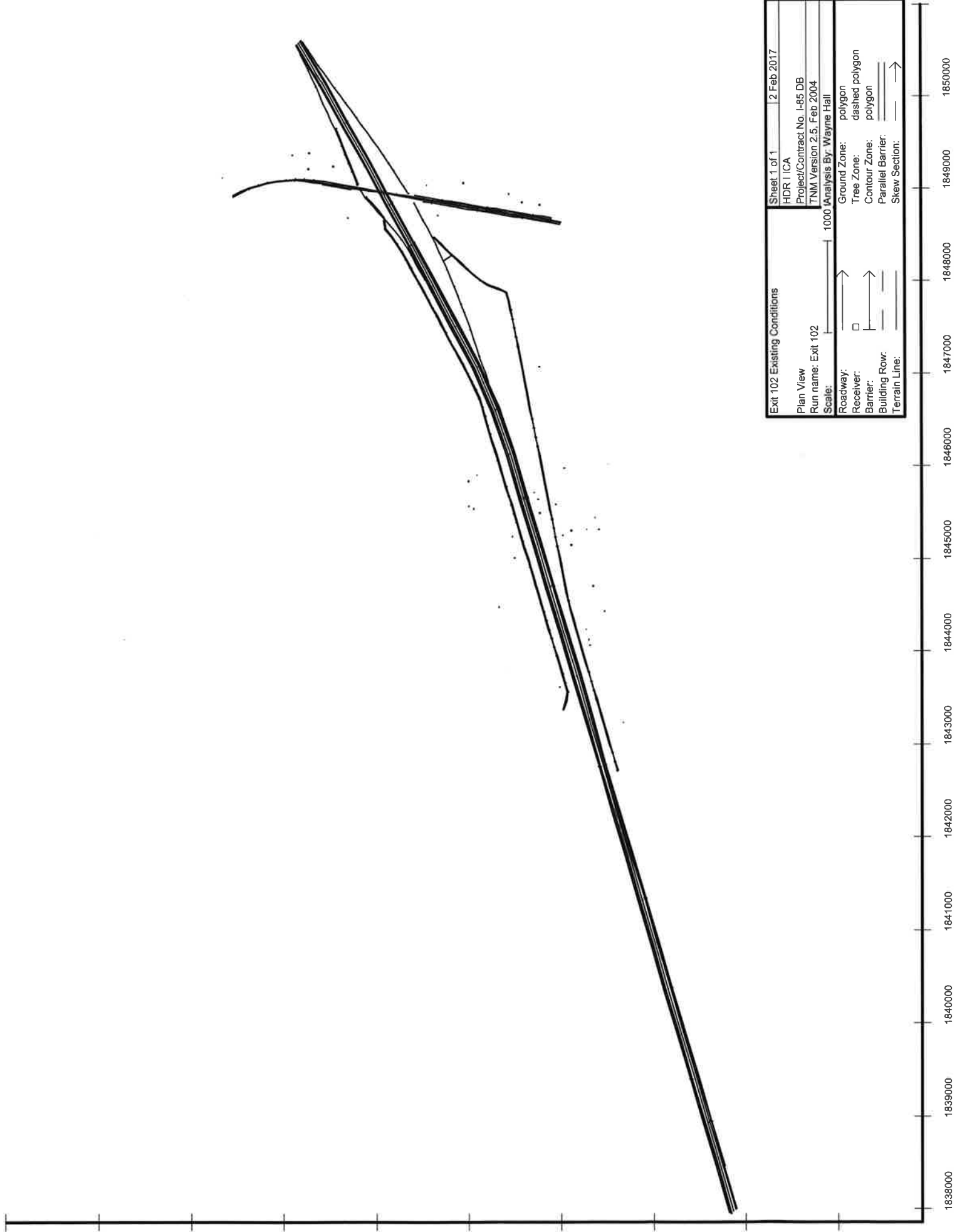
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name		No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			With Barrier		Calculated minus Goal		
					LAeq1h Calculated	Crit'n	Crit'n	Calculated	Crit'n Sub'l Inc	Type Impact	Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
				dBA	dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1			34	1	0.0	72.7	71	72.7	15	Snd Lvl	72.7	0.0		-8.0
2			35	1	0.0	76.7	71	76.7	15	Snd Lvl	76.7	0.0		-8.0
3			36	1	0.0	61.2	66	61.2	15	----	61.2	0.0		-8.0
4			37	1	0.0	64.8	66	64.8	15	----	64.8	0.0		-8.0
5			38	1	0.0	73.8	66	73.8	15	Snd Lvl	73.8	0.0		-8.0
6			39	1	0.0	60.9	66	60.9	15	----	60.9	0.0		-8.0
7			40	1	0.0	65.5	66	65.5	15	----	65.5	0.0		-8.0
8			41	1	0.0	62.8	66	62.8	15	----	62.8	0.0		-8.0
9			42	1	0.0	63.3	66	63.3	15	----	63.3	0.0		-8.0
10			43	1	0.0	63.6	66	63.6	15	----	63.6	0.0		-8.0
11			44	1	0.0	62.8	66	62.8	15	----	62.8	0.0		-8.0
12			45	1	0.0	62.9	66	62.9	15	----	62.9	0.0		-8.0
13			46	1	0.0	60.6	66	60.6	15	----	60.6	0.0		-8.0
14			47	1	0.0	62.1	66	62.1	15	----	62.1	0.0		-8.0
15			48	1	0.0	62.8	66	62.8	15	----	62.8	0.0		-8.0
16			49	1	0.0	60.9	66	60.9	15	----	60.9	0.0		-8.0
17			50	1	0.0	58.9	71	58.9	15	----	58.9	0.0		-8.0
18			51	1	0.0	61.0	66	61.0	15	----	61.0	0.0		-8.0
19			52	1	0.0	68.7	71	68.7	15	----	68.7	0.0		-8.0
20			53	1	0.0	74.8	71	74.8	15	Snd Lvl	74.8	0.0		-8.0
112			54	1	0.0	57.1	66	57.1	15	----	57.1	0.0		-8.0
113			55	1	0.0	77.8	71	77.8	15	Snd Lvl	77.8	0.0		-8.0
114			56	1	0.0	74.1	71	74.1	15	Snd Lvl	74.1	0.0		-8.0
Dwelling Units														
			# DUs	Noise Reduction										
				Min	Avg	Max								
				dB	dB	dB								
All Selected			23	0.0	0.0	0.0								
All Impacted			6	0.0	0.0	0.0								
All that meet NR Goal			0	0.0	0.0	0.0								

Section 2 Noise Analysis Area

Existing Conditions, No Build, Build

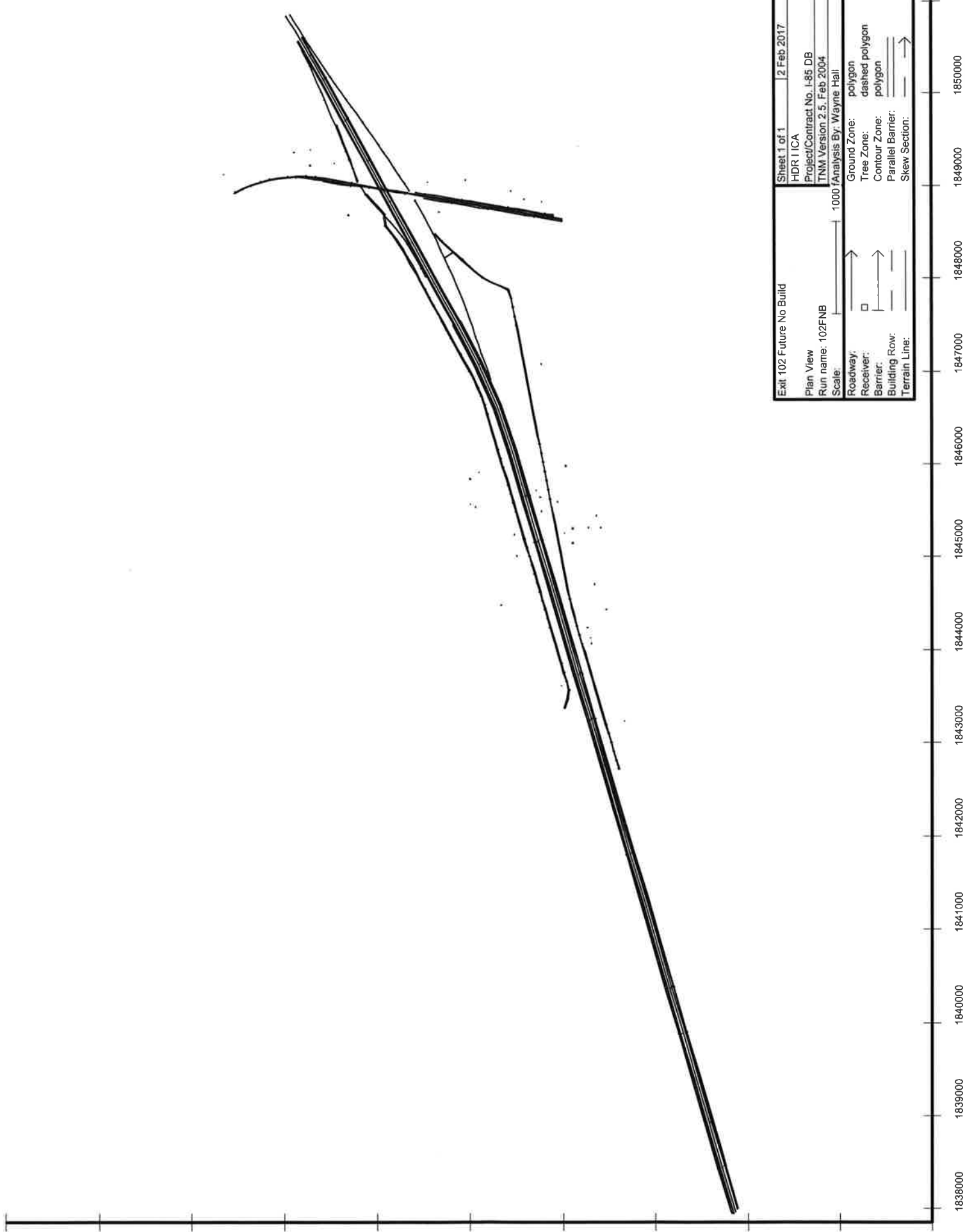


Exit 102 Existing Conditions	Sheet 1 of 1	2 Feb 2017
Plan View	HDR ICA	
Run name: Exit 102	Project/Contract No. I-85 DB	
Scale: 1000 Analysis By: Wayne Hall	TNM Version 2.5, Feb 2004	
Roadway: <input type="checkbox"/>	Ground Zone: polygon	
Receiver: <input type="checkbox"/>	Tree Zone: dashed polygon	
Barrier: <input type="checkbox"/>	Contour Zone: polygon	
Building Row: <input type="checkbox"/>	Parallel Barrier: <input type="checkbox"/>	
Terrain Line: <input type="checkbox"/>	Skew Section: <input type="checkbox"/>	

RESULTS: SOUND LEVELS

I-85 DB

107	142	1	0.0	64.8	66	64.8	15	***	64.8	0.0	8	-8.0
108	143	1	0.0	71.3	66	71.3	15	Snd Lvl	71.3	0.0	8	-8.0
109	144	1	0.0	70.8	66	70.8	15	Snd Lvl	70.8	0.0	8	-8.0
110	145	1	0.0	70.7	66	70.7	15	Snd Lvl	70.7	0.0	8	-8.0
111	146	1	0.0	65.5	71	65.5	15	***	65.5	0.0	8	-8.0
Dwelling Units												
		# DUs		Noise Reduction								
				Min	Avg	Max						
				dB	dB	dB						
All Selected				38	0.0	0.0						
All Impacted				15	0.0	0.0						
All that meet NR Goal				0	0.0	0.0						



Exit: 102 Future No Build	Sheet 1 of 1	2 Feb 2017
Plan View	HDR IICA	
Run name: 102FNB	Project/Contract No. I-85 DB	
Scale: 1000	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: Wayne Hall	
Receiver:	Ground Zone:	polygon
Barrier:	Tree Zone:	dashed polygon
Building Row:	Contour Zone:	polygon
Terrain Line:	Parallel Barrier:	
	Skew Section:	→

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA

Wayne Hall

20 February 2017

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

Exit 102 Future No Build

I-85 DB

INPUT HEIGHTS

BARRIER DESIGN:

68 deg F, 50% RH

ATMOSPHERICS:

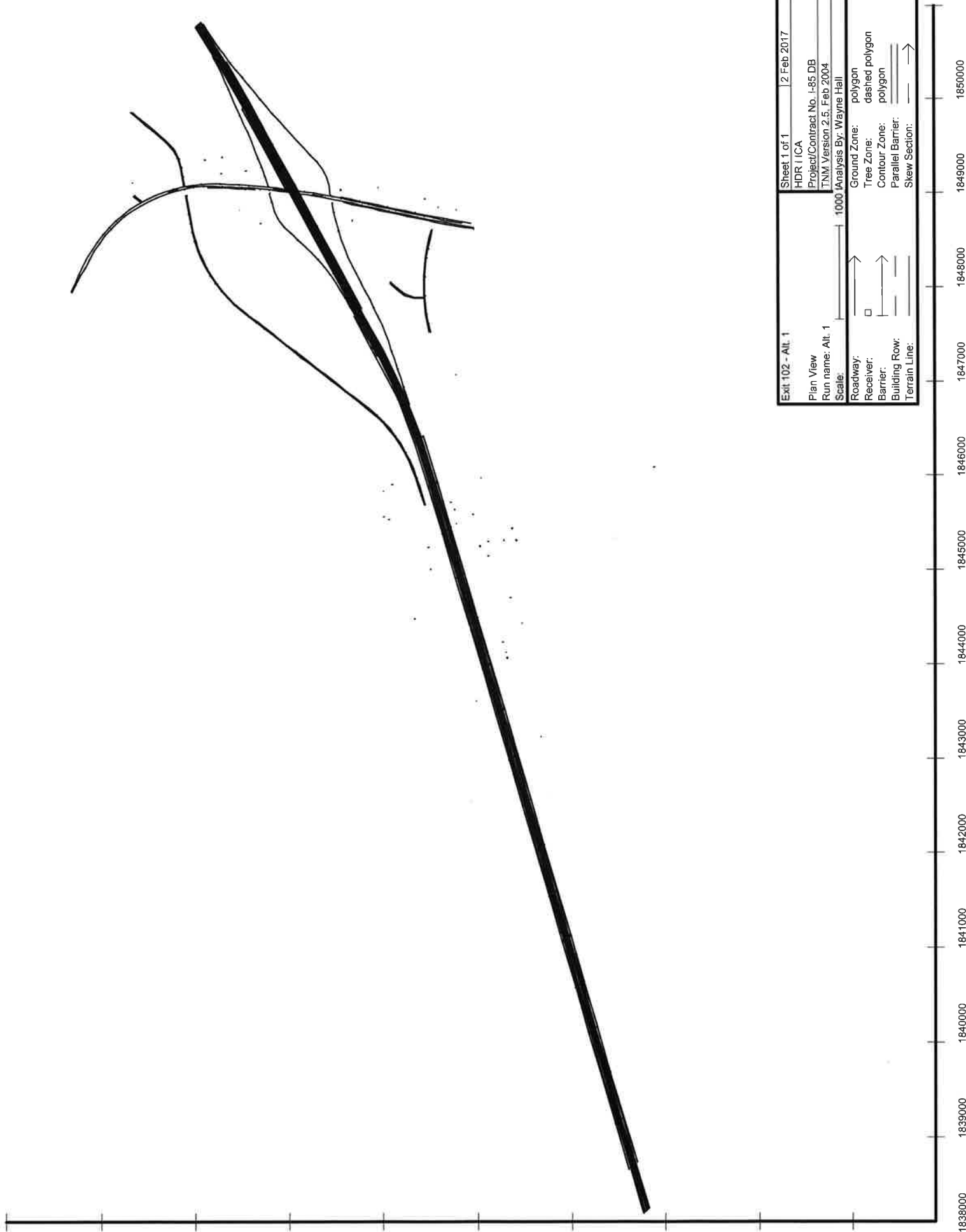
Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h dBA	No Barrier		Increase over existing		Type Impact	With Barrier		Calculated minus Goal dB
				LAeq1h Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dB		Calculated LAeq1h dBA	Noise Reduction Calculated dB	Goal dB
21	109	1	0.0	70.1	70.1	71	70.1	15	70.1	0.0	8
22	110	1	0.0	64.9	64.9	66	64.9	15	64.9	0.0	8
23	111	1	0.0	69.4	69.4	66	69.4	15	69.4	0.0	8
24	112	1	0.0	75.6	75.6	66	75.6	15	75.6	0.0	8
25	113	1	0.0	65.2	65.2	66	65.2	15	65.2	0.0	8
26	114	1	0.0	65.1	65.1	66	65.1	15	65.1	0.0	8
27	115	1	0.0	68.6	68.6	66	68.6	15	68.6	0.0	8
28	116	1	0.0	71.4	71.4	66	71.4	15	71.4	0.0	8
29	117	1	0.0	67.9	67.9	71	67.9	15	67.9	0.0	8
30	118	1	0.0	55.7	55.7	66	55.7	15	55.7	0.0	8
31	119	1	0.0	61.3	61.3	66	61.3	15	61.3	0.0	8
32	120	1	0.0	61.4	61.4	66	61.4	15	61.4	0.0	8
33	121	1	0.0	63.0	63.0	66	63.0	15	63.0	0.0	8
34	122	1	0.0	64.4	64.4	71	64.4	15	64.4	0.0	8
88	123	1	0.0	68.6	68.6	71	68.6	15	68.6	0.0	8
89	124	1	0.0	62.7	62.7	71	62.7	15	62.7	0.0	8
90	125	1	0.0	63.0	63.0	66	63.0	15	63.0	0.0	8
91	126	1	0.0	63.3	63.3	66	63.3	15	63.3	0.0	8
92	127	1	0.0	62.9	62.9	66	62.9	15	62.9	0.0	8
93	128	1	0.0	70.6	70.6	71	70.6	15	70.6	0.0	8
94	129	1	0.0	68.9	68.9	66	68.9	15	68.9	0.0	8
95	130	1	0.0	64.4	64.4	66	64.4	15	64.4	0.0	8
96	131	1	0.0	79.3	79.3	66	79.3	15	79.3	0.0	8
97	132	1	0.0	78.1	78.1	66	78.1	15	78.1	0.0	8
98	133	1	0.0	68.8	68.8	66	68.8	15	68.8	0.0	8
99	134	1	0.0	79.8	79.8	66	79.8	15	79.8	0.0	8
100	135	1	0.0	62.1	62.1	66	62.1	15	62.1	0.0	8
101	136	1	0.0	61.5	61.5	66	61.5	15	61.5	0.0	8
102	137	1	0.0	62.3	62.3	66	62.3	15	62.3	0.0	8
103	138	1	0.0	65.7	65.7	66	65.7	15	65.7	0.0	8
104	139	1	0.0	71.7	71.7	66	71.7	15	71.7	0.0	8
105	140	1	0.0	70.4	70.4	66	70.4	15	70.4	0.0	8
106	141	1	0.0	68.5	68.5	66	68.5	15	68.5	0.0	8

