

Appendix A. Ambient Noise Level Monitoring and TNM Validation



Memorandum

Date: Wednesday, April 27, 2022

Project: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

To: Tracy Roberts
NCDOT Traffic Noise & Air Quality Group Leader

From: Mukul Pal, HDR

Subject: Traffic Noise Model (TNM) Validation Report

Summary

The purpose of this TNM Validation Report is to document the predictive accuracy of the FHWA Traffic Noise Model (FHWA TNM v2.5) traffic noise models for the I-40 Widening project in Orange and Durham Counties (TIP#: I-3306A).

TNM model validation is the process by which the precision of the modeled relationship between traffic and predicted equivalent noise levels is refined and/or confirmed. The validation process is the basis upon which the traffic noise models for predicting existing year and design year traffic noise levels is founded.

The ambient noise environment varies depending on the proximity to I-40 and the presence of a natural and mechanical sources, and human activity typically present throughout the project vicinity. TNM predicted hourly equivalent traffic noise levels were within ± 3 dB(A) for seventy-one (71) of the seventy-three (73) monitoring locations for which traffic was the dominant source. Since TNM can only predict traffic related noise levels, TNM under-predicted hourly equivalent sound levels for one (1) monitoring location (M6.3) for which non-traffic sources were dominant. Additionally, TNM over-predicted hourly equivalent sounds for one (1) monitoring location (M22b.3). The reason for TNM over-prediction is undetermined. Tree zones were initially considered to validate M22b.3 monitoring location, however, was determined to not be a reasonable representation of the existing noise study area features per manual 8.9. Atmospheric influences could be the probable cause for not validating. Refer to Table 1 for a summary of the TNM validation results.

This TNM Validation Report will be included as Appendix A in the I-40 Widening Project Design Noise Report (TIP#: I-3306A DNR).



Ambient Noise Level, Traffic, and Weather Data

Traffic Noise Analysis Work Plan for this project was approved by the North Carolina Department of Transportation (NCDOT) on May 6, 2021. The work plan proposed forty (40) monitoring sessions for measuring existing noise levels. The individual monitoring locations for each monitoring session are shown in Figure 2.

From November 15-18, 2021 and January 18-19, 2022 ambient sound level data was acquired at 73 individual monitoring locations during 40 short-term monitoring sessions. Where applicable noise level data was acquired in arrays of two or three noise meter locations to evaluate attenuation with increased distances from the dominant roadway noise source. The noise levels presented in Table 1 are the short-term ambient equivalent sound levels obtained in the I-40 Widening projects vicinity (TIP#: I-3306A).

The range of ambient short-term 20-minute equivalent sound levels, Leq20-min obtained at seventy-three (73) individual monitoring locations during forty (40) short-term monitoring sessions representing the thirty-five (35) noise study areas (NSAs) for the project was between 50.2 dB(A) at 103 Landing Drive (M32.6), and 72.1 dB(A) at 7326 Sunrise Road (M31.1).

Classified vehicle traffic counts from existing roadways were acquired concurrently with each of the forty (40) noise monitoring sessions. Traffic data was categorized into five classifications: automobiles, medium trucks, heavy trucks, buses, and motorcycles. Traffic speed for each direction was collected using a handheld radar speed gun. Additionally, weather information was concurrently collected using the hand-held meteorological data collection device HoldPeak HP-866B-WM Anemometer. Refer to individual measurement sheets for this information.

TNM Model Validation

TNM model validation is the process by which the accuracy of the computer-generated existing models is confirmed. In accordance with the NCDOT 2016 Traffic Noise policy, computer models were created using the FHWA TNM v2.5 to predict existing traffic noise levels within the project study area. For each measurement location if the predicted noise level is within ± 3 dB(A) of the measured noise level, that measurement site is considered validated.

The ambient noise environment varies depending on the proximity to I-40 and the presence of natural and mechanical sources and human activity typically present throughout the project vicinity. TNM predicted hourly equivalent traffic noise levels were within ± 3 dB(A) for seventy-one (71) of the seventy-three (73) monitoring locations for which traffic was the dominant source. Since TNM can only predict traffic related noise levels, TNM under-predicted hourly equivalent sound levels for one (1) monitoring location (M6.3) for which non-traffic sources were dominant. Additionally, TNM over-predicted hourly equivalent sounds for one (1) monitoring location (M22b.3). The reason for TNM over-prediction is undetermined. Tree zones were initially considered to validate M22b.3 monitoring location, however, was determined to not be a reasonable representation of the existing noise study area features per manual 8.9. Atmospheric influences could be the probable cause for not validating.

Refer to Table 1 for a summary of the TNM validation results.



Table 1: TNM Validation Table

Monitoring Session	Monitoring Location	TNM Predicted L_{eq} dB(A) ¹	Measured L_{eq} 20-min dBA(A)	Validation Delta (Pred. – Meas.)
1	M1.1	67.6	66.8	0.8
2	M2.1	64.8	62.2	2.6
3	M3.1	62.5	63.0	-0.5
	M3.2	61.1	58.4	2.7
4	M4.1	61.8	61.6	0.2
5	M5.1	57.4	59.0	-1.6
6-1	M6.1	63.3	61.3	2.0
	M6.2	57.9	57.1	0.8
	M6.3	51.1	54.8	-3.7 ²
6-2	M6.4	66.8	65.1	1.7
	M6.5	63.1	63.4	-0.3
	M6.6	60.6	60.7	-0.1
7	M7.1	57.7	59.9	-2.2
	M7.2	56.3	57.9	-1.6
8	M8.1	57.3	60.2	-2.9
9	M9.1	71.2	69.0	2.2
	M9.2	61.7	64.5	-2.8
10	M10.1	62	61.2	0.8
	M10.2	58.3	59.1	-0.8
11	M11.1	61.5	58.8	2.7
12	M12.1	66.9	66.6	0.3
	M12.2	64.7	65.0	-0.3
13-1	M13.1	64.9	64.1	0.8
	M13.2	61.5	59.7	1.8
	M13.3	56.1	55.7	0.4
13-2	M13.4	62.3	59.7	2.6
	M13.5	58.1	56.4	1.7
	M13.6	56.5	53.6	2.9
14	M14.1	68.9	67.6	1.3
	M14.2	64.4	64.3	0.1
15	M15.1	55.3	53.8	1.5



Memorandum

Monitoring Session	Monitoring Location	TNM Predicted L_{eq} dB(A) ¹	Measured L_{eq} 20-min dBA(A)	Validation Delta (Pred. – Meas.)
16	M16.1	53.1	53.8	-0.7
17	M17.1	66.5	66.6	-0.1
	M17.2	57.0	54.2	2.8
18	M18.1	61.7	62.1	-0.4
19	M19.1	60.6	57.7	2.9
20	M20.1	68.5	68.7	-0.2
	M20.2	65.8	65.9	-0.1
22a	M22a.1	72.7	71.3	1.4
	M22a.2	68.3	67.7	0.6
22b	M22b.1	63.9	63.7	-0.1
	M22b.2	58.6	60.9	-2.4
	M22b.3	62.8	55.4	7.4 ³
23	M23.1	59.8	61.5	-1.7
24	M24.1	57.3	56.8	0.5
	M24.2	62.3	61.0	1.3
25	M25.1	68.2	66.5	1.7
26	M26.1	71	68.8	2.2
	M26.2	65.4	63.3	2.1
27	M27.1	58.3	60.3	-2.0
28	M28.1	65.9	66.8	-0.9
	M28.2	57.3	59.1	-1.8
29-1	M29.1	61.5	61.4	0.1
	M29.2	58.6	59.6	-1.0
	M29.3	55.8	55.3	0.5
29-2	M29.4	56.9	58.9	-2.0
	M29.5	53.1	55.0	-1.9
	M29.6	53.3	53.6	-0.3
29-3	M30.1	65.1	64.9	0.2
	M30.2	59.9	57.0	2.9
31	M31.1	71.3	72.1	-0.8
32-1	M32.1	69	67.7	1.3
	M32.2	60.3	60.7	-0.4