RESULTS: SOUND LEVELS

I-85 DB

107		142	1	0.0	66.5	66	66.5	15	Snd Lvl	66.5	0.0	8	-8.0
108		143	1	0.0	73.0	66	73.0	15	Snd Lvl	73.0	0.0	8	-8.0
109		144	1	0.0	72.5	66	72.5	15	Snd Lvl	72.5	0.0	8	-8.0
110		145	1	0.0	72.4	66	72.4	15	Snd Lvl	72.4	0.0	8	-8.0
111		146	1	0.0	67.2	71	67.2	15	****	67.2	0.0	8	-8.0
Dwelling Units													
		# DUs		Noise Reduction									
				Min	Avg	Max							
				dB	dB	dB							
All Selected				38	0.0	0.0							
All Impacted				16	0.0	0.0							
All that meet NR Goal				0	0.0	0.0							



Exit 102 - Alt. 1	Sheet 1 of 1	2 Feb 2017
Plan View	HDR I CA	
Run name: Alt. 1	Project/Contract No. I-85 DB	
Scale: 1000	TNM Version 2.5, Feb 2004	
Roadway:	Ground Zone:	polygon
Receiver:	Tree Zone:	dashed polygon
Barrier:	Contour Zone:	polygon
Building Row:	Parallel Barrier:	
Terrain Line:	Skew Section:	→

RESULTS: SOUND LEVELS

I-85 DB

HDR I CA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:
Exit 102 - Alt. 1

I-85 DB

INPUT HEIGHTS

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

68 deg F, 50% RH

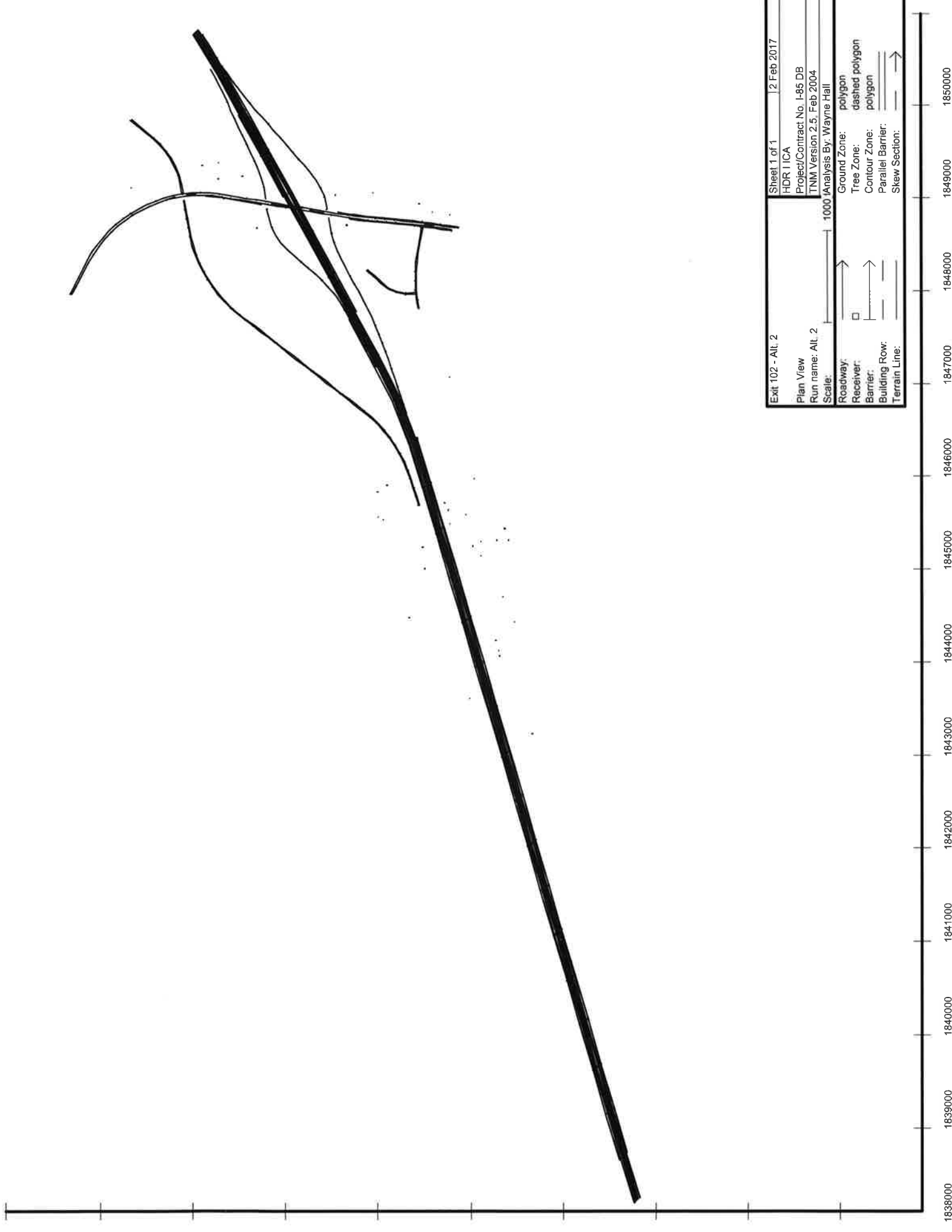
ATMOSPHERICS:

Receiver		#DUs		Existing		No Barrier		Increase over existing		Type		With Barrier		Noise Reduction		Calculated		Calculated		Calculated	
Name	No.			L _{Aeq1h}	dBA	L _{Aeq1h}	dBA	Calculated	Crit'n	Impact	Sub'l Inc	Calculated	dBA	Calculated	dB	Calculated	dB	Calculated	Goal	Calculated	minus Goal
21	107	1	0.0	72.1	71	72.1	15	Snd Lvl	15	72.1	0.0	72.1	0.0	72.1	0.0	72.1	0.0	72.1	0.0	72.1	-8.0
22	108	1	0.0	65.2	66	65.2	15	Snd Lvl	15	65.2	0.0	65.2	0.0	65.2	0.0	65.2	0.0	65.2	0.0	65.2	-8.0
23	109	1	0.0	70.9	66	70.9	15	Snd Lvl	15	70.9	0.0	70.9	0.0	70.9	0.0	70.9	0.0	70.9	0.0	70.9	-8.0
24	110	1	0.0	74.3	66	74.3	15	Snd Lvl	15	74.3	0.0	74.3	0.0	74.3	0.0	74.3	0.0	74.3	0.0	74.3	-8.0
25	111	1	0.0	65.4	66	65.4	15	Snd Lvl	15	65.4	0.0	65.4	0.0	65.4	0.0	65.4	0.0	65.4	0.0	65.4	-8.0
26	112	1	0.0	64.9	66	64.9	15	Snd Lvl	15	64.9	0.0	64.9	0.0	64.9	0.0	64.9	0.0	64.9	0.0	64.9	-8.0
27	113	1	0.0	69.2	66	69.2	15	Snd Lvl	15	69.2	0.0	69.2	0.0	69.2	0.0	69.2	0.0	69.2	0.0	69.2	-8.0
28	114	1	0.0	71.9	66	71.9	15	Snd Lvl	15	71.9	0.0	71.9	0.0	71.9	0.0	71.9	0.0	71.9	0.0	71.9	-8.0
29	115	1	0.0	67.1	66	67.1	15	Snd Lvl	15	67.1	0.0	67.1	0.0	67.1	0.0	67.1	0.0	67.1	0.0	67.1	-8.0
30	116	1	0.0	57.5	66	57.5	15	Snd Lvl	15	57.5	0.0	57.5	0.0	57.5	0.0	57.5	0.0	57.5	0.0	57.5	-8.0
31	117	1	0.0	61.5	66	61.5	15	Snd Lvl	15	61.5	0.0	61.5	0.0	61.5	0.0	61.5	0.0	61.5	0.0	61.5	-8.0
32	118	1	0.0	61.2	66	61.2	15	Snd Lvl	15	61.2	0.0	61.2	0.0	61.2	0.0	61.2	0.0	61.2	0.0	61.2	-8.0
33	119	1	0.0	62.7	66	62.7	15	Snd Lvl	15	62.7	0.0	62.7	0.0	62.7	0.0	62.7	0.0	62.7	0.0	62.7	-8.0
34	120	1	0.0	63.3	71	63.3	15	Snd Lvl	15	63.3	0.0	63.3	0.0	63.3	0.0	63.3	0.0	63.3	0.0	63.3	-8.0
88	121	1	0.0	70.6	71	70.6	15	Snd Lvl	15	70.6	0.0	70.6	0.0	70.6	0.0	70.6	0.0	70.6	0.0	70.6	-8.0
89	122	1	0.0	62.0	71	62.0	15	Snd Lvl	15	62.0	0.0	62.0	0.0	62.0	0.0	62.0	0.0	62.0	0.0	62.0	-8.0
90	123	1	0.0	62.4	66	62.4	15	Snd Lvl	15	62.4	0.0	62.4	0.0	62.4	0.0	62.4	0.0	62.4	0.0	62.4	-8.0
91	124	1	0.0	62.8	66	62.8	15	Snd Lvl	15	62.8	0.0	62.8	0.0	62.8	0.0	62.8	0.0	62.8	0.0	62.8	-8.0
92	125	1	0.0	62.3	66	62.3	15	Snd Lvl	15	62.3	0.0	62.3	0.0	62.3	0.0	62.3	0.0	62.3	0.0	62.3	-8.0
93	126	1	0.0	67.3	71	67.3	15	Snd Lvl	15	67.3	0.0	67.3	0.0	67.3	0.0	67.3	0.0	67.3	0.0	67.3	-8.0
94	127	1	0.0	66.5	66	66.5	15	Snd Lvl	15	66.5	0.0	66.5	0.0	66.5	0.0	66.5	0.0	66.5	0.0	66.5	-8.0
95	128	1	0.0	67.9	66	67.9	15	Snd Lvl	15	67.9	0.0	67.9	0.0	67.9	0.0	67.9	0.0	67.9	0.0	67.9	-8.0
96	129	1	0.0	78.9	66	78.9	15	Snd Lvl	15	78.9	0.0	78.9	0.0	78.9	0.0	78.9	0.0	78.9	0.0	78.9	-8.0
97	130	1	0.0	77.5	66	77.5	15	Snd Lvl	15	77.5	0.0	77.5	0.0	77.5	0.0	77.5	0.0	77.5	0.0	77.5	-8.0
98	131	1	0.0	71.6	66	71.6	15	Snd Lvl	15	71.6	0.0	71.6	0.0	71.6	0.0	71.6	0.0	71.6	0.0	71.6	-8.0
99	132	1	0.0	79.0	66	79.0	15	Snd Lvl	15	79.0	0.0	79.0	0.0	79.0	0.0	79.0	0.0	79.0	0.0	79.0	-8.0
100	133	1	0.0	64.2	66	64.2	15	Snd Lvl	15	64.2	0.0	64.2	0.0	64.2	0.0	64.2	0.0	64.2	0.0	64.2	-8.0
101	134	1	0.0	63.8	66	63.8	15	Snd Lvl	15	63.8	0.0	63.8	0.0	63.8	0.0	63.8	0.0	63.8	0.0	63.8	-8.0
102	135	1	0.0	65.7	66	65.7	15	Snd Lvl	15	65.7	0.0	65.7	0.0	65.7	0.0	65.7	0.0	65.7	0.0	65.7	-8.0
103	136	1	0.0	69.5	66	69.5	15	Snd Lvl	15	69.5	0.0	69.5	0.0	69.5	0.0	69.5	0.0	69.5	0.0	69.5	-8.0
104	137	1	0.0	72.2	66	72.2	15	Snd Lvl	15	72.2	0.0	72.2	0.0	72.2	0.0	72.2	0.0	72.2	0.0	72.2	-8.0
105	138	1	0.0	70.6	66	70.6	15	Snd Lvl	15	70.6	0.0	70.6	0.0	70.6	0.0	70.6	0.0	70.6	0.0	70.6	-8.0
106	139	1	0.0	68.2	66	68.2	15	Snd Lvl	15	68.2	0.0	68.2	0.0	68.2	0.0	68.2	0.0	68.2	0.0	68.2	-8.0

RESULTS: SOUND LEVELS

I-85 DB

		140	1	0.0	67.2	66	67.2	15	Snd Lvl	67.2	0.0	8	-8.0
107		141	1	0.0	73.6	66	73.6	15	Snd Lvl	73.6	0.0	8	-8.0
108		142	1	0.0	73.8	66	73.8	15	Snd Lvl	73.8	0.0	8	-8.0
109		143	1	0.0	74.1	66	74.1	15	Snd Lvl	74.1	0.0	8	-8.0
110		144	1	0.0	71.1	71	71.1	15	Snd Lvl	71.1	0.0	8	-8.0
Dwelling Units													
		# DUs	Noise Reduction										
			Min	Avg	Max								
			dB	dB	dB								
All Selected			38	0.0	0.0								
All Impacted			20	0.0	0.0								
All that meet NR Goal			0	0.0	0.0								



Exit 102 - Alt. 2	Sheet 1 of 1	12 Feb 2017
Plan View	HDR IICA	
Run name: Alt. 2	Project/Contract No. I-85 DB	
Scale: 1000	TNM Version 2.5, Feb 2004	
Roadway:	Ground Zone:	polygon
Receiver:	Tree Zone:	dashed polygon
Barrier:	Contour Zone:	polygon
Building Row:	Parallel Barrier:	
Terrain Line:	Skew Section:	→

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5RESULTS: SOUND LEVELS
PROJECT/CONTRACT:

RUN:

I-85 DB
Exit 102 - Alt. 2

BARRIER DESIGN:

INPUT HEIGHTS

ATMOSPHERICS:

68 deg F, 50% RH

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h dBA	No Barrier		Increase over existing		Type Impact	With Barrier		Calculated minus Goal dB
				LAeq1h Calculated dBA	Crit'n dBA	Calculated dB	Crit'n Sub'l Inc dB		LAeq1h Calculated dBA	Noise Reduction Calculated dB	Goal dB
21	107	1	0.0	72.1	71	72.1	15	Snd Lvl	72.1	0.0	8
22	108	1	0.0	65.2	66	65.2	15	****	65.2	0.0	8
23	109	1	0.0	70.9	66	70.9	15	Snd Lvl	70.9	0.0	8
24	110	1	0.0	74.3	66	74.3	15	Snd Lvl	74.3	0.0	8
25	111	1	0.0	65.4	66	65.4	15	****	65.4	0.0	8
26	112	1	0.0	64.9	66	64.9	15	****	64.9	0.0	8
27	113	1	0.0	69.2	66	69.2	15	Snd Lvl	69.2	0.0	8
28	114	1	0.0	71.9	66	71.9	15	Snd Lvl	71.9	0.0	8
29	115	1	0.0	69.1	71	69.1	15	****	69.1	0.0	8
30	116	1	0.0	58.0	66	58.0	15	****	58.0	0.0	8
31	117	1	0.0	62.8	66	62.8	15	****	62.8	0.0	8
32	118	1	0.0	63.1	66	63.1	15	****	63.1	0.0	8
33	119	1	0.0	64.9	66	64.9	15	****	64.9	0.0	8
34	120	1	0.0	68.3	71	68.3	15	****	68.3	0.0	8
88	121	1	0.0	70.7	71	70.7	15	****	70.7	0.0	8
89	122	1	0.0	62.0	71	62.0	15	****	62.0	0.0	8
90	123	1	0.0	62.1	66	62.1	15	****	62.1	0.0	8
91	124	1	0.0	62.0	66	62.0	15	****	62.0	0.0	8
92	125	1	0.0	61.7	66	61.7	15	****	61.7	0.0	8
93	126	1	0.0	67.3	71	67.3	15	****	67.3	0.0	8
94	127	1	0.0	66.4	66	66.4	15	Snd Lvl	66.4	0.0	8
95	128	1	0.0	67.9	66	67.9	15	Snd Lvl	67.9	0.0	8
96	129	1	0.0	78.9	66	78.9	15	Snd Lvl	78.9	0.0	8
97	130	1	0.0	77.5	66	77.5	15	Snd Lvl	77.5	0.0	8
98	131	1	0.0	71.6	66	71.6	15	Snd Lvl	71.6	0.0	8
99	132	1	0.0	79.0	66	79.0	15	Snd Lvl	79.0	0.0	8
100	133	1	0.0	64.2	66	64.2	15	****	64.2	0.0	8
101	134	1	0.0	63.8	66	63.8	15	****	63.8	0.0	8
102	135	1	0.0	65.7	66	65.7	15	****	65.7	0.0	8
103	136	1	0.0	69.5	66	69.5	15	Snd Lvl	69.5	0.0	8
104	137	1	0.0	72.2	66	72.2	15	Snd Lvl	72.2	0.0	8
105	138	1	0.0	70.6	66	70.6	15	Snd Lvl	70.6	0.0	8
106	139	1	0.0	68.2	66	68.2	15	Snd Lvl	68.2	0.0	8