Memorandum

Monitoring Session	Monitoring Location	TNM Predicted L_{eq} dB(A) ¹	Measured L_{eq} 20-min dBA(A)	Validation Delta (Pred. – Meas.)
	M32.3	54.9	56.7	-1.8
32-2	M32.4	61.5	62.5	-1.0
	M32.5	51.5	54.4	-2.9
	M32.6	47.5	50.2	-2.7
32-3	M32.7	65.9	65.8	0.1
	M32.8	62.7	60.4	2.3
	M32.9	60	57.9	2.1
33	M33.1	63.3	62.3	1.0
34	M34.1	62.4	65.2	-2.8
35	M35.1	63.7	63.1	0.6
Measurement Site Validated				Measurement Site Not Validated

1. Hourly equivalent noise levels, $L_{eq}(h)$, are expressed to the nearest one-tenth decibels to ensure that TNM-predicted noise levels validate to within ± 3.0 dB(A) of measured noise levels without the benefits of rounding.
2. TNM under-predicted due to dominant non-traffic noise sources.
3. TNM over-prediction is undetermined. Tree zones were initially considered to validate M22b.3 monitoring location, however, was determined to not be a reasonable representation of the existing noise study area features per manual 8.9. Atmospheric influences could be the probable cause for not validating.

Attachments:

Field noise measurement datasheets
Noise meter certificates

SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M1.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-85, Dimmocks Mill Road Date: 11/17/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M1.1 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M1.1- 1319 Dimmocks Mill Rd.

SITE SKETCH:



Start Time: 9:30 AM/PM

Duration: 20 minutes

Wind Speed: 4 mph

Wind Direction: SSW

Temperature: 55°F

Humidity: 70%

Site M1.1 Leq: 66.8 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-85 NB	341	18	37	1	0	65
I-85 SB / I-40 WB	296	16	59	1	0	65
I-40 EB Ramp	510	28	44	1	0	65
Dimmocks Road NB	8	1	0	0	0	45
Dimmocks Road SB	11	0	0	0	0	45

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	9:30 AM	68.0	74.1
2	9:31 AM	66.2	69.2
3	9:32 AM	66.5	69.2
4	9:33 AM	66.8	68.2
5	9:34 AM	67.2	69.0
6	9:35 AM	67.0	69.5
7	9:36 AM	66.6	68.9
8	9:37 AM	67.1	69.3
9	9:38 AM	66.6	68.7
10	9:39 AM	66.9	70.4
11	9:40 AM	66.1	69.0
12	9:41 AM	66.5	69.0
13	9:42 AM	67.2	70.4
14	9:43 AM	66.1	69.2
15	9:44 AM	66.1	68.8
16	9:45 AM	66.7	69.4
17	9:46 AM	66.3	69.1
18	9:47 AM	66.8	70.1
19	9:48 AM	66.7	69.7
20	9:49 AM	67.2	70.1

Ambient Noise Monitoring Site M1.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M2.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-85, Dimmocks Rd. Date: 11/17/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M2.1 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

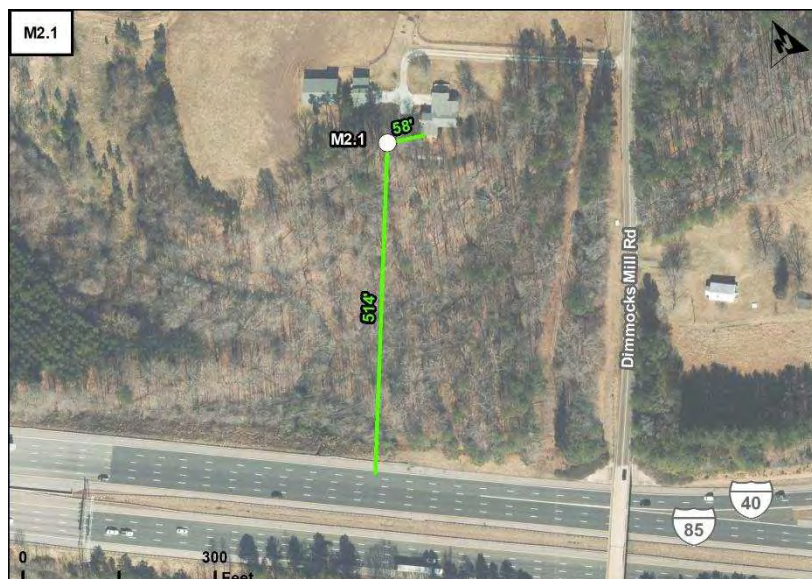
WEIGHTING (circle one)

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Location Description – M2.1- 1218 Dimmocks Mill Rd.