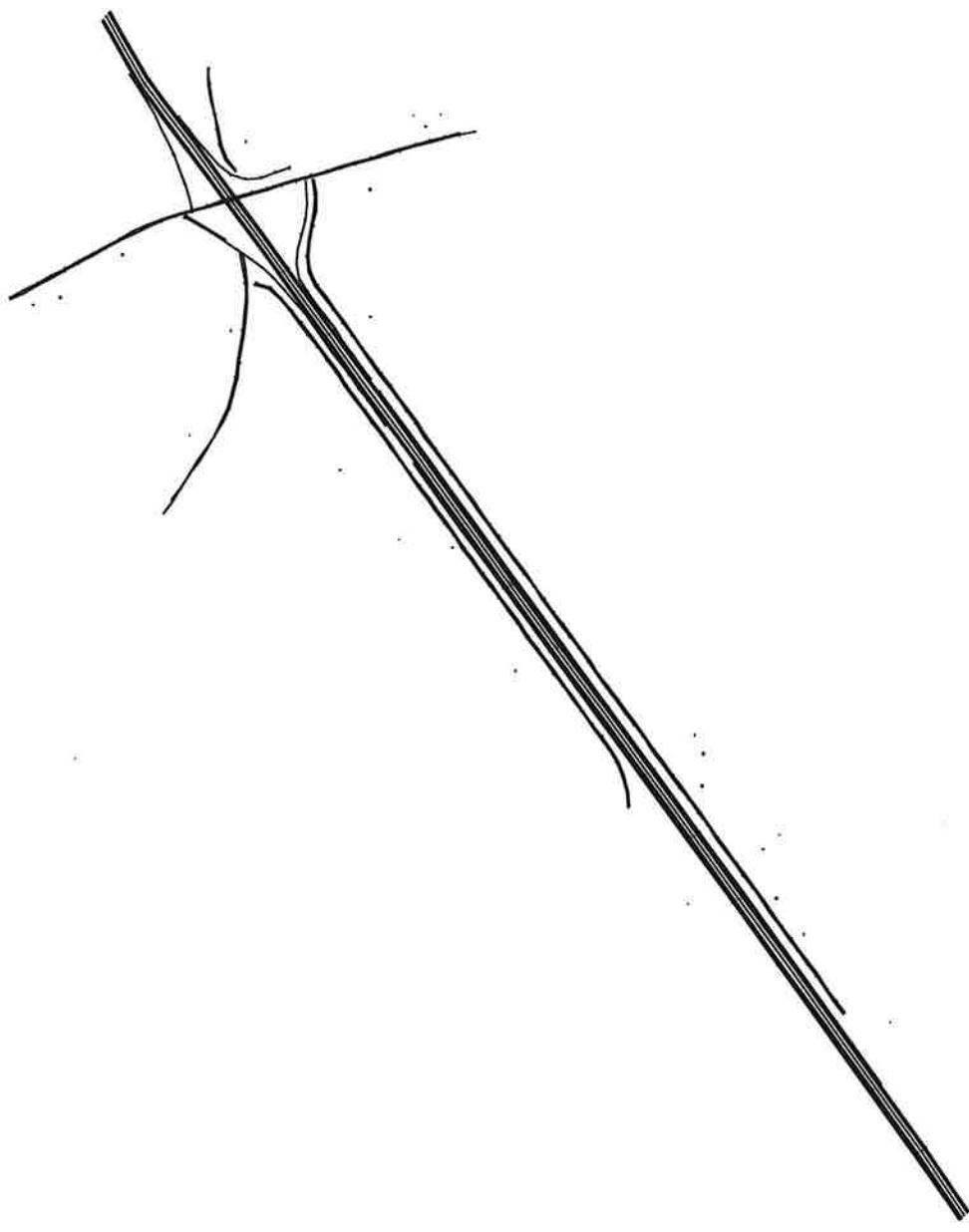
RESULTS: SOUND LEVELS

I-85 DB

Dwelling Units	# DUs	Noise Reduction			Snd Lvl	15	Snd Lvl	67.2	0.0	67.2	66	67.2	0.0	8	-8.0
		Min	Avg	Max											
		dB	dB	dB											
All Selected	36	0.0	0.0	0.0											
All Impacted	20	0.0	0.0	0.0											
All that meet NR Goal	0	0.0	0.0	0.0											

Section 3 Noise Analysis Area

Existing Conditions, No Build, Build



Exit 104 Existing Conditions		Sheet 1 of 1	2 Feb 2017
Plan View		HDR IICA	
Run name: Exit 104		Project/Contract No. I-85 DB	
Scale: 1" = 100'		TNM Version 2.5, Feb 2004	
Roadway:		Analysis By: Wayne Hall	
Receiver:	□	Ground Zone:	polygon
Barrier:	—	Tree Zone:	dashed polygon
Building Row:	—	Contour Zone:	polygon
Terrain Line:	—	Parallel Barrier:	—
		Skew Section:	— →

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5

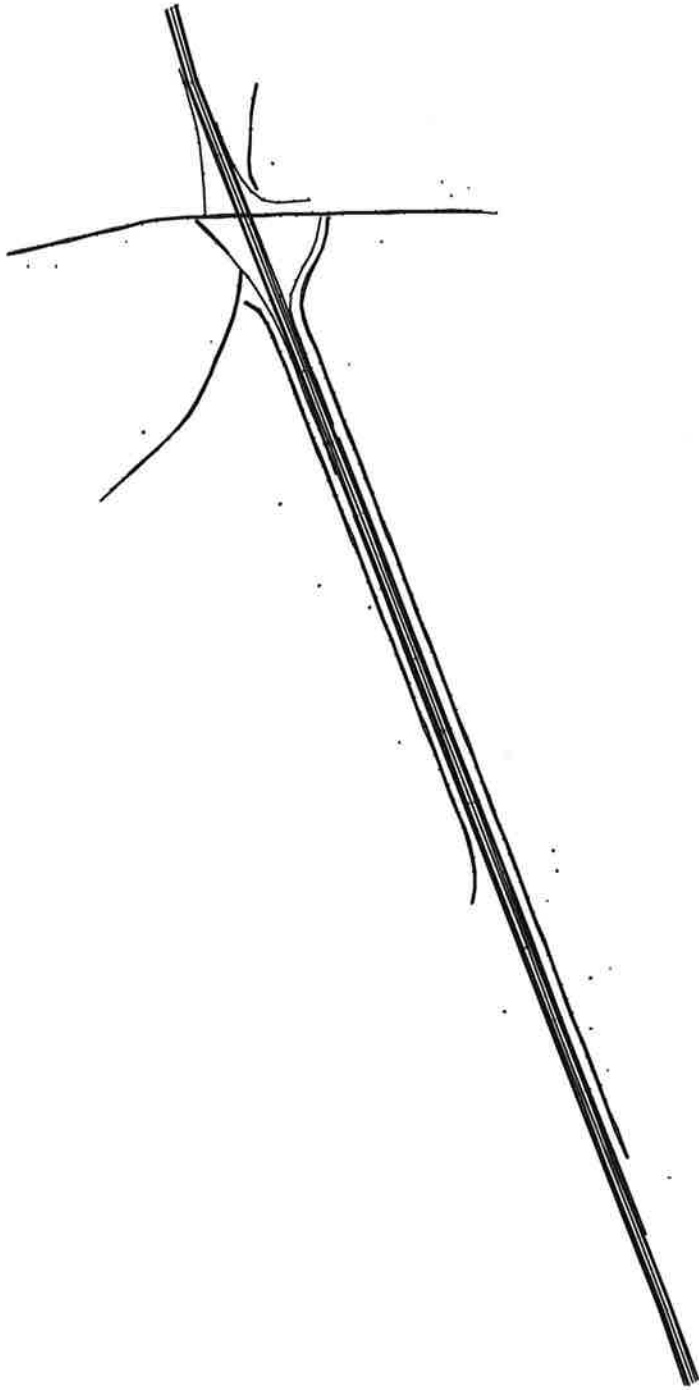
RESULTS: SOUND LEVELS

PROJECT/CONTRACT:
Exit 104 Existing Conditions
BARRIER DESIGN:
INPUT HEIGHTS

I-85 DB

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.ATMOSPHERICS:
68 deg F, 50% RH

Receiver Name		No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Noise Reduction		Calculated minus Goal
				LAeq1h	Calculated	Crit'n	Calculated	Crit'n	Sub'l Inc		Calculated LAeq1h	Goal	Calculated	Goal	dB
				dBA	dBA	dBA	dB		dB		dBA	dB	dB	dB	dB
35			85	1	0.0	70.5	71	70.5	15	----	70.5		0.0	8	-8.0
36			86	1	0.0	71.5	66	71.5	15	Snd Lvl	71.5		0.0	8	-8.0
37			87	1	0.0	73.1	66	73.1	15	Snd Lvl	73.1		0.0	8	-8.0
38			88	1	0.0	67.2	66	67.2	15	Snd Lvl	67.2		0.0	8	-8.0
39			89	1	0.0	67.1	71	67.1	15	----	67.1		0.0	8	-8.0
40			90	1	0.0	58.3	66	58.3	15	----	58.3		0.0	8	-8.0
41			91	1	0.0	65.4	66	65.4	15	----	65.4		0.0	8	-8.0
42			92	1	0.0	59.3	66	59.3	15	----	59.3		0.0	8	-8.0
43			93	1	0.0	56.0	66	56.0	15	----	56.0		0.0	8	-8.0
44			94	1	0.0	55.3	66	55.3	15	----	55.3		0.0	8	-8.0
74			95	1	0.0	69.5	71	69.5	15	----	69.5		0.0	8	-8.0
75			96	1	0.0	56.4	66	56.4	15	----	56.4		0.0	8	-8.0
76			97	1	0.0	57.0	66	57.0	15	----	57.0		0.0	8	-8.0
77			98	1	0.0	55.7	66	55.7	15	----	55.7		0.0	8	-8.0
78			99	1	0.0	60.6	71	60.6	15	----	60.6		0.0	8	-8.0
79			100	1	0.0	71.0	71	71.0	15	Snd Lvl	71.0		0.0	8	-8.0
80			101	1	0.0	67.2	66	67.2	15	Snd Lvl	67.2		0.0	8	-8.0
81			102	1	0.0	67.8	66	67.8	15	Snd Lvl	67.8		0.0	8	-8.0
82			103	1	0.0	71.8	66	71.8	15	Snd Lvl	71.8		0.0	8	-8.0
83			104	1	0.0	66.1	66	66.1	15	Snd Lvl	66.1		0.0	8	-8.0
84			105	1	0.0	69.3	66	69.3	15	Snd Lvl	69.3		0.0	8	-8.0
85			106	1	0.0	72.4	66	72.4	15	Snd Lvl	72.4		0.0	8	-8.0
86			107	1	0.0	73.1	66	73.1	15	Snd Lvl	73.1		0.0	8	-8.0
87			108	1	0.0	69.8	66	69.8	15	Snd Lvl	69.8		0.0	8	-8.0
Dwelling Units															
			# DUs	Noise Reduction		Max		Avg							
				Min	Avg	dB		dB							
All Selected			24	0.0		0.0		0.0							
All Impacted			12	0.0		0.0		0.0							
All that meet NR Goal			0	0.0		0.0		0.0							



Exit 104 Future No Build	Sheet 1 of 1	12 Feb 2017
Plan View (rotated)	HDR ICA	
Run name: Exit 104FNB	Project/Contract No. I-85 DB	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: Wayne Hall	
Receiver:	Ground Zone: polygon	
Barrier:	Tree Zone: dashed polygon	
Building Row:	Contour Zone: polygon	
Terrain Line:	Parallel Barrier:	
	Skew Section:	→

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:
RUN: Exit 104 Future No Build
BARRIER DESIGN: INPUT HEIGHTS

I-85 DB

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name												
No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Calculated minus Goal	
			LAeq1h Calculated	Crit'n	Calculated	Crit'n	Calculated		LAeq1h	Noise Reduction		
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	
35	221	1	0.0	72.1	71	72.1	15	Snd Lvl	72.1	0.0	8	-8.0
36	222	1	0.0	73.2	66	73.2	15	Snd Lvl	73.2	0.0	8	-8.0
37	223	1	0.0	74.8	66	74.8	15	Snd Lvl	74.8	0.0	8	-8.0
38	224	1	0.0	68.8	66	68.8	15	Snd Lvl	68.8	0.0	8	-8.0
39	225	1	0.0	68.7	71	68.7	15	-----	68.7	0.0	8	-8.0
40	226	1	0.0	60.0	66	60.0	15	-----	60.0	0.0	8	-8.0
41	227	1	0.0	67.1	66	67.1	15	Snd Lvl	67.1	0.0	8	-8.0
42	228	1	0.0	61.0	66	61.0	15	-----	61.0	0.0	8	-8.0
43	229	1	0.0	57.7	66	57.7	15	-----	57.7	0.0	8	-8.0
44	230	1	0.0	57.0	66	57.0	15	-----	57.0	0.0	8	-8.0
74	231	1	0.0	71.2	71	71.2	15	Snd Lvl	71.2	0.0	8	-8.0
75	232	1	0.0	58.1	66	58.1	15	-----	58.1	0.0	8	-8.0
76	233	1	0.0	58.6	66	58.6	15	-----	58.6	0.0	8	-8.0
77	234	1	0.0	57.3	66	57.3	15	-----	57.3	0.0	8	-8.0
78	235	1	0.0	62.3	71	62.3	15	-----	62.3	0.0	8	-8.0
79	236	1	0.0	72.7	71	72.7	15	Snd Lvl	72.7	0.0	8	-8.0
80	237	1	0.0	68.9	66	68.9	15	Snd Lvl	68.9	0.0	8	-8.0
81	238	1	0.0	69.5	66	69.5	15	Snd Lvl	69.5	0.0	8	-8.0
82	239	1	0.0	73.4	66	73.4	15	Snd Lvl	73.4	0.0	8	-8.0
83	240	1	0.0	67.8	66	67.8	15	Snd Lvl	67.8	0.0	8	-8.0
84	241	1	0.0	70.9	66	70.9	15	Snd Lvl	70.9	0.0	8	-8.0
85	242	1	0.0	74.0	66	74.0	15	Snd Lvl	74.0	0.0	8	-8.0
86	243	1	0.0	74.7	66	74.7	15	Snd Lvl	74.7	0.0	8	-8.0
87	244	1	0.0	71.5	66	71.5	15	Snd Lvl	71.5	0.0	8	-8.0
Dwelling Units												
	# DUs	Noise Reduction			Max							
		Min	Avg	dB								
All Selected	24	0.0	0.0	0.0								
All Impacted	15	0.0	0.0	0.0								
All that meet NR Goal	0	0.0	0.0	0.0								



Exit 104 Alternative 1	Sheet 1 of 1	2 Feb 2017
Plan View (rotated)	HDR 1 ICA	
Run name: Alt. 1	Project/Contract No. I-85 DB	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: Wayne Hall	
Receiver:	Ground Zone:	polygon
Barrier:	Tree Zone:	dashed polygon
Building Row:	Contour Zone:	polygon
Terrain Line:	Parallel Barrier:	— — — — —
	Skew Section:	— — — — —

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA

Wayne Hall

20 February 2017

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN: Exit 104 Alternative 1

BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS:

68 deg F, 50% RH

I-85 DB

Exit 104 Alternative 1

INPUT HEIGHTS

68 deg F, 50% RH

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name		#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Calculated minus Goal
No.				LAeq1h Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	LAeq1h Calculated		Noise Reduction Calculated	Goal	
			dBA	dBA	dBA		dB	dB		dBA	dB	dB
35		127	1	0.0	71.4	71	71.4	15	Snd Lvl	71.4	0.0	8
36		128	1	0.0	72.1	66	72.1	15	Snd Lvl	72.1	0.0	8
37		129	1	0.0	73.0	66	73.0	15	Snd Lvl	73.0	0.0	8
38		130	1	0.0	67.5	66	67.5	15	Snd Lvl	67.5	0.0	8
39		131	1	0.0	68.4	71	68.4	15	-----	68.4	0.0	8
40		132	1	0.0	58.6	66	58.6	15	-----	58.6	0.0	8
41		133	1	0.0	66.1	66	66.1	15	Snd Lvl	66.1	0.0	8
42		134	1	0.0	58.7	66	58.7	15	-----	58.7	0.0	8
43		135	1	0.0	57.1	66	57.1	15	-----	57.1	0.0	8
44		136	1	0.0	56.7	66	56.7	15	-----	56.7	0.0	8
74		137	1	0.0	68.8	71	68.8	15	-----	68.8	0.0	8
75		138	1	0.0	59.0	66	59.0	15	-----	59.0	0.0	8
76		139	1	0.0	59.4	66	59.4	15	-----	59.4	0.0	8
77		140	1	0.0	58.4	66	58.4	15	-----	58.4	0.0	8
78		141	1	0.0	61.4	71	61.4	15	-----	61.4	0.0	8
79		142	1	0.0	71.6	71	71.6	15	Snd Lvl	71.6	0.0	8
80		143	1	0.0	69.2	66	69.2	15	Snd Lvl	69.2	0.0	8
81		144	1	0.0	69.5	66	69.5	15	Snd Lvl	69.5	0.0	8
82		145	1	0.0	73.2	66	73.2	15	Snd Lvl	73.2	0.0	8
83		146	1	0.0	67.4	66	67.4	15	Snd Lvl	67.4	0.0	8
84		147	1	0.0	70.5	66	70.5	15	Snd Lvl	70.5	0.0	8
85		148	1	0.0	74.3	66	74.3	15	Snd Lvl	74.3	0.0	8
86		149	1	0.0	73.8	66	73.8	15	Snd Lvl	73.8	0.0	8
87		150	1	0.0	70.5	66	70.5	15	Snd Lvl	70.5	0.0	8
Dwelling Units												
		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		24	0.0	0.0	0.0							
All Impacted		14	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							



Exit 104 Alternative 2	Sheet 1 of 1	12 Feb 2017
Plan View (rotated)	HDR IICA	
Run name: Alt. 2	Project/Contract No. I-85 DB	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: Wayne Hall	
Receiver:	Ground Zone:	polygon
Barrier:	Tree Zone:	dashed polygon
Building Row:	Contour Zone:	polygon
Terrain Line:	Parallel Barrier:	
	Skew Section:	→

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA

Wayne Hall

20 February 2017

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN: Exit 104 Alternative 2

BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS:

68 deg F, 50% RH

I-85 DB

Exit 104 Alternative 2

INPUT HEIGHTS

68 deg F, 50% RH

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name		No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Calculated minus Goal dB
					LAeq1h Calculated	Crit'n	Calculated	Crit'n	Calculated		LAeq1h	Noise Reduction	
				dBA	dBA	dBA	dBA	dB	dB		dBA	dB	dB
35		127	1	0.0	71.4	71	71.4	15	Snd Lvl	71.4	0.0	8	-8.0
36		128	1	0.0	72.1	66	72.1	15	Snd Lvl	72.1	0.0	8	-8.0
37		129	1	0.0	73.0	66	73.0	15	Snd Lvl	73.0	0.0	8	-8.0
38		130	1	0.0	67.5	66	67.5	15	Snd Lvl	67.5	0.0	8	-8.0
39		131	1	0.0	68.4	71	68.4	15	-----	68.4	0.0	8	-8.0
40		132	1	0.0	58.6	66	58.6	15	-----	58.6	0.0	8	-8.0
41		133	1	0.0	66.1	66	66.1	15	Snd Lvl	66.1	0.0	8	-8.0
42		134	1	0.0	58.7	66	58.7	15	-----	58.7	0.0	8	-8.0
43		135	1	0.0	57.1	66	57.1	15	-----	57.1	0.0	8	-8.0
44		136	1	0.0	56.7	66	56.7	15	-----	56.7	0.0	8	-8.0
74		137	1	0.0	68.8	71	68.8	15	-----	68.8	0.0	8	-8.0
75		138	1	0.0	59.7	66	59.7	15	-----	59.7	0.0	8	-8.0
76		139	1	0.0	59.6	66	59.6	15	-----	59.6	0.0	8	-8.0
77		140	1	0.0	58.7	66	58.7	15	-----	58.7	0.0	8	-8.0
78		141	1	0.0	61.4	71	61.4	15	-----	61.4	0.0	8	-8.0
79		142	1	0.0	71.6	71	71.6	15	Snd Lvl	71.6	0.0	8	-8.0
80		143	1	0.0	69.2	66	69.2	15	Snd Lvl	69.2	0.0	8	-8.0
81		144	1	0.0	69.5	66	69.5	15	Snd Lvl	69.5	0.0	8	-8.0
82		145	1	0.0	73.2	66	73.2	15	Snd Lvl	73.2	0.0	8	-8.0
83		146	1	0.0	67.4	66	67.4	15	Snd Lvl	67.4	0.0	8	-8.0
84		147	1	0.0	70.5	66	70.5	15	Snd Lvl	70.5	0.0	8	-8.0
85		148	1	0.0	74.3	66	74.3	15	Snd Lvl	74.3	0.0	8	-8.0
86		149	1	0.0	73.8	66	73.8	15	Snd Lvl	73.8	0.0	8	-8.0
87		150	1	0.0	70.5	66	70.5	15	Snd Lvl	70.5	0.0	8	-8.0
Dwelling Units													
				Noise Reduction		Max							
				Min dB	Avg dB								
All Selected				24	0.0	0.0	0.0						
All Impacted				14	0.0	0.0	0.0						
All that meet NR Goal				0	0.0	0.0	0.0						



Exit 104 Alternative 3	Sheet 1 of 1	12 Feb 2017
Plan View (rotated)	HDR 1 ICA	
Run name: Alt. 3	Project/Contract No. I-85 DB	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: Wayne Hall	
Receiver:	Ground Zone: polygon	
Barrier:	Tree Zone: dashed polygon	
Building Row:	Contour Zone: polygon	
Terrain Line:	Parallel Barrier:	
	Skew Section:	→

RESULTS: SOUND LEVELS

I-85 DB

HDR IICA
Wayne Hall

20 February 2017

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN:

BARRIER DESIGN:

I-85 DB
Exit 104 Alternative 3
INPUT HEIGHTS

68 deg F, 50% RH

ATMOSPHERICS:

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name												
No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Calculated minus Goal dB	
			LAeq1h Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	LAeq1h Calculated		Noise Reduction Calculated	Goal		
		dBA	dBA		dB	dBA	dB	dBA	dB	dB		
35	127	1	0.0	71.4	71	71.4	15	Snd Lvl	71.4	0.0	8	-8.0
36	128	1	0.0	72.1	66	72.1	15	Snd Lvl	72.1	0.0	8	-8.0
37	129	1	0.0	73.0	66	73.0	15	Snd Lvl	73.0	0.0	8	-8.0
38	130	1	0.0	67.5	66	67.5	15	Snd Lvl	67.5	0.0	8	-8.0
39	131	1	0.0	68.4	71	68.4	15	****	68.4	0.0	8	-8.0
40	132	1	0.0	58.6	66	58.6	15	****	58.6	0.0	8	-8.0
41	133	1	0.0	66.1	66	66.1	15	Snd Lvl	66.1	0.0	8	-8.0
42	134	1	0.0	58.7	66	58.7	15	****	58.7	0.0	8	-8.0
43	135	1	0.0	57.1	66	57.1	15	****	57.1	0.0	8	-8.0
44	136	1	0.0	56.7	66	56.7	15	****	56.7	0.0	8	-8.0
74	137	1	0.0	68.8	71	68.8	15	****	68.8	0.0	8	-8.0
75	138	1	0.0	59.4	66	59.4	15	****	59.4	0.0	8	-8.0
76	139	1	0.0	59.4	66	59.4	15	****	59.4	0.0	8	-8.0
77	140	1	0.0	58.4	66	58.4	15	****	58.4	0.0	8	-8.0
78	141	1	0.0	61.4	71	61.4	15	****	61.4	0.0	8	-8.0
79	142	1	0.0	71.6	71	71.6	15	Snd Lvl	71.6	0.0	8	-8.0
80	143	1	0.0	69.2	66	69.2	15	Snd Lvl	69.2	0.0	8	-8.0
81	144	1	0.0	69.5	66	69.5	15	Snd Lvl	69.5	0.0	8	-8.0
82	145	1	0.0	73.2	66	73.2	15	Snd Lvl	73.2	0.0	8	-8.0
83	146	1	0.0	67.4	66	67.4	15	Snd Lvl	67.4	0.0	8	-8.0
84	147	1	0.0	70.5	66	70.5	15	Snd Lvl	70.5	0.0	8	-8.0
85	148	1	0.0	74.3	66	74.3	15	Snd Lvl	74.3	0.0	8	-8.0
86	149	1	0.0	73.8	66	73.8	15	Snd Lvl	73.8	0.0	8	-8.0
87	150	1	0.0	70.5	66	70.5	15	Snd Lvl	70.5	0.0	8	-8.0
Dwelling Units												
		# DUs	Noise Reduction									
			Min dB	Avg dB								
All Selected		24	0.0	0.0	0.0							
All Impacted		14	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							



Exit 104 Alternative 4	Sheet 1 of 1	12 Feb 2017
Plan View (rotated)	HDR IICA	
Run name: Alt. 4	Project/Contract No. I-85 DB	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: Wayne Hall	
Receiver:	Ground Zone:	polygon
Building Row:	Tree Zone:	dashed polygon
Terrain Line:	Contour Zone:	polygon
	Parallel Barrier:	
	Skew Section:	→

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5RESULTS: SOUND LEVELS
PROJECT/CONTRACT:

RUN:

BARRIER DESIGN:
INPUT HEIGHTS

I-85 DB

Exit 104 Alternative 4

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

ATMOSPHERICS:

68 deg F, 50% RH

Receiver Name												
No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Calculated minus Goal	
			LAeq1h Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	LAeq1h Calculated		Noise Reduction Calculated			
		dBA	dBA	dBA	dB			dBA	dB	dB		
35	127	1	0.0	71.4	71	71.4	15	Snd Lvl	71.4	0.0	8	
36	128	1	0.0	72.1	66	72.1	15	Snd Lvl	72.1	0.0	8	
37	129	1	0.0	73.0	66	73.0	15	Snd Lvl	73.0	0.0	8	
38	130	1	0.0	67.5	66	67.5	15	Snd Lvl	67.5	0.0	8	
39	131	1	0.0	68.4	71	68.4	15	-----	68.4	0.0	8	
40	132	1	0.0	58.6	66	58.6	15	-----	58.6	0.0	8	
41	133	1	0.0	66.1	66	66.1	15	Snd Lvl	66.1	0.0	8	
42	134	1	0.0	58.7	66	58.7	15	-----	58.7	0.0	8	
43	135	1	0.0	57.1	66	57.1	15	-----	57.1	0.0	8	
44	136	1	0.0	56.7	66	56.7	15	-----	56.7	0.0	8	
74	137	1	0.0	68.8	71	68.8	15	-----	68.8	0.0	8	
75	138	1	0.0	58.3	66	58.3	15	-----	58.3	0.0	8	
76	139	1	0.0	58.8	66	58.8	15	-----	58.8	0.0	8	
77	140	1	0.0	58.0	66	58.0	15	-----	58.0	0.0	8	
78	141	1	0.0	61.7	71	61.7	15	-----	61.7	0.0	8	
79	142	1	0.0	72.1	71	72.1	15	Snd Lvl	72.1	0.0	8	
80	143	1	0.0	69.1	66	69.1	15	Snd Lvl	69.1	0.0	8	
81	144	1	0.0	69.4	66	69.4	15	Snd Lvl	69.4	0.0	8	
82	145	1	0.0	73.2	66	73.2	15	Snd Lvl	73.2	0.0	8	
83	146	1	0.0	67.4	66	67.4	15	Snd Lvl	67.4	0.0	8	
84	147	1	0.0	70.5	66	70.5	15	Snd Lvl	70.5	0.0	8	
85	148	1	0.0	74.3	66	74.3	15	Snd Lvl	74.3	0.0	8	
86	149	1	0.0	73.8	66	73.8	15	Snd Lvl	73.8	0.0	8	
87	150	1	0.0	70.5	66	70.5	15	Snd Lvl	70.5	0.0	8	
Dwelling Units												
# DUs		Noise Reduction										
		Min	Avg	Max								
		dB	dB	dB								
All Selected	24	0.0	0.0	0.0								
All Impacted	14	0.0	0.0	0.0								
All that meet NR Goal	0	0.0	0.0	0.0								

Section 4 Noise Analysis Area

Existing Conditions, No Build, Build

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN: I-85 DB
Exit 106 Existing Conditions
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

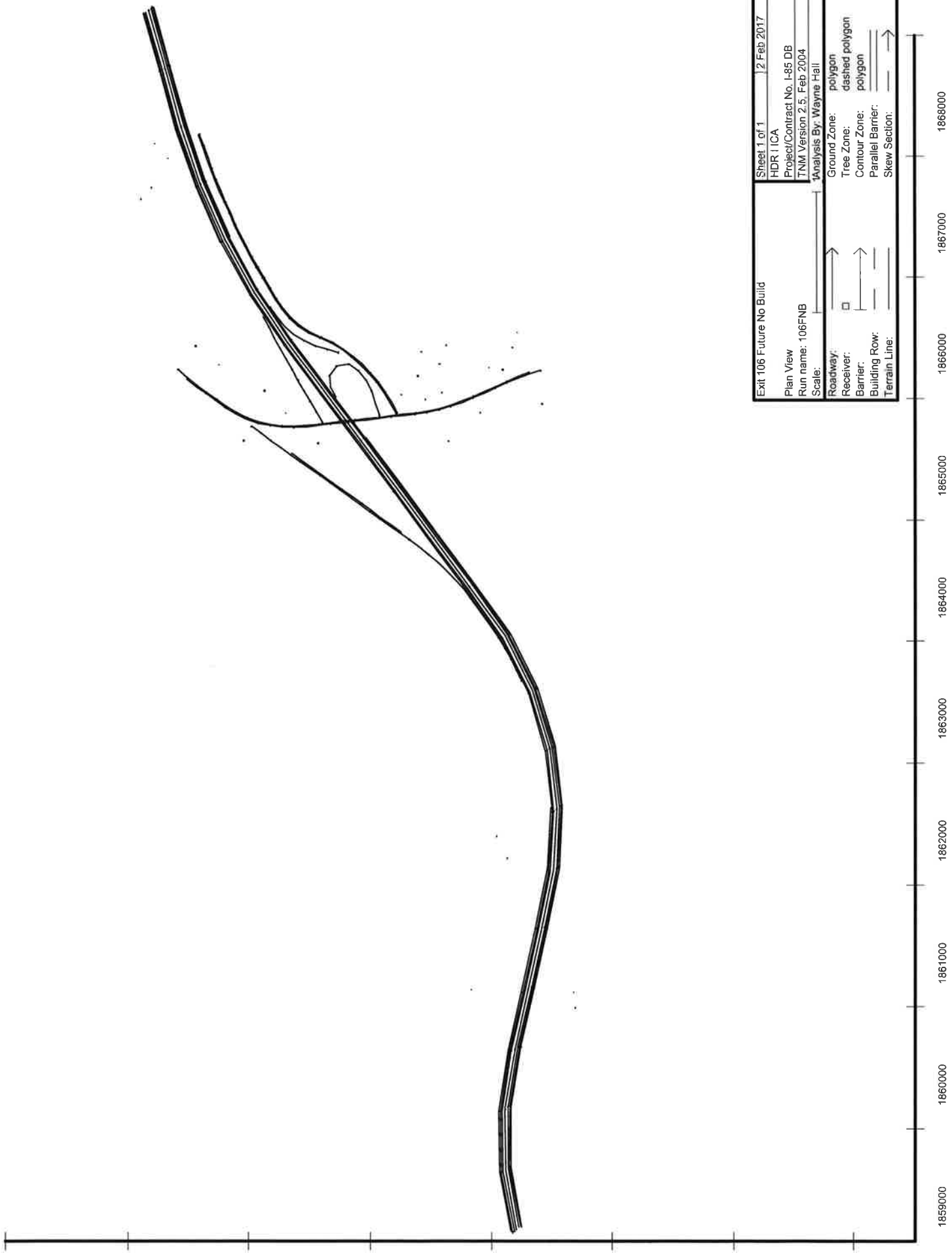
Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name		No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Noise Reduction Calculated	Goal	Calculated minus Goal
					LAeq1h Calculated	Crit'n	dBA	dB	Crit'n		Sub'l Inc	LAeq1h Calculated			
				dBA	dBA	dBA	dB	dB	dB		dBA	dB	dB		dB
45		101	1	0.0	62.8	66	62.8	15	-----		62.8	0.0	8		-8.0
46		102	1	0.0	66.9	66	66.9	15	Snd Lvl		66.9	0.0	8		-8.0
47		103	1	0.0	65.5	66	65.5	15	-----		65.5	0.0	8		-8.0
48		104	1	0.0	69.5	71	69.5	15	-----		69.5	0.0	8		-8.0
49		105	1	0.0	66.0	71	66.0	15	-----		66.0	0.0	8		-8.0
50		106	1	0.0	67.8	71	67.8	15	-----		67.8	0.0	8		-8.0
51		107	1	0.0	67.8	71	67.8	15	-----		67.8	0.0	8		-8.0
52		108	1	0.0	64.7	71	64.7	15	-----		64.7	0.0	8		-8.0
53		109	1	0.0	63.6	71	63.6	15	-----		63.6	0.0	8		-8.0
54		110	1	0.0	65.0	71	65.0	15	-----		65.0	0.0	8		-8.0
55		111	1	0.0	67.3	71	67.3	15	-----		67.3	0.0	8		-8.0
56		112	1	0.0	74.8	66	74.8	15	Snd Lvl		74.8	0.0	8		-8.0
57		113	1	0.0	71.7	66	71.7	15	Snd Lvl		71.7	0.0	8		-8.0
58		114	1	0.0	63.2	71	63.2	15	-----		63.2	0.0	8		-8.0
59		115	1	0.0	62.2	71	62.2	15	-----		62.2	0.0	8		-8.0
60		116	1	0.0	65.6	71	65.6	15	-----		65.6	0.0	8		-8.0
61		117	1	0.0	63.2	66	63.2	15	-----		63.2	0.0	8		-8.0
62		118	1	0.0	62.0	71	62.0	15	-----		62.0	0.0	8		-8.0
63		119	1	0.0	62.7	66	62.7	15	-----		62.7	0.0	8		-8.0
64		120	1	0.0	61.6	66	61.6	15	-----		61.6	0.0	8		-8.0
65		121	1	0.0	59.1	66	59.1	15	-----		59.1	0.0	8		-8.0
66		122	1	0.0	58.6	66	58.6	15	-----		58.6	0.0	8		-8.0
67		123	1	0.0	55.8	66	55.8	15	-----		55.8	0.0	8		-8.0
68		124	1	0.0	55.1	66	55.1	15	-----		55.1	0.0	8		-8.0
69		125	1	0.0	56.5	66	56.5	15	-----		56.5	0.0	8		-8.0
70		126	1	0.0	60.2	71	60.2	15	-----		60.2	0.0	8		-8.0
71		127	1	0.0	65.1	66	65.1	15	-----		65.1	0.0	8		-8.0
72		128	1	0.0	66.6	71	66.6	15	-----		66.6	0.0	8		-8.0
73		129	1	0.0	65.9	71	65.9	15	-----		65.9	0.0	8		-8.0
Dwelling Units		# DUs			Noise Reduction										
					Min	Avg	Max								
					dB	dB	dB								