SITE SKETCH:



Start Time:
10:04 AM/PM

Duration:
20 minutes

Wind Speed: 6 mph

Wind Direction: SSW

Temperature: 65°F

Humidity: 65%

Site M2.1 Leq: 62.2 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-85 NB / I-40 EB	764	30	84	1	0	65
I-85 SB	244	14	21	0	0	65
I-40 WB Ramp	278	18	41	0	0	60
Dimmocks Road NB	7	0	0	0	0	45
Dimmocks Road SB	5	0	0	0	0	45

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	10:04	62.6	64.6
2	10:05	62.3	63.8
3	10:06	61.2	63.2
4	10:07	62.3	63.9
5	10:08	62.0	63.7
6	10:09	61.4	64.2
7	10:10	62.1	64.3
8	10:11	62.2	65.5
9	10:12	63.0	64.7
10	10:13	62.1	64.3
11	10:14	62.1	65.8
12	10:15	63.1	66.3
13	10:16	61.5	63.0
14	10:17	63.2	68.9
15	10:18	62.0	65.2
16	10:19	62.3	64.5
17	10:20	63.8	67.6
18	10:21	61.0	62.4
19	10:22	61.7	63.6
20	10:23	61.2	63.2

Ambient Noise Monitoring Site M2.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M3.1, M3.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-85, I-40, Dimmocks Road Date: 11/15/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M3.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M3.2 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

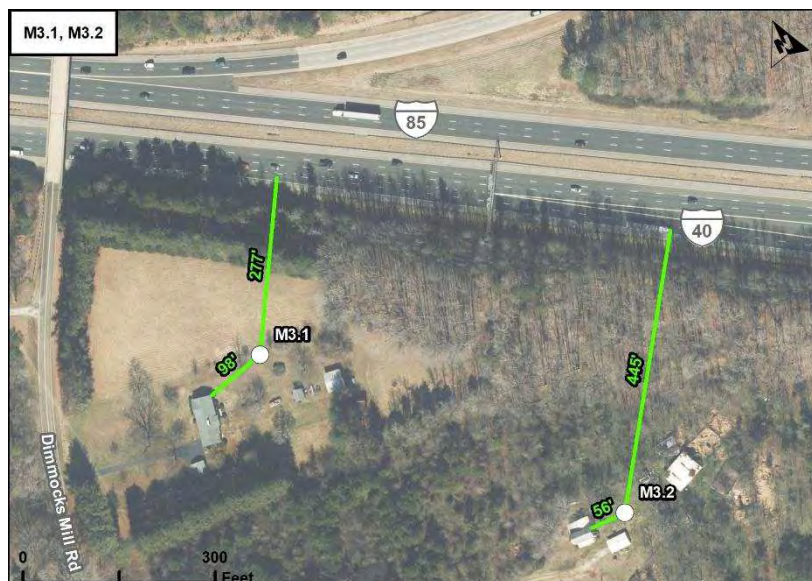
WEIGHTING (circle one)

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Location Description – M3.1- 1229 Dimmocks Mill Rd; M3.2- 1414 Dimmocks Mill Rd.

SITE SKETCH:



Start Time: 2:04 AM/PM

Duration: 20 minutes

Wind Speed: 10 mph

Wind Direction: NW

Temperature: 53°F

Humidity: 30%

Site M3.1 Leq: 63.0 dB(A)
Calibration offset: 0.00 dB(A)

Site M3.2 Leq: 58.4 dB(A)
Calibration offset: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-85 NB	294	21	72	1	0	65
I-85 SB / I-40 WB	312	18	55	0	0	65
I-40 EB Ramp	436	17	42	0	0	65
Dimmocks Road NB	4	0	0	0	0	45
Dimmocks Road SB	8	0	0	0	0	45