RESULTS: SOUND LEVELS

I-85 DB

All Selected	29	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0



Exit 106 Future No Build		Sheet 1 of 1	12 Feb 2017
Plan View		HDR 1 ICA	
Run name: 106FNB		Project/Contract No. I-85 DB	
Scale:		TNM Version 2.5, Feb 2004	
		Analysis By: Wayne Hall	
Roadway:	→	Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:	→	Contour Zone:	polygon
Building Row:	—	Parallel Barrier:	—
Terrain Line:	—	Skew Section:	— →

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN: Exit 106 Future No Build

BARRIER DESIGN: INPUT HEIGHTS

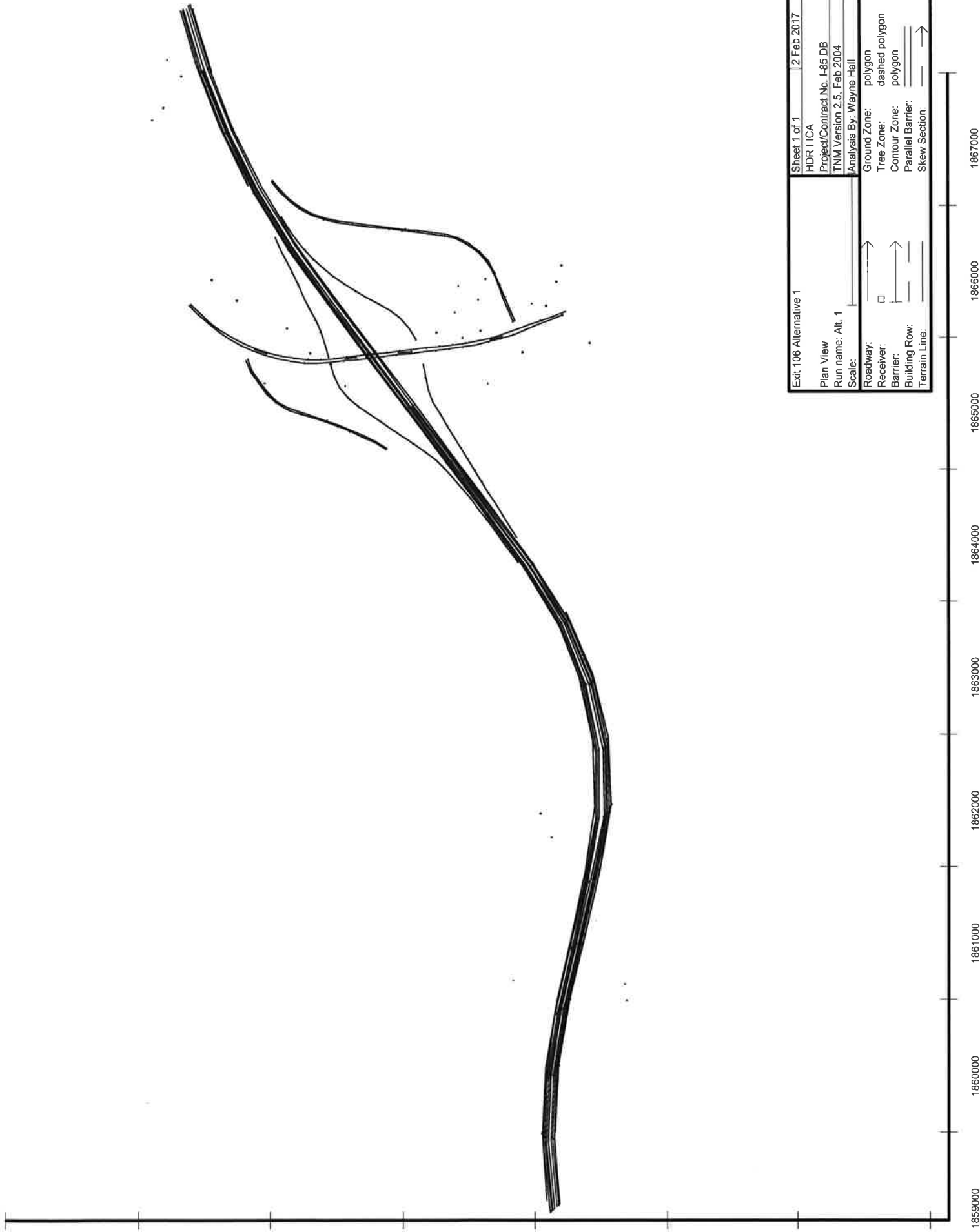
ATMOSPHERICS:

68 deg F, 50% RH

I-85 DB

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name												
No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Calculated minus Goal	
			LAeq1h Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	LAeq1h Calculated		Noise Reduction Calculated	Goal		
		dBA	dBA	dBA	dB	dB	dB		dBA	dB	dB	
45	102	1	0.0	64.8	66	64.8	15	-----	64.8	0.0	8	
46	103	1	0.0	68.8	66	68.8	15	Snd Lvl	68.8	0.0	8	
47	104	1	0.0	67.4	66	67.4	15	Snd Lvl	67.4	0.0	8	
48	105	1	0.0	71.1	71	71.1	15	Snd Lvl	71.1	0.0	8	
49	106	1	0.0	66.7	71	66.7	15	-----	66.7	0.0	8	
50	107	1	0.0	69.5	71	69.5	15	-----	69.5	0.0	8	
51	108	1	0.0	69.5	71	69.5	15	-----	69.5	0.0	8	
52	109	1	0.0	66.6	71	66.6	15	-----	66.6	0.0	8	
53	110	1	0.0	65.5	71	65.5	15	-----	65.5	0.0	8	
54	111	1	0.0	67.0	71	67.0	15	-----	67.0	0.0	8	
55	112	1	0.0	69.3	71	69.3	15	-----	69.3	0.0	8	
56	113	1	0.0	76.7	66	76.7	15	Snd Lvl	76.7	0.0	8	
57	114	1	0.0	73.7	66	73.7	15	Snd Lvl	73.7	0.0	8	
58	115	1	0.0	65.0	71	65.0	15	-----	65.0	0.0	8	
59	116	1	0.0	64.1	71	64.1	15	-----	64.1	0.0	8	
60	117	1	0.0	67.7	71	67.7	15	-----	67.7	0.0	8	
61	118	1	0.0	65.0	66	65.0	15	-----	65.0	0.0	8	
62	119	1	0.0	63.8	71	63.8	15	-----	63.8	0.0	8	
63	120	1	0.0	64.6	66	64.6	15	-----	64.6	0.0	8	
64	121	1	0.0	63.4	66	63.4	15	-----	63.4	0.0	8	
65	122	1	0.0	60.9	66	60.9	15	-----	60.9	0.0	8	
66	123	1	0.0	60.3	66	60.3	15	-----	60.3	0.0	8	
67	124	1	0.0	57.6	66	57.6	15	-----	57.6	0.0	8	
68	125	1	0.0	56.9	66	56.9	15	-----	56.9	0.0	8	
69	126	1	0.0	58.3	66	58.3	15	-----	58.3	0.0	8	
70	127	1	0.0	62.0	71	62.0	15	-----	62.0	0.0	8	
71	128	1	0.0	66.9	66	66.9	15	Snd Lvl	66.9	0.0	8	
72	129	1	0.0	68.6	71	68.6	15	-----	68.6	0.0	8	
73	130	1	0.0	67.9	71	67.9	15	-----	67.9	0.0	8	
Dwelling Units												
		# DUs	Noise Reduction									
			Min	Avg							Max	
			dB	dB	dB							



Exit 106 Alternative 1	Sheet 1 of 1	2 Feb 2017
Plan View	HDR I CA	
Run name: Alt. 1	Project/Contract No. I-85 DB	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: Wayne Hall	
Receiver:	Ground Zone: polygon	
Barrier:	Tree Zone: dashed polygon	
Building Row:	Contour Zone: polygon	
Terrain Line:	Parallel Barrier:	
	Skew Section:	→

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA
Wayne Hall20 February 2017
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:
RUN: Exit 106 Alternative 1
BARRIER DESIGN: INPUT HEIGHTS

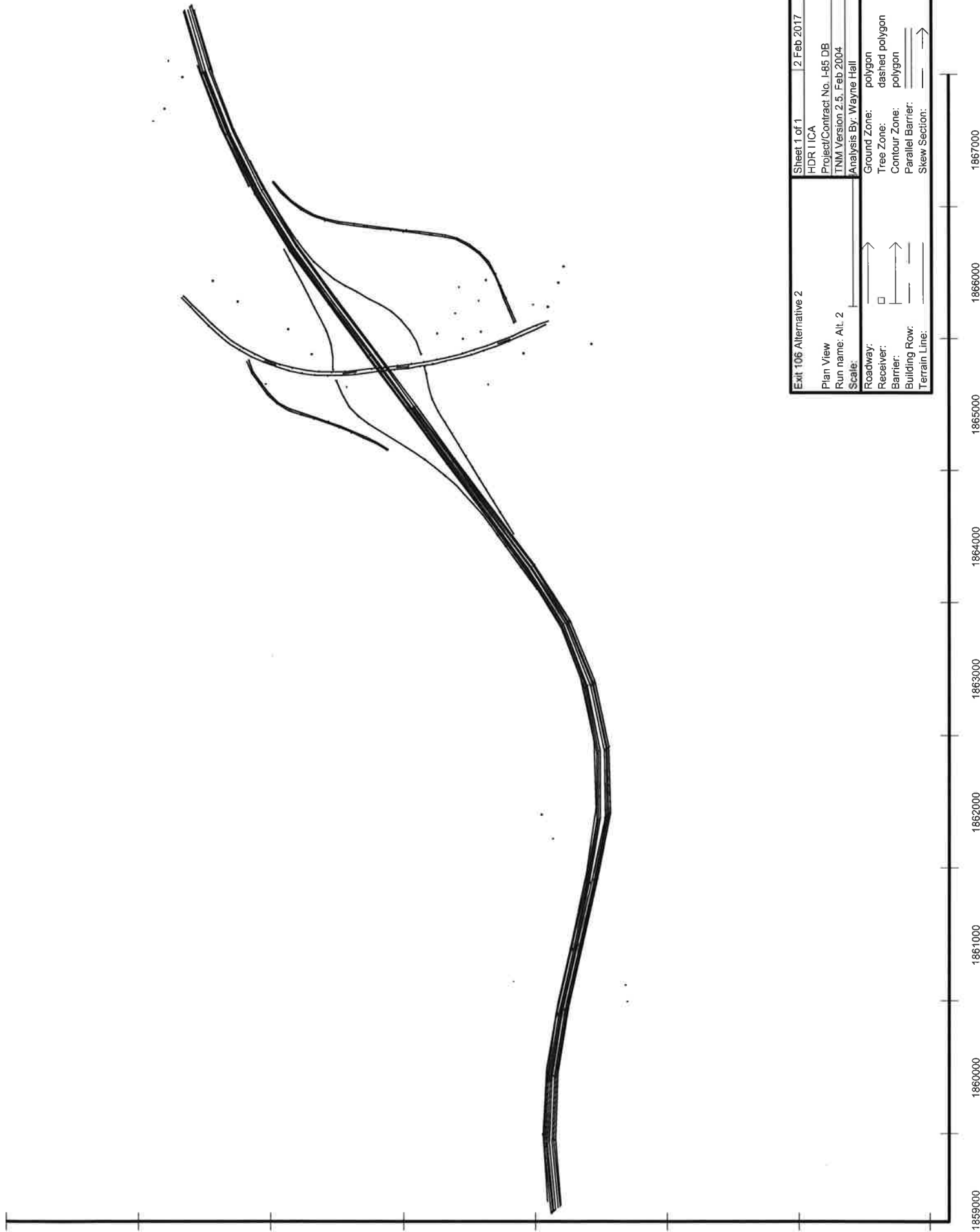
I-85 DB

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

68 deg F, 50% RH

ATMOSPHERICS:

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier			Increase over existing			With Barrier			Calculated minus Goal
				LAeq1h Calculated	Crit'n	dBA	Calculated	Crit'n Sub'l Inc	Type Impact	Calculated LAeq1h	Noise Reduction		
											Calculated	Goal	
			dBA	dBA	dBA	dB	dB	dB	dBA	dB	dB		
45	101	1	0.0	66.1	66	66.1	15	Snd Lvl	66.1	0.0	8	-8.0	
46	102	1	0.0	70.1	66	70.1	15	Snd Lvl	70.1	0.0	8	-8.0	
47	103	1	0.0	68.6	66	68.6	15	Snd Lvl	68.6	0.0	8	-8.0	
48	104	1	0.0	74.4	71	74.4	15	Snd Lvl	74.4	0.0	8	-8.0	
49	105	1	0.0	61.7	71	61.7	15	-----	61.7	0.0	8	-8.0	
50	106	1	0.0	69.3	71	69.3	15	-----	69.3	0.0	8	-8.0	
51	107	1	0.0	67.8	71	67.8	15	-----	67.8	0.0	8	-8.0	
52	108	1	0.0	64.6	71	64.6	15	-----	64.6	0.0	8	-8.0	
53	109	1	0.0	63.4	71	63.4	15	-----	63.4	0.0	8	-8.0	
54	110	1	0.0	65.0	71	65.0	15	-----	65.0	0.0	8	-8.0	
55	111	1	0.0	67.8	71	67.8	15	-----	67.8	0.0	8	-8.0	
56	112	1	0.0	75.1	66	75.1	15	Snd Lvl	75.1	0.0	8	-8.0	
57	113	1	0.0	71.5	66	71.5	15	Snd Lvl	71.5	0.0	8	-8.0	
58	114	1	0.0	63.5	71	63.5	15	-----	63.5	0.0	8	-8.0	
59	115	1	0.0	62.2	71	62.2	15	-----	62.2	0.0	8	-8.0	
60	116	1	0.0	66.4	71	66.4	15	-----	66.4	0.0	8	-8.0	
61	117	1	0.0	65.3	66	65.3	15	-----	65.3	0.0	8	-8.0	
62	118	1	0.0	63.4	71	63.4	15	-----	63.4	0.0	8	-8.0	
63	119	1	0.0	63.4	66	63.4	15	-----	63.4	0.0	8	-8.0	
64	120	1	0.0	63.5	66	63.5	15	-----	63.5	0.0	8	-8.0	
65	121	1	0.0	61.1	66	61.1	15	-----	61.1	0.0	8	-8.0	
66	122	1	0.0	60.1	66	60.1	15	-----	60.1	0.0	8	-8.0	
67	123	1	0.0	57.3	66	57.3	15	-----	57.3	0.0	8	-8.0	
68	124	1	0.0	57.0	66	57.0	15	-----	57.0	0.0	8	-8.0	
69	125	1	0.0	57.5	66	57.5	15	-----	57.5	0.0	8	-8.0	
70	126	1	0.0	60.2	71	60.2	15	-----	60.2	0.0	8	-8.0	
71	127	1	0.0	65.1	66	65.1	15	-----	65.1	0.0	8	-8.0	
72	128	1	0.0	66.8	71	66.8	15	-----	66.8	0.0	8	-8.0	
73	129	1	0.0	66.3	71	66.3	15	-----	66.3	0.0	8	-8.0	
Dwelling Units	# DUs	Noise Reduction											
		Min	Avg	Max									
		dB	dB	dB									



Exit 106 Alternative 2	Sheet 1 of 1	2 Feb 2017
Plan View	HDR ICA	
Run name: Alt. 2	Project/Contract No. I-45 DB	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: Wayne Hall	
Receiver:	Ground Zone: polygon	
Barrier:	Tree Zone: dashed polygon	
Building Row:	Contour Zone: polygon	
Terrain Line:	Parallel Barrier: —	
	Skew Section: —>	

1-85 DB

HDR I ICA
Wayne Hall

20 February 2017
TNM 2.5
Calculated with T

RESULTS: SOUND LEVELS

RUN:

BARRIER DESIGN:

Exit 106 Alternative 2

INPUT HEIGHTS

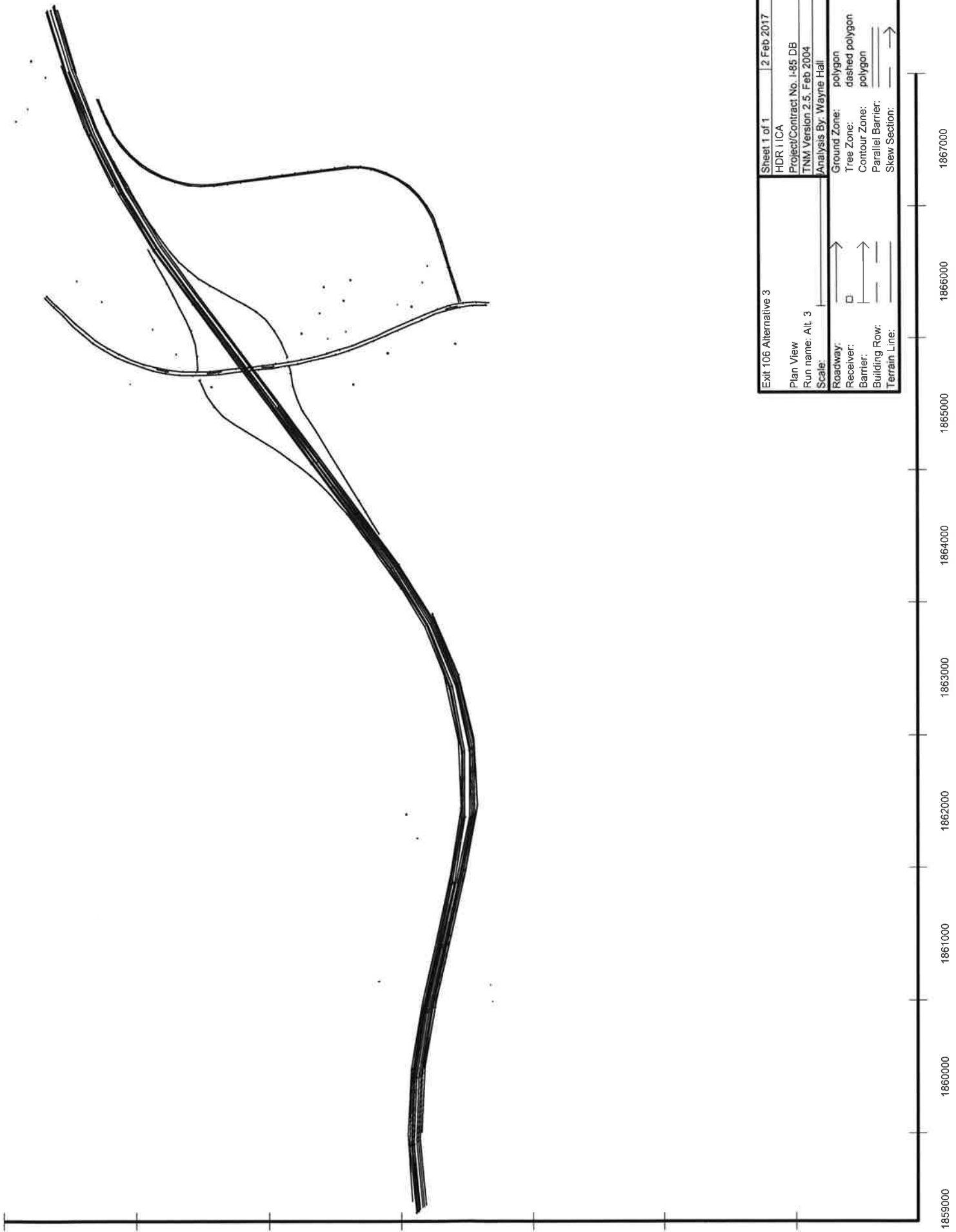
ATMOSPHERICS:
68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name															
No.	#DUs	Existing LAeq1h	No Barrier			Increase over existing			Type Impact	With Barrier			Calculated minus Goal dB		
			Calculated	Crit'n	dBA	dB	Calculated	Crit'n Sub'l Inc		Snd Lvl	LAeq1h	Noise Reduction Calculated		Goal	
															dBA
45	101	1	0.0	66.1	66	66.1	15	Snd Lvl	66.1	0.0	8	-8.0			
46	102	1	0.0	70.1	66	70.1	15	Snd Lvl	70.1	0.0	8	-8.0			
47	103	1	0.0	68.6	66	68.6	15	Snd Lvl	68.6	0.0	8	-8.0			
48	104	1	0.0	72.8	71	72.8	15	Snd Lvl	72.8	0.0	8	-8.0			
49	105	1	0.0	62.1	71	62.1	15	*****	62.1	0.0	8	-8.0			
50	106	1	0.0	68.0	71	68.0	15	*****	68.0	0.0	8	-8.0			
51	107	1	0.0	67.8	71	67.8	15	*****	67.8	0.0	8	-8.0			
52	108	1	0.0	64.6	71	64.6	15	*****	64.6	0.0	8	-8.0			
53	109	1	0.0	63.4	71	63.4	15	*****	63.4	0.0	8	-8.0			
54	110	1	0.0	65.0	71	65.0	15	*****	65.0	0.0	8	-8.0			
55	111	1	0.0	67.7	71	67.7	15	*****	67.7	0.0	8	-8.0			
56	112	1	0.0	74.7	66	74.7	15	Snd Lvl	74.7	0.0	8	-8.0			
57	113	1	0.0	71.0	66	71.0	15	Snd Lvl	71.0	0.0	8	-8.0			
58	114	1	0.0	62.9	71	62.9	15	*****	62.9	0.0	8	-8.0			
59	115	1	0.0	62.0	71	62.0	15	*****	62.0	0.0	8	-8.0			
60	116	1	0.0	65.9	71	65.9	15	*****	65.9	0.0	8	-8.0			
61	117	1	0.0	62.9	66	62.9	15	*****	62.9	0.0	8	-8.0			
62	118	1	0.0	61.9	71	61.9	15	*****	61.9	0.0	8	-8.0			
63	119	1	0.0	62.6	66	62.6	15	*****	62.6	0.0	8	-8.0			
64	120	1	0.0	63.1	66	63.1	15	*****	63.1	0.0	8	-8.0			
65	121	1	0.0	60.6	66	60.6	15	*****	60.6	0.0	8	-8.0			
66	122	1	0.0	58.8	66	58.8	15	*****	58.8	0.0	8	-8.0			
67	123	1	0.0	56.4	66	56.4	15	*****	56.4	0.0	8	-8.0			
68	124	1	0.0	56.4	66	56.4	15	*****	56.4	0.0	8	-8.0			
69	125	1	0.0	56.9	66	56.9	15	*****	56.9	0.0	8	-8.0			
70	126	1	0.0	59.6	71	59.6	15	*****	59.6	0.0	8	-8.0			
71	127	1	0.0	64.0	66	64.0	15	*****	64.0	0.0	8	-8.0			
72	128	1	0.0	66.5	71	66.5	15	*****	66.5	0.0	8	-8.0			
73	129	1	0.0	66.1	71	66.1	15	*****	66.1	0.0	8	-8.0			
Dwelling Units															
	# DUs	Noise Reduction			Max										
		Min	Avg	dB											
		dB	dB	dB	dB										

RESULTS: SOUND LEVELS

		I-85 DB		
All Selected		29	0.0	0.0
All Impacted		6	0.0	0.0
All that meet NR Goal		0	0.0	0.0



Exit 106 Alternative 3	Sheet 1 of 1	12 Feb 2017
Plan View	HDR / ICA	
Run name: Alt. 3	Project/Contract No. I-85 DB	
Scale:	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: Wayne Hall	
Receiver:	Ground Zone: polygon	
Barrier:	Tree Zone: dashed polygon	
Building Row:	Contour Zone: polygon	
Terrain Line:	Parallel Barrier: —	
	Skew Section: — →	

RESULTS: SOUND LEVELS

I-85 DB

HDR I ICA

Wayne Hall

20 February 2017

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN: Exit 106 Alternative 3

BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

I-85 DB

Exit 106 Alternative 3

INPUT HEIGHTS

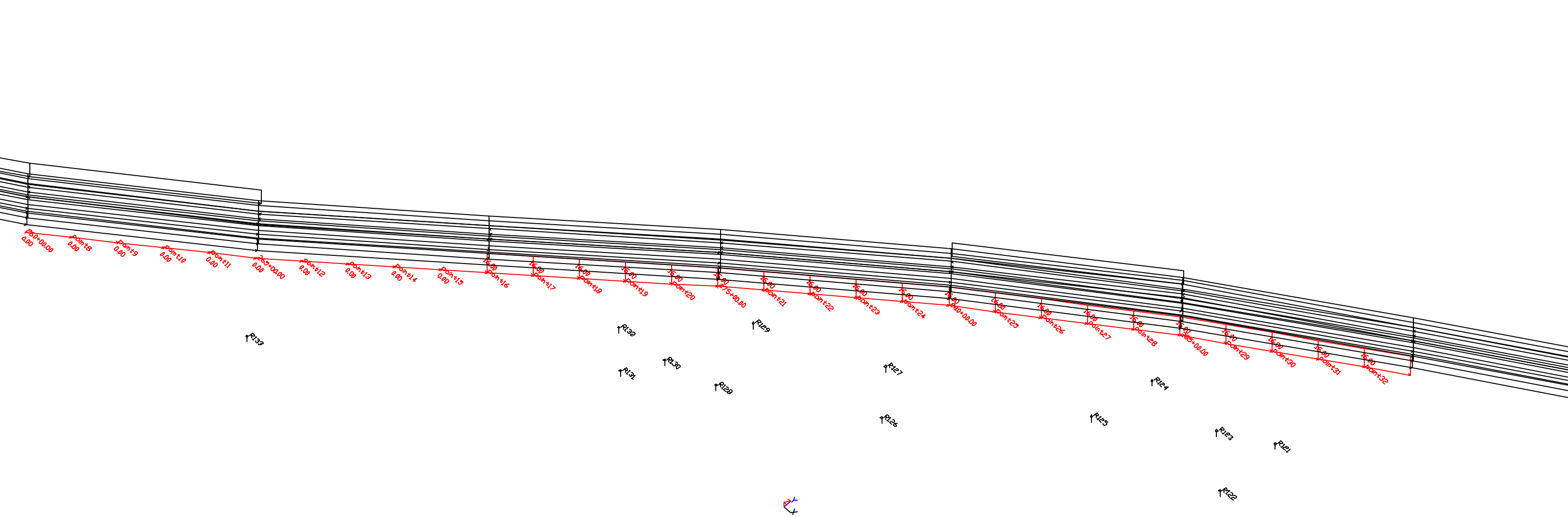
Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Receiver Name		No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			Type Impact	With Barrier		Calculated minus Goal
					LAeq1h Calculated	Crit'n	Crit'n	Calculated	Sub'l Inc		Calculated LAeq1h	Noise Reduction Calculated	
					dBA	dBA	dBA	dB	dB	dB	dBA	dB	dB
45		101	1	0.0	66.1	66.1	66	66.1	15	Snd Lvl	66.1	0.0	8
46		102	1	0.0	70.1	70.1	66	70.1	15	Snd Lvl	70.1	0.0	8
47		103	1	0.0	68.6	68.6	66	68.6	15	Snd Lvl	68.6	0.0	8
48		104	1	0.0	72.2	72.2	71	72.2	15	Snd Lvl	72.2	0.0	8
49		105	1	0.0	61.9	61.9	71	61.9	15	-----	61.9	0.0	8
50		106	1	0.0	68.1	68.1	71	68.1	15	-----	68.1	0.0	8
51		107	1	0.0	67.9	67.9	71	67.9	15	-----	67.9	0.0	8
52		108	1	0.0	64.7	64.7	71	64.7	15	-----	64.7	0.0	8
53		109	1	0.0	63.4	63.4	71	63.4	15	-----	63.4	0.0	8
54		110	1	0.0	65.0	65.0	71	65.0	15	-----	65.0	0.0	8
55		111	1	0.0	67.7	67.7	71	67.7	15	-----	67.7	0.0	8
56		112	1	0.0	74.7	74.7	66	74.7	15	Snd Lvl	74.7	0.0	8
57		113	1	0.0	71.1	71.1	66	71.1	15	Snd Lvl	71.1	0.0	8
58		114	1	0.0	63.0	63.0	71	63.0	15	-----	63.0	0.0	8
59		115	1	0.0	62.0	62.0	71	62.0	15	-----	62.0	0.0	8
60		116	1	0.0	65.9	65.9	71	65.9	15	-----	65.9	0.0	8
61		117	1	0.0	63.0	63.0	66	63.0	15	-----	63.0	0.0	8
62		118	1	0.0	62.0	62.0	71	62.0	15	-----	62.0	0.0	8
63		119	1	0.0	62.5	62.5	66	62.5	15	-----	62.5	0.0	8
64		120	1	0.0	61.5	61.5	66	61.5	15	-----	61.5	0.0	8
65		121	1	0.0	59.7	59.7	66	59.7	15	-----	59.7	0.0	8
66		122	1	0.0	59.7	59.7	66	59.7	15	-----	59.7	0.0	8
67		123	1	0.0	57.6	57.6	66	57.6	15	-----	57.6	0.0	8
68		124	1	0.0	57.7	57.7	66	57.7	15	-----	57.7	0.0	8
69		125	1	0.0	57.8	57.8	66	57.8	15	-----	57.8	0.0	8
70		126	1	0.0	59.7	59.7	71	59.7	15	-----	59.7	0.0	8
71		127	1	0.0	64.1	64.1	66	64.1	15	-----	64.1	0.0	8
72		128	1	0.0	66.8	66.8	71	66.8	15	-----	66.8	0.0	8
73		129	1	0.0	66.3	66.3	71	66.3	15	-----	66.3	0.0	8
Dwelling Units				# DUs	Noise Reduction								
					Min	Avg	Max						
					dB	dB	dB						

RESULTS: SOUND LEVELS

		I-85 DB		
All Selected	29	0.0	0.0	0.0
All Impacted	6	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Barrier Analysis



Exit 104 Alternative 4		Sheet 1 of 1	3 Jan 2017
Barrier View-Barr.A 16'x2000'		HDR I ICA	
Run name: Barr_A_exit104		Project/Contract No. I-85 DB	
Scale: <DNA - due to perspective>		TNM Version 2.5, Feb 2004	
		Analysis By: Wayne Hall	
Roadway:	—————>	Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:	—————>	Contour Zone:	polygon
Building Row:	—— —	Parallel Barrier:	—————
Terrain Line:	—————	Skew Section:	—— —>

3-Jan-17
TNM 2.5
Calculated with TNM 2.5

I-85 DB

Exit 104 Alternative 4

Barr.A 16'x3000'

68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing	No Barrier		Increase over existing			With Barrier		Goal	Calculated minus Goal
			LAeq1h	LAeq1h	Calculated	Crit'n	Type	Calculated	Noise Reduction			
							Impact	LAeq1h	Calculated			
			dBA	dBA	dBA	dB	dB		dB	dB		
R80	172	1	67	69.2	66	2.2	15 Snd Lvl	67	2.2	8	-5.8	
R81	173	1	68	69.4	66	1.4	15 Snd Lvl	66.8	2.6	8	-5.4	
R82	174	1	72	73.2	66	1.2	15 Snd Lvl	65.9	7.3	8	-0.7	
R83	175	1	66	67.4	66	1.4	15 Snd Lvl	64.8	2.6	8	-5.4	
R84	176	1	69	70.8	66	1.8	15 Snd Lvl	67.6	3.2	8	-4.8	
R85	177	1	72	74.3	66	2.3	15 Snd Lvl	66.4	7.9	8	-0.1	
R86	178	1	73	73.8	66	0.8	15 Snd Lvl	64.3	9.5	8	1.5	

Dwelling Units	# DUs	Noise Reduction			Not feasible to reduce noise levels at 75% of impacted receivers by 5dBA
		Min dB	Avg dB	Max dB	
All Selected	7	0	1.5	9.5	
All Impacted	7	2.2	5	9.5	
All that meet NR Goal	1	9.5	9.5	9.5	

3-Feb-17
TNM 2.5

PROJECT/CONTRA I-85 DB

Exit 104 Alternative 4

BARRIER DESIGN: Barr.A 16'x2000'

Barriers Name	Type	Heights along Barrier			Length	If Wall Area	If Berm Volume	Top Width	Run:Rise	Cost
		Min	Avg	Max						
		ft	ft	ft						
Barr_A_Exit104	W	16	16	16	3000	48000				\$ 1,680,004.00
									Total Cost:	\$ 1,680,004.00

SCDOT Feasibility and Reasonableness Worksheet

Date: 2/3/2017

Project Name I-85 Widening

Highway Traffic Noise Abatement Measure Noise Barrier A (Receivers 80-86)

Feasibility

Number of Impacted Receivers

7

Number of Benefited Receivers

3

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure

43%

Is the proposed noise abatement measure acoustically feasible?

NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☐ Yes

☒ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography

☐ Yes

☐ No

Safety

☐ Yes

☐ No

Drainage

☐ Yes

☐ No

Utilities

☐ Yes

☐ No

Maintenance

☐ Yes

☐ No

Access

☐ Yes

☐ No

Exposed Height of Wall

☐ Yes

☐ No

If "Yes" was marked for any of the questions above, please explain below.

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers

Number of Benefited Receivers that
achieve at least an 8 dBA reduction

Percentage of Benefited Receivers that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers must achieve at least a 8 dBA reduction for it to be reasonable.

Is the proposed noise abatement measure acoustically feasible? ☐ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for
noise abatement measure

Estimated construction cost for noise
abatement measure

Estimated cost per Benefited Receiver

Based on the SCDOT policy of \$30,000 per Benefited Receiver, would the abatement measure be reasonable?