LOG SHEET

#	1 Minute Period Starting	Measured Leq M3.1 (dBA)	Lmax	Measured Leq M3.2 (dBA)	Lmax
1	14:04	63.3	65.3	58.5	60.3
2	14:05	62.5	63.8	57.4	58.6
3	14:06	62.9	63.8	58.0	59.0
4	14:07	62.8	66.7	58.1	59.2
5	14:08	63.6	66.8	58.4	60.1
6	14:09	63.6	65.7	57.8	58.7
7	14:10	63.7	64.4	58.8	59.7
8	14:11	62.3	63.8	58.0	60.1
9	14:12	62.4	64.2	56.3	57.4
10	14:13	62.4	63.3	58.0	59.7
11	14:14	62.2	63.8	58.5	60.9
12	14:15	63.2	64.8	58.5	59.8
13	14:16	63.2	65.5	58.7	59.9
14	14:17	62.3	63.0	58.3	59.7
15	14:18	62.7	64.5	58.9	60.7
16	14:19	62.3	64.2	58.3	60.3
17	14:20	63.6	64.7	59.8	61.7
18	14:21	64.3	65.7	59.2	60.4
19	14:22	63.0	64.7	57.6	58.6
20	14:23	63.6	65.6	59.2	62.3

Ambient Noise Monitoring Site M3.1



Ambient Noise Monitoring Site M3.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M4.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-85, I-40, Dimmocks Rd Date: 11/15/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M4.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M4.1- 1225 Dimmocks Mill Rd

SITE SKETCH:



Start Time:
11:54 **AM**/PM

Duration:
20 minutes

Wind Speed: 9 mph

Wind Direction: NNW

Temperature: 54°F

Humidity: 34%

Site M4.1 Leq: 61.6 dB(A)

Calibration offset: N/A

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-85 SB	286	19	24	0	0	65
I-40 WB Ramp	328	23	30	0	0	65
I-85NB/I-40 EB	625	28	72	1	0	60
Dimmocks Road NB	2	0	0	0	0	45
Dimmocks Road SB	1	0	0	0	0	45

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	11:54	62.4	64.5
2	11:55	60.9	62.6
3	11:56	61.2	62.2
4	11:57	61.3	64.2
5	11:58	60.9	62.5
6	11:59	60.1	60.9
7	12:00	61.3	62.6
8	12:01	62.2	63.3
9	12:02	61.7	63.8
10	12:03	61.0	62.3
11	12:04	62.1	64.6
12	12:05	60.0	61.7
13	12:06	61.2	63.1
14	12:07	60.7	62.1
15	12:08	61.8	63.0
16	12:09	62.1	64.2
17	12:10	62.1	63.4
18	12:11	63.1	65.5
19	12:12	61.9	63.2
20	12:13	61.7	64.7

Ambient Noise Monitoring Site M4.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M5.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M5.1 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M5.1- 1125 New Grady Brown School Rd

SITE SKETCH:



Start Time:
8:55 AM/PM

Duration:
20 minutes

Wind Speed: 9 mph

Wind Direction: SW

Temperature: 38°F

Humidity: 25%

Site M5.1 Leq: 59.0dB(A)

Calibration offset: -0.02 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB (before merge)	493	28	61	1	0	70
I-40 WB (after exit)	390	27	53	0	0	70
I-40 WB Ramp to I-85 NB	4	0	2	0	0	70
I-85 SB Ramp to I-40 EB	5	1	3	0	0	60

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	8:55	58.4	60.9
2	8:56	58.4	60.5
3	8:57	58.1	59.3
4	8:58	57.3	59.5
5	8:59	58.0	59.7
6	9:00	58.1	60.1
7	9:01	57.8	59.8
8	9:02	59.2	61.3
9	9:03	58.5	60.6
10	9:04	65.3	73.8
11	9:05	58.0	62.7
12	9:06	58.1	61.1
13	9:07	57.5	59.4
14	9:08	58.2	59.8
15	9:09	58.8	60.9
16	9:10	57.9	60.1
17	9:11	57.8	59.9
18	9:12	58.4	62.7
19	9:13	58.5	60.0
20	9:14	57.5	60.5

Ambient Noise Monitoring Site M5.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M6.1, M6.2, M6.3

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 01/18/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M6.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M6.2 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M6.3 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