NOTE: SCDOT Policy states that the preliminary noise analysis is based on \$35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation.

☐ Yes ☐ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above)

Number of Benefited Receivers
in **support** of noise abatement measure

Percentage of Benefited Receivers
in **support** of noise abatement measure

Number of Benefited Receivers
opposed to noise abatement measure

Percentage of Benefited Receivers
opposed to noise abatement measure

Number of Benefited Receivers **that did not
respond** to solicitation on noise abatement
measure

Percentage of Benefited Receivers **that
did not respond** to solicitation on noise
abatement measure

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement.

☐ Yes ☐ No

Noise Abatement is not feasible for reducing or eliminating noise impacts for this project.

3-Jan-17
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:	I-85 DB
RUN:	Exit 102 - Alt. 1
BARRIER DESIGN:	Barr.B 16'

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing	No Barrier				With Barrier			Calculated minus Goal dB	
			LAEq1h	LAEq1h		Increase over existing Type	Calculated	N/A				
					Calculated Crit'n	Calculated Crit'n	Impact	LAEq1h	Calculated	Goal		
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	
R95	84	1	72	67.9	66	2.9	15 Snd Lvl	64.9		3	8	-5
R96	85	1	74	79.4	66	1.7	15 Snd Lvl	75.8		3.6	8	-4.4
R97	86	1	63	77.7	66	4.9	15 Snd Lvl	74.2		3.5	8	-4.5
R98	87	1	78	71.7	66	1.4	15 Snd Lvl	65.4		6.3	8	-1.7
R99	88	1	76	79.6	66	1.7	15 Snd Lvl	75.8		3.8	8	-4.2
R100	89	1	67	64.2	66	4.7	15 ----	59.5		4.7	8	-3.3
R101	90	1	78	63.9	66	1.6	15 ----	58.7		5.2	8	-2.8
R102	91	1	60	65.8	66	4.2	15 ----	59.8		6	8	-2
R103	92	1	60	69.5	66	3.9	15 Snd Lvl	62.6		6.9	8	-1.1
R104	93	1	61	72.1	66	4.8	15 Snd Lvl	65.6		6.5	8	-1.5
R105	94	1	64	70.6	66	5.5	15 Snd Lvl	64.5		6.1	8	-1.9
R106	95	1	70	68.2	66	2.1	15 Snd Lvl	62.2		6	8	-2
R107	96	1	69	67.2	66	1.6	15 Snd Lvl	61.5		5.7	8	-2.3
R108	97	1	69	73.7	66	0.8	15 Snd Lvl	66.6		7.1	8	-0.9
R109	98	1	67	73.9	66	1.5	15 Snd Lvl	67.2		6.7	8	-1.3
R110	99	1	68	74.3	66	1.2	15 Snd Lvl	67.7		6.6	8	-1.4
R111	100	1	67	71.1	66	1.2	15 Snd Lvl	70.8		0.3	8	-7.7

Dwelling Units	# DUs	Noise Reduction			Not Feasible to reduce noise levels at 75% of impacted receptors by at least 5dBA
		Min dB	Avg dB	Max dB	
All Selected	17	0.3	3.7	7.1	
All Impacted	14	5.2	6.2	7.1	
All that meet NR Goal	0	0	0	0	

HDR ICA 3-Feb-17
Wayne Hall TNM 2.5

RESULTS: BARRIER DESCRI

PROJECT/CONTRACT: I-85 DB
 RUN: Exit 102 - Alt. 1
 BARRIER DESIGN: Barr.B 16'

Barriers Name	Type	Heights along Barrier			Length	If Wall Area	If Berm Volume	Top Width	Run:Rise	Cost
		Min	Avg	Max						
		ft	ft	ft						
Barr.C	W	16	16	16	3000	48000				\$ 1,680,000.00
									Total Cost:	\$ 1,680,000.00

SCDOT Feasibility and Reasonableness Worksheet

Date: 2/13/2017

Project Name I-85 Widening

Highway Traffic Noise Abatement Measure Noise Barrier B (Receivers 95-110)

Feasibility

Number of Impacted Receivers 14

Number of Benefited Receivers 10

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure

71%

Is the proposed noise abatement measure acoustically feasible?

NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☐ Yes

☒ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Safety	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Drainage	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Utilities	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Maintenance	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Access	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Exposed Height of Wall	<input type="checkbox"/> Yes	<input type="checkbox"/> No

If "Yes" was marked for any of the questions above, please explain below.

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers

Number of Benefited Receivers that
achieve at least an 8 dBA reduction

Percentage of Benefited Receivers that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers must achieve at least a 8 dBA reduction for it to be reasonable.

Is the proposed noise abatement measure acoustically feasible? ☐ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for
noise abatement measure

Estimated construction cost for noise
abatement measure

Estimated cost per Benefited Receiver

Based on the SCDOT policy of \$30,000 per Benefited Receiver, would the abatement measure be reasonable?

NOTE: SCDOT Policy states that the preliminary noise analysis is based on \$35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation.

☐ Yes ☐ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above)

Number of Benefited Receivers
in **support** of noise abatement measure

Percentage of Benefited Receivers
in **support** of noise abatement measure

Number of Benefited Receivers
opposed to noise abatement measure

Percentage of Benefited Receivers
opposed to noise abatement measure

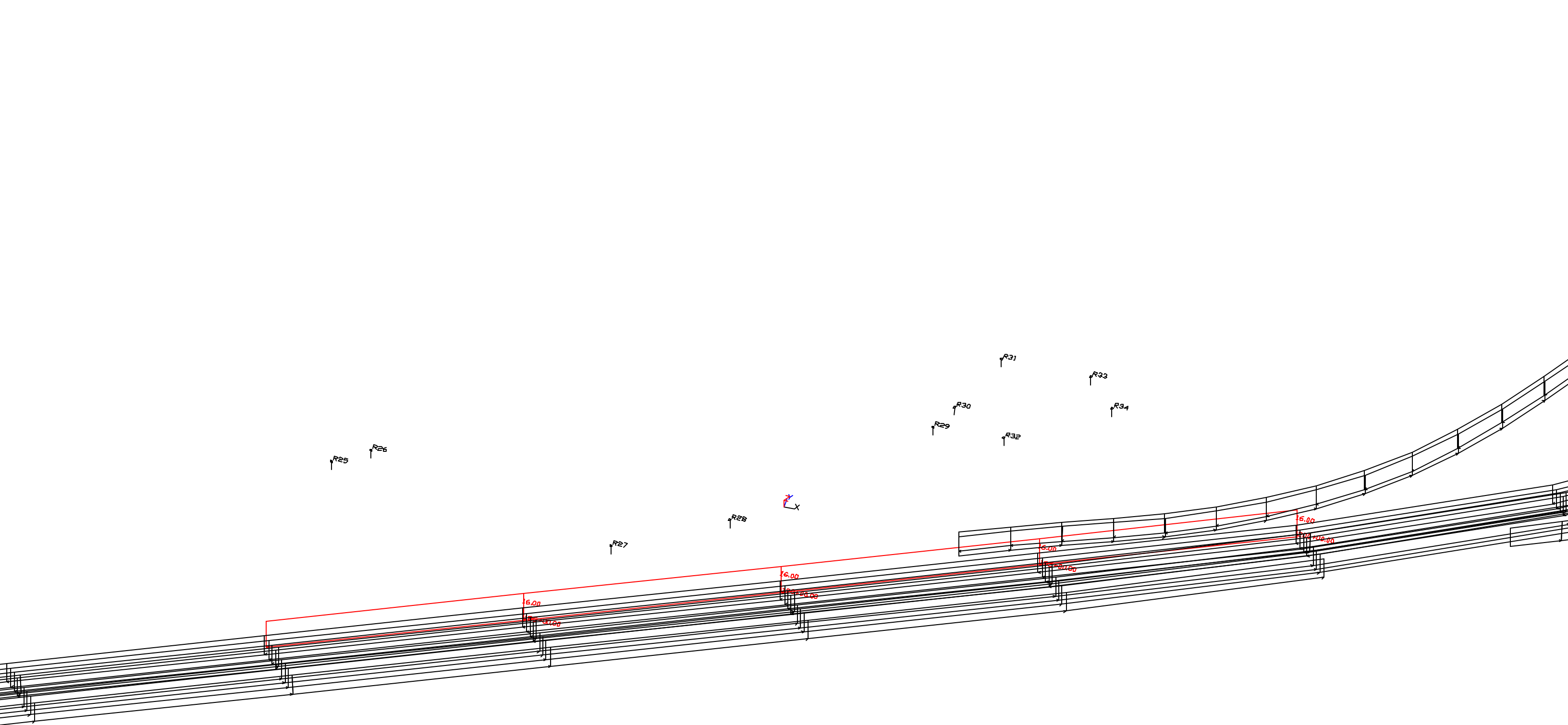
Number of Benefited Receivers **that did not
respond** to solicitation on noise abatement
measure

Percentage of Benefited Receivers **that
did not respond** to solicitation on noise
abatement measure

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement.

☐ Yes ☐ No

Noise Abatement is not feasible for reducing or eliminating noise impacts for this project.



Exit 102 - Alt. 1		Sheet 1 of 1	3 Jan 2017
Barrier View-Barr.C 16'x2000'		HDR I ICA	
Run name: Barr.B_C_exit102		Project/Contract No. I-85 DB	
Scale: <DNA - due to perspective>		TNM Version 2.5, Feb 2004	
		Analysis By: Wayne Hall	
Roadway:	—————>	Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:	—————>	Contour Zone:	polygon
Building Row:	—— —	Parallel Barrier:	—————
Terrain Line:	—————	Skew Section:	—— —>

3-Jan-17
TNM 2.5
Calculated with TNM 2.5

PROJECT/C	I-85 DB
RUN:	Exit 102 - Alt. 1
BARRIER D	Barr.C 16'x2000'

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Name	No.	#DUs	Existing LAeq1h	No Barrier		Increase over existing			With Barrier		Goal	Calculated minus Goal
				LAeq1h	Calculated Crit'n	Type	Impact	Calculated LAeq1h	Noise Reduction			
									Calculated			
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R22	108	1	64	65.4	66	1.8	15	----	63.1	2.3	8	-5.7
R23	109	1	63	70.7	66	2.4	15	Snd Lvl	62.2	8.5	8	0.5
R24	110	1	68	74.4	66	2.7	15	Snd Lvl	62.6	11	8	3
R25	111	1	74	65.4	66	0.4	15	----	65.3	11.8	8	3.8
R26	112	1	64	65.1	66	1.4	15	----	60	5.1	8	-2.9
R27	113	1	63	69.2	66	2.1	15	Snd Lvl	59.9	9.3	8	1.3
R28	114	1	64	71.9	66	1.6	15	Snd Lvl	61.3	4.7	8	-3.3

Dwelling Units	# DUs	Noise Reduction		
		Min dB	Avg dB	Max dB
All Selected	7	2.3	7	11.8
All Impacted	4	4.3	6.2	9.1
All that meet NR Goa	3	8.5	9.7	11

Not reasonable based on cost effectiveness.

PROJECT/CI-85 DB
RUN: Exit 102 - Alt. 1
BARRIER D Barr.C 16'x2000'

Name	Type	Heights along Barrier			Length	If Wall Area	If Berm Volume	Top Width	Run:Rise	Cost
		Min	Avg	Max						
		ft	ft	ft						
Barr.C	W	16	16	16	2000	32000				\$1,120,000.00
Total Cost:									\$1,120,000.00	

SCDOT Feasibility and Reasonableness Worksheet

Date: 2/33/2017

Project Name I-85 Widening

Highway Traffic Noise Abatement Measure Noise Barrier C (Receivers 22-28)

Feasibility

Number of Impacted Receivers 4

Number of Benefited Receivers 5

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure

75%

Is the proposed noise abatement measure acoustically feasible?

NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes

☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Safety	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Drainage	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Utilities	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Maintenance	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Access	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Exposed Height of Wall	<input type="checkbox"/> Yes	<input type="checkbox"/> No

If "Yes" was marked for any of the questions above, please explain below.

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers

5

Number of Benefited Receivers that
achieve at least an 8 dBA reduction

4

Percentage of Benefited Receivers that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers must achieve at least a 8 dBA reduction for it to be reasonable.

80%

Is the proposed noise abatement measure acoustically feasible? ☒ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for
noise abatement measure

\$35

Estimated construction cost for noise
abatement measure

\$1,120,000

Estimated cost per Benefited Receiver

\$224,000

Based on the SCDOT policy of \$30,000 per Benefited Receiver, would the abatement measure be reasonable?

NOTE: SCDOT Policy states that the preliminary noise analysis is based on \$35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation.

☐ Yes ☒ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above)

Number of Benefited Receivers
in **support** of noise abatement measure

Number of Benefited Receivers
opposed to noise abatement measure

Number of Benefited Receivers **that did not
respond** to solicitation on noise abatement
measure

Percentage of Benefited Receivers
in **support** of noise abatement measure

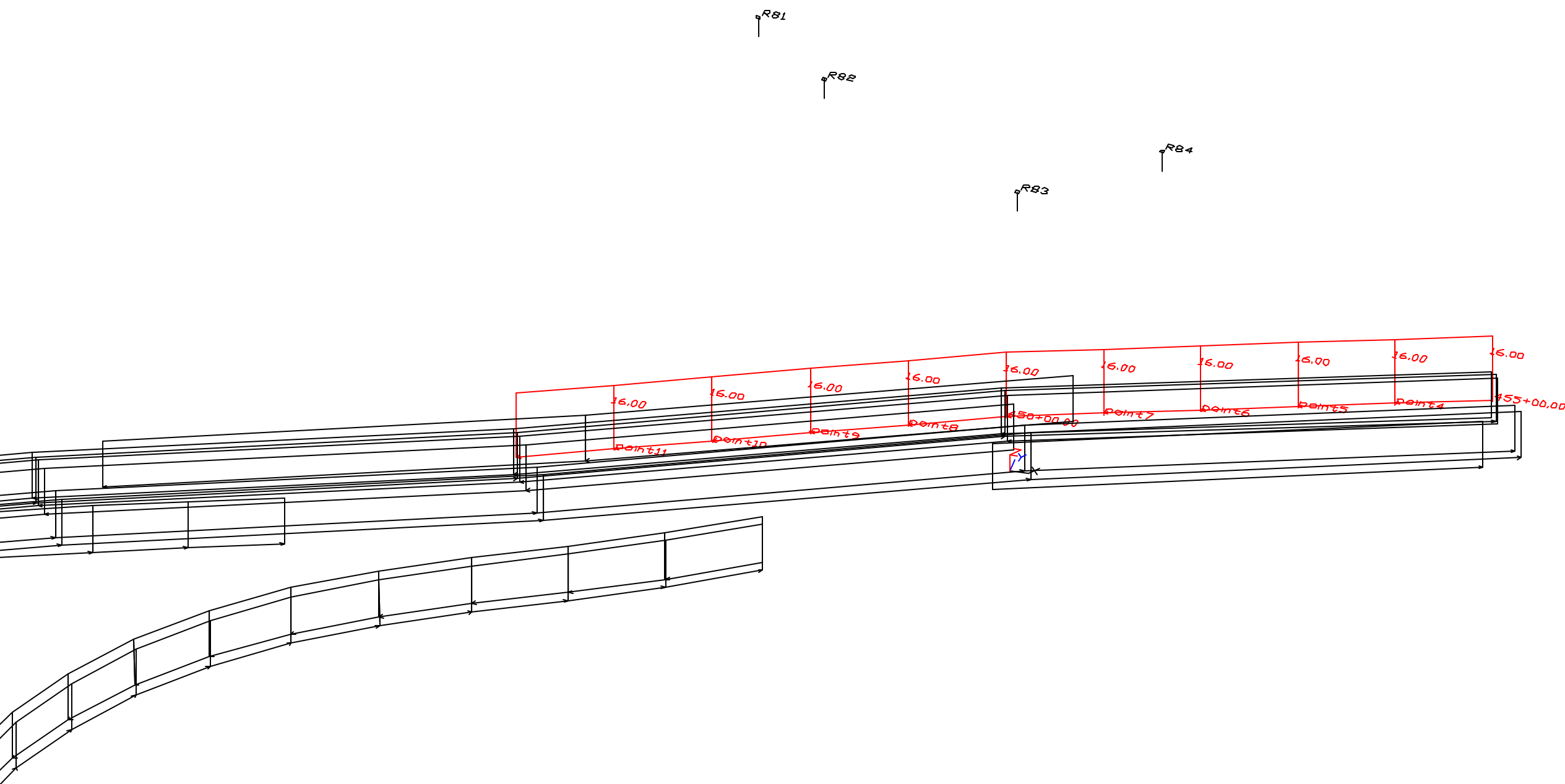
Percentage of Benefited Receivers
opposed to noise abatement measure

Percentage of Benefited Receivers **that
did not respond** to solicitation on noise
abatement measure

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement.

☐ Yes ☐ No

Noise Abatement is feasible but not reasonable for reducing or eliminating noise impacts for this project.