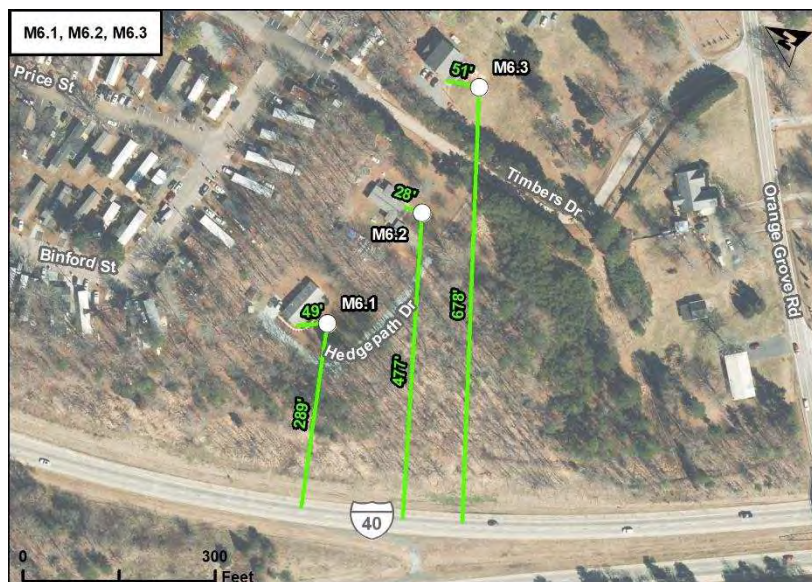
WEIGHTING (circle one)

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Location Description – M6- 2311 Hedgepath Ln; M6.2- 998 Timbers Dr; M6.3- 999 Timbers Dr

SITE SKETCH:



Start Time: 4:50 AM/PM

Duration: 20 minutes

Wind Speed: 1 mph

Wind Direction: W

Temperature: 44°F

Humidity: 38%

Site M6.1 Leq: 61.3 dB(A)
Calibration offset: -0.01 dB(A)

Site M6.2 Leq: 57.1 dB(A)
Calibration offset: 0.01 dB(A)

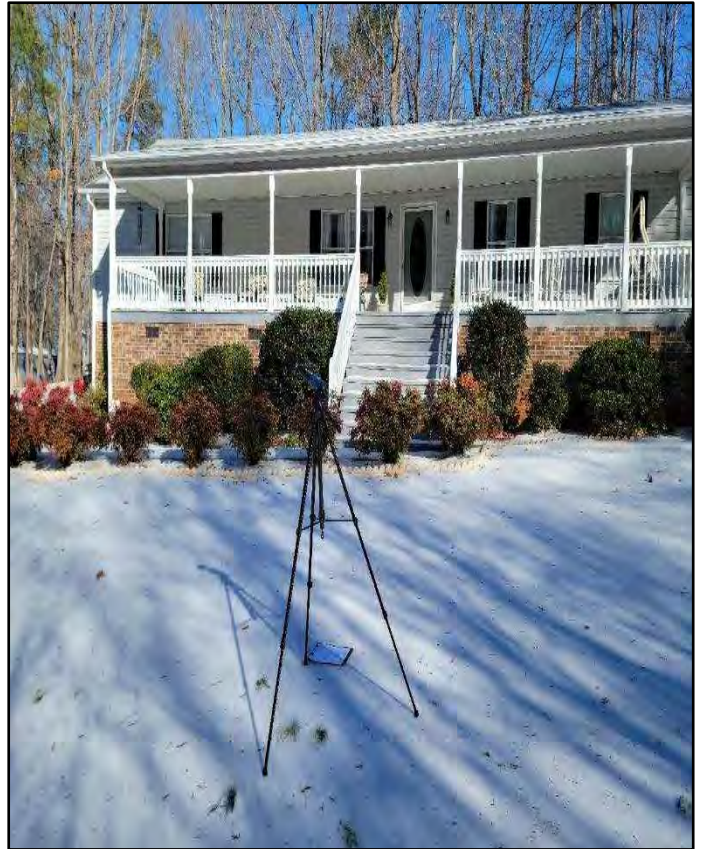
Site M6.3 Leq: 54.8 dB(A)
Calibration offset: 0.02 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	552	13	41	0	0	70
I-40 WB	722	32	82	0	0	70
I-40 WB Ramp to I-85	4	0	0	0	0	55

LOG SHEET

#	1 Minute Period Starting	Measured Leq M6.1 (dBA)	Lmax	Measured Leq M6.2 (dBA)	Lmax	Measured Leq M6.3 (dBA)	Lmax
1	16:50	61.7	65.8	57.3	62.0	55.3	59.3
2	16:51	61.4	63.1	56.7	58.9	54.8	56.4
3	16:52	61.2	63.6	56.8	59.0	54.4	56.3
4	16:53	61.0	62.9	56.5	58.6	54.5	56.7
5	16:54	61.2	63.1	57.1	58.6	54.7	56.9
6	16:55	62.1	65.9	57.6	60.8	55.2	57.8
7	16:56	60.8	63.0	56.4	59.9	54.5	55.8
8	16:57	61.3	63.8	56.8	58.4	54.4	55.2
9	16:58	60.3	62.8	56.4	58.1	54.2	55.9
10	16:59	61.8	62.7	57.3	59.3	54.9	56.1
11	17:00	61.3	63.3	57.4	59.5	55.0	56.7
12	17:01	60.3	62.7	56.5	59.0	54.2	56.9
13	17:02	61.3	62.7	56.9	58.3	54.7	56.0
14	17:03	60.7	62.5	56.9	58.6	54.6	56.0
15	17:04	60.1	61.7	56.2	58.0	54.1	55.2
16	17:05	61.1	62.9	57.0	58.4	54.7	56.0
17	17:06	62.3	64.0	58.3	60.7	55.7	57.8
18	17:07	60.7	62.8	56.9	58.9	54.1	56.4
19	17:08	62.9	66.7	58.0	62.1	56.0	60.7
20	17:09	61.8	63.5	58.0	62.6	54.8	58.2

Ambient Noise Monitoring Site M6.1



Ambient Noise Monitoring Site M6.2



Ambient Noise Monitoring Site M6.3



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M6.4, M6.5, M6.6

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-85, I-40 Date: 01/18/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M6.4 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
M6.5 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M6.6 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

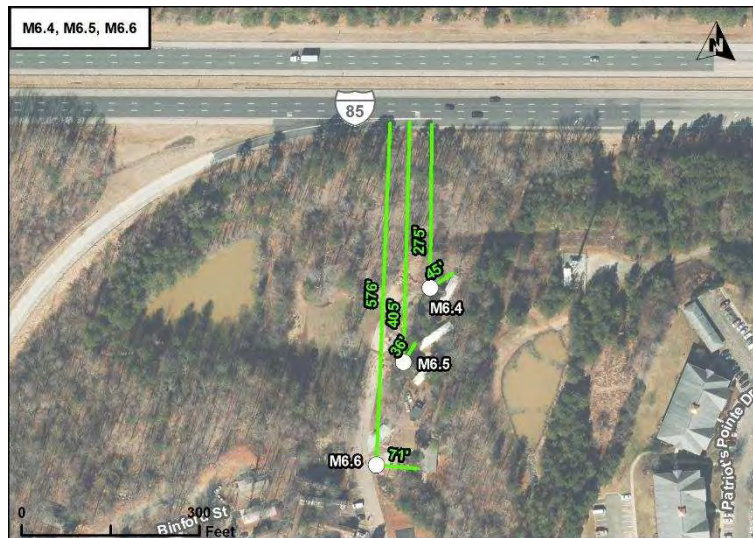
WEIGHTING (circle one)

A

Lin.

Location Description – M6.4- 1089 Timber Dr ; M6.5: 1085 Timber Dr ; M6.6: 1080 Timber Dr.