Exit 106 Alternative 3		Sheet 1 of 1	3 Jan 2017
Barrier View-Barr.D 16'x1000'		HDR I ICA	
Run name: Barr.D_exit106		Project/Contract No. I-85 DB	
Scale: <DNA - due to perspective>		TNM Version 2.5, Feb 2004	
		Analysis By: Wayne Hall	
Roadway:	—————>	Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:	—————>	Contour Zone:	polygon
Building Row:	—— —	Parallel Barrier:	=====
Terrain Line:	—————	Skew Section:	—— —>

HDR I ICA
Wayne Hall

3-Jan-17
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: I-85 DB
RUN: Exit 106 Alternative 3
BARRIER DESIGN: Barr.D 16'x1000'

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h	Increase over existing	Type	With Barrier	Noise Reduction	Goal	Calculated minus Goal
			Calculated	Calculated	Calculated	Sub'l Inc	Calculated	Calculated		
			dB	dB	dB	dB	dB	dB	dB	dB
R54	68	1	65	65.1	71	0.1	15 ----	62.4	2.7	8 -5.3
R55	69	1	67	68.1	71	1.1	15 ----	65.3	2.8	8 -5.2
R56	70	1	75	75	66	0	15 Snd Lvl	73	2	8 -6
R57	71	1	72	71.4	66	-0.6	15 Snd Lvl	69	2.4	8 -5.6

Dwelling Units

# DUs	Noise Reduction
	Min Avg Max
	dB dB dB

Not feasible to reduce noise levels at 75% of impacted receivers by 5dBA

All Selected	4	2	2.4	2.8
All Impacted	2	2	2.2	2.4
All that meet NR Goal	0	0	0	0

HDR I ICA
Wayne Hall

3-Jan-17
TNM 2.5

RESULTS: BARRIER DESCRIP

PROJECT/CONTRACT: I-85 DB
RUN: Exit 106 Alternative 3
BARRIER DESIGN: Barr.D 16'x1000'

Barriers

Name	Type	Heights along Barrier	Length	If Wall	If Berm	Cost
		Min Avg Max		Area	Volume	Run:Rise
		ft ft ft	ft	sq ft	cu yd	ft:ft \$
Barr.D	W	16 16 16	998	15965		\$558,787.00
Total Cost						\$558,787.00

SCDOT Feasibility and Reasonableness Worksheet

Date: 2/3/2017

Project Name I-85 Widening

Highway Traffic Noise Abatement Measure Noise Barrier D

Feasibility

Number of Impacted Receivers 2

Number of Benefited Receivers 0

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure 0

Is the proposed noise abatement measure acoustically feasible?

NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☐ Yes

☒ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography

☐ Yes

☐ No

Safety

☐ Yes

☐ No

Drainage

☐ Yes

☐ No

Utilities

☐ Yes

☐ No

Maintenance

☐ Yes

☐ No

Access

☐ Yes

☐ No

Exposed Height of Wall

☐ Yes

☐ No

If "Yes" was marked for any of the questions above, please explain below.

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers

0

Number of Benefited Receivers that
achieve at least an 8 dBA reduction

0

Percentage of Benefited Receivers that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers must achieve at least a 8 dBA reduction for it to be reasonable.

0

Is the proposed noise abatement measure acoustically feasible?

☐

Yes

☒

No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for
noise abatement measure

Estimated construction cost for noise
abatement measure

Estimated cost per Benefited Receiver

Based on the SCDOT policy of \$30,000 per Benefited Receiver, would the abatement measure be reasonable?

NOTE: SCDOT Policy states that the preliminary noise analysis is based on \$35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation.

☐

Yes

☐

No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above)

Number of Benefited Receivers
in **support** of noise abatement measure

Number of Benefited Receivers
opposed to noise abatement measure

Number of Benefited Receivers **that did not
respond** to solicitation on noise abatement
measure

Percentage of Benefited Receivers
in **support** of noise abatement measure

Percentage of Benefited Receivers
opposed to noise abatement measure

Percentage of Benefited Receivers **that
did not respond** to solicitation on noise
abatement measure

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement.

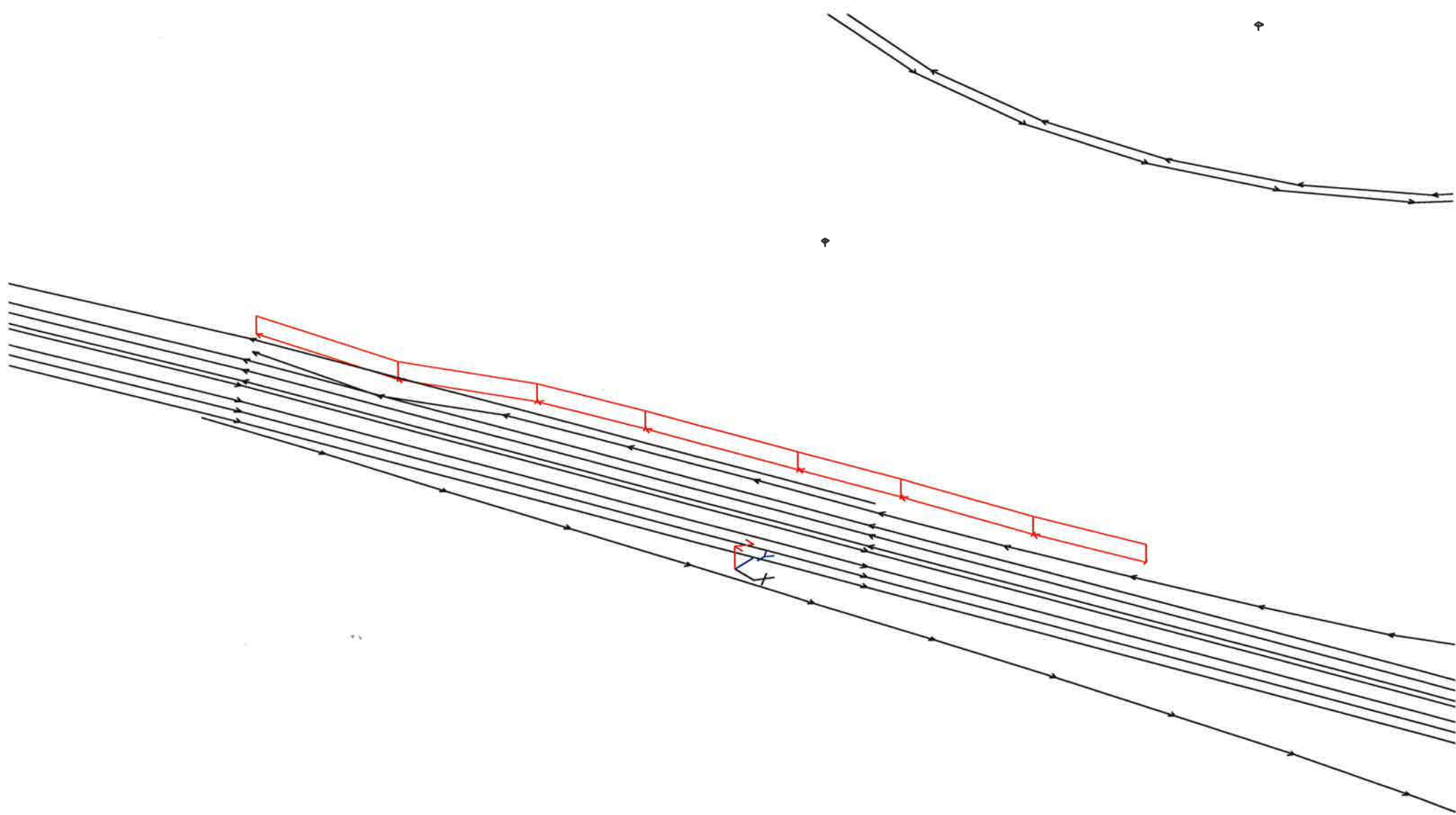
☐

Yes

☐

No

Noise Abatement is not feasible for reducing or eliminating noise impacts for this project.



Exit 100 Receiver 5 Barrier Analysis		Sheet 1 of 1	7 Feb 2017
Perspective View		HDR ICA	
Run name: Single Barrier		Project/Contract No. I-85 DB Prep	
Scale: <DNA - due to perspective>		TNM Version 2.5, Feb 2004	
		Analysis By: Wayne Hall	
Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

7-Feb-17
TNM 2.5
Calculated with TNM 2.5

PROJECT/CONTRACT: I-85 DB
 RUN: Exit 100 - Isolated Receiver 5 Barrier
 BARRIER DESIGN: Barr.E 16'x700'

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

No.	#DUs	Existing	No Barrier		Increase over existing			With Barrier	Noise Reduction		Goal	Calculated minus Goal dB	
		LAeq1h	LAeq1h	Calculated	Crit'n	Calculated	Crit'n	Impact	Calculated	LAeq1h			Calculated
		dB	dB	dB	dB	dB	dB	dB	dB	dB			
38	1	72	74	66	2	15	2nd Lvl	71		3	8		

# DUs	Noise Reduction		
	Min	Avg	Max
	dB	dB	dB

Not Feasible to reduce noise levels at 75% of impacted receptors by at least 5dBA

All Selected	1	0	1.5	3
All Impacted	1	0	1.5	3
All that meet NR Goal	0	0	0	0

7-Feb-17
TNM 2.5

PROJECT/CONTRACT: I-85 DB
 RUN: Exit 100 - Isolated Receiver 5 Barrier
 BARRIER DESIGN: Barr.E 16'

Type	Heights along Barrier			Length	If Wall Area	If Berm Volume			Cost
	Min	Avg	Max				Top Width	Run:Rise	
	ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	\$
W	16	16	16	700	11200				\$ 392,000.00
								Total Cost	\$ 392,000.00

SCDOT Feasibility and Reasonableness Worksheet

Date: 2/6/2017

Project Name I-85 Widening

Highway Traffic Noise Abatement Measure Barrier E - Isolated Receiver 5

Feasibility

Number of Impacted Receivers

1

Number of Benefited Receivers

1

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure

100%

Is the proposed noise abatement measure acoustically feasible?

NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes

☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography

☐ Yes

☐ No

Safety

☐ Yes

☐ No

Drainage

☐ Yes

☐ No

Utilities

☐ Yes

☐ No

Maintenance

☐ Yes

☐ No

Access

☐ Yes

☐ No

Exposed Height of Wall

☐ Yes

☐ No

If "Yes" was marked for any of the questions above, please explain below.

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers

1

Number of Benefited Receivers that
achieve at least an 8 dBA reduction

0

Percentage of Benefited Receivers that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers must achieve at least a 8 dBA reduction for it to be reasonable.

0

Is the proposed noise abatement measure acoustically feasible?

☐

Yes

☒

No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for
noise abatement measure

\$35.00

Estimated construction cost for noise
abatement measure

\$369,431

Estimated cost per Benefited Receiver

\$369,431

Based on the SCDOT policy of \$30,000 per Benefited Receiver, would the abatement measure be reasonable?

NOTE: SCDOT Policy states that the preliminary noise analysis is based on \$35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation.

☐

Yes

☒

No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above)

Number of Benefited Receivers
in **support** of noise abatement measure

Number of Benefited Receivers
opposed to noise abatement measure

Number of Benefited Receivers **that did not
respond** to solicitation on noise abatement
measure

Percentage of Benefited Receivers
in **support** of noise abatement measure

Percentage of Benefited Receivers
opposed to noise abatement measure

Percentage of Benefited Receivers **that
did not respond** to solicitation on noise
abatement measure

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement.

☐

Yes

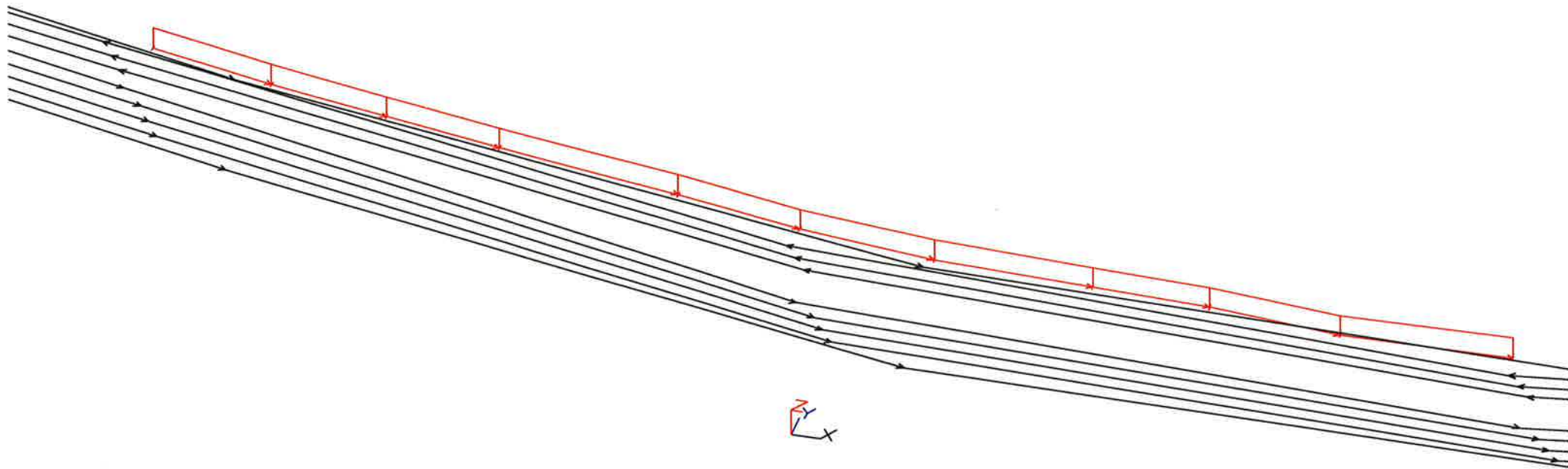
☐





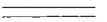


No

Noise Abatement is not reasonable for reducing or eliminating noise impacts for this project. Additionally, this single isolated receiver calculation was used as the sample mitigation run for all other single isolated residential receivers. This result applies to Barriers 5, 36, 41, 45, 87, and 94.

46

47



Exit 106 Barrier F Receivers 46 - 47		Sheet 1 of 1	7 Feb 2017
Perspective View		HDR ICA	
Run name: Barrier F - Twin Receivers 46 and 47		Project/Contract No. I-85 DB	
Scale: <DNA - due to perspective>		TNM Version 2.5, Feb 2004	
		Analysis By: Wayne Hall	
Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

HDR I ICA
Wayne Hall

7-Feb-17
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: I-85 DB
RUN: Exit 106 - Two Receiver Barrier
BARRIER DESIGN: Barr.F 16'x965'

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h	Increase over existing	Type	With Barrier	Calculated Noise Reduction	Goal	Calculated minus Goal
				Calculated Crit'n	Calculated Crit'n	Sub'l Inc	LAeq1h	Calculated		
			dB	dB	dB	dB		dB	dB	dB
R46	102	1	67	70.4	66	3.4	15 Snd Lvl	67	3.4	8 -4.6
R47	103	1	67	68.8	66	1.8	15 Snd Lvl	66.5	2.3	8 -5.7

Dwelling Units	# DUs	Noise Reduction			
		Min	Avg	Max	
		dB	dB	dB	
All Selected	2	2.3	2.8	3.4	
All Impacted	2	2.3	2.8	3.4	
All that meet NR Goal	0	0	0	0	

Not feasible to reduce noise levels at 75% of impacted receivers by 5dBA

HDR I ICA
Wayne Hall

7-Feb-17
TNM 2.5

RESULTS: BARRIER DESCRIP

PROJECT/CONTRACT: I-85 DB
RUN: Exit 106 - Two Receiver barrier
BARRIER DESIGN: Barr.F 16'x965'

Barriers Name	Type	Heights along Barrier	Length	If Wall Area	If Berm Volume	Top Width	Cost
		Min	Avg	Max			Run:Rise
		ft	ft	ft	ft	sq ft	cu yd
Barr.F	W	16	16	16	965	15440	\$ 540,400.00
							Total Cost: \$ 540,400.00

SCDOT Feasibility and Reasonableness Worksheet

Date: 2/6/2017

Project Name I-85 Widening

Highway Traffic Noise Abatement Measure Barrier F - Isolated Receivers 46 and 47

Feasibility

Number of Impacted Receivers 2

Number of Benefited Receivers 0

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure

0%

Is the proposed noise abatement measure acoustically feasible?

NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☐ Yes

☒ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography

☐ Yes

☐ No

Safety

☐ Yes

☐ No

Drainage

☐ Yes

☐ No

Utilities

☐ Yes

☐ No

Maintenance

☐ Yes

☐ No

Access

☐ Yes

☐ No

Exposed Height of Wall

☐ Yes

☐ No

If "Yes" was marked for any of the questions above, please explain below.

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers

0

Number of Benefited Receivers that
achieve at least an 8 dBA reduction

0

Percentage of Benefited Receivers that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers must achieve at least a 8 dBA reduction for it to be reasonable.

0

Is the proposed noise abatement measure acoustically feasible? ☐ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for
noise abatement measure

\$35.00

Estimated construction cost for noise
abatement measure

\$270,079

Estimated cost per Benefited Receiver

\$540,158

Based on the SCDOT policy of \$30,000 per Benefited Receiver, would the abatement measure be reasonable?

NOTE: SCDOT Policy states that the preliminary noise analysis is based on \$35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation.

☐ Yes ☒ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above)

Number of Benefited Receivers
in **support** of noise abatement measure

Number of Benefited Receivers
opposed to noise abatement measure

Number of Benefited Receivers **that did not
respond** to solicitation on noise abatement
measure

Percentage of Benefited Receivers
in **support** of noise abatement measure

Percentage of Benefited Receivers
opposed to noise abatement measure

Percentage of Benefited Receivers **that
did not respond** to solicitation on noise
abatement measure

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement.

☐ Yes ☐ No

Noise Abatement is not feasible or reasonable for reducing or eliminating noise impacts for this project. Additionally, this two isolated receiver calculation was used as the sample mitigation model run for all other two isolated receivers. This result also applies to Barriers 37 and 38.