SITE SKETCH:



Start Time: 5:28 AM/PM

Duration: 20 minutes

Wind Speed: 4 mph

Wind Direction: W

Temperature: 47°F

Humidity: 39%

Site M6.4 Leq: 65.1 dB(A)

Site M6.5 Leq: 63.4 dB(A)

Site M6.6 Leq: 60.7 dB(A)

Calibration offset: -0.01 dB(A)

Calibration offset: 0.02 dB(A)

Calibration offset: -0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-85 SB	348	28	24	0	0	70
I-85 NB	304	21	26	0	0	65
I-40 WB	522	26	58	0	0	65
I-40 WB Ramp to I-85	2	0	1	0	0	55

LOG SHEET

#	1 Minute Period Starting	Measured Leq M6.4 (dBA)	Lmax	Measured Leq M6.5 (dBA)	Lmax	Measured Leq M6.6 (dBA)	Lmax
1	17:28	65.9	69.4	64.4	68.0	61.8	65.3
2	17:29	65.1	69.8	63.7	69.5	60.5	65.0
3	17:30	65.5	68.9	63.1	64.5	61.3	67.8
4	17:31	65.5	67.5	63.6	66.1	60.3	61.4
5	17:32	64.0	68.3	62.4	64.8	60.8	64.5
6	17:33	64.7	67.3	63.0	65.1	61.0	68.3
7	17:34	64.8	67.2	62.0	63.9	60.4	62.4
8	17:35	64.6	67.6	63.2	65.7	59.5	62.9
9	17:36	64.6	66.7	62.4	64.2	60.2	61.9
10	17:37	64.3	66.3	61.9	64.6	60.0	62.0
11	17:38	64.3	68.0	63.4	66.5	59.4	61.9
12	17:39	65.8	68.8	64.0	66.2	60.8	63.6
13	17:40	67.3	74.1	65.7	70.8	61.1	62.5
14	17:41	65.5	68.1	62.5	65.0	62.7	67.5
15	17:42	64.1	67.3	63.3	65.3	59.2	61.1
16	17:43	65.0	67.9	63.3	65.8	61.1	63.7
17	17:44	64.8	67.7	63.5	65.6	60.5	63.4
18	17:45	63.9	67.3	63.0	64.8	60.6	62.9
19	17:46	65.8	67.4	64.2	66.6	60.8	62.8
20	17:47	64.7	66.4	63.1	65.0	61.3	63.8

Ambient Noise Monitoring Site M6.4



Ambient Noise Monitoring Site M6.5



Ambient Noise Monitoring Site M6.6



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M7.1, M7.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 11/18/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M7.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M7.2 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M7.1- 2405 Timber Oak Dr ; M7.2- 520 New Grady Brown School Rd

SITE SKETCH:



Start Time: 8:38 AM/PM

Duration: 20 minutes

Wind Speed: 7 mph

Wind Direction: SW

Temperature: 57°F

Humidity: 90%

Site M7.1 Leq: 59.9 dB(A)
Calibration offset: 0.00 dB(A)

Site M7.2 Leq: 57.9 dB(A)
Calibration offset: -0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	689	22	73	1	0	70
I-40 WB	468	28	65	0	0	70

LOG SHEET

#	1 Minute Period Starting	Measured Leq M7.1 (dBA)	Lmax	Measured Leq M7.2 (dBA)	Lmax
1	8:38	64.2	68.6	58.2	60.1
2	8:39	61.4	63.4	58.8	60.6
3	8:40	58.8	60.9	57.4	61.5
4	8:41	58.8	62.1	57.1	60.3
5	8:42	59.9	61.8	58.7	59.8
6	8:43	58.5	60.2	56.7	58.8
7	8:44	60.6	61.7	58.7	60.3
8	8:45	59.5	61.6	58.5	61.1
9	8:46	58.5	62.9	57.2	59.1
10	8:47	58.2	60.2	56.5	58.5
11	8:48	58.8	60.8	57.1	59.2
12	8:49	58.4	60.3	56.5	59.2
13	8:50	59.4	61.4	57.2	59.5
14	8:51	59.5	61.0	59.0	62.0
15	8:52	60.0	62.2	58.0	59.8
16	8:53	60.1	61.6	59.0	61.4
17	8:54	59.5	61.6	57.7	59.1
18	8:55	59.2	61.5	57.7	60.0
19	8:56	59.2	60.5	57.5	59.5
20	8:57	59.8	61.5	58.1	59.7

Ambient Noise Monitoring Site M7.1



Ambient Noise Monitoring Site M7.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M8.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, Orange Grove Rd Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M8.1 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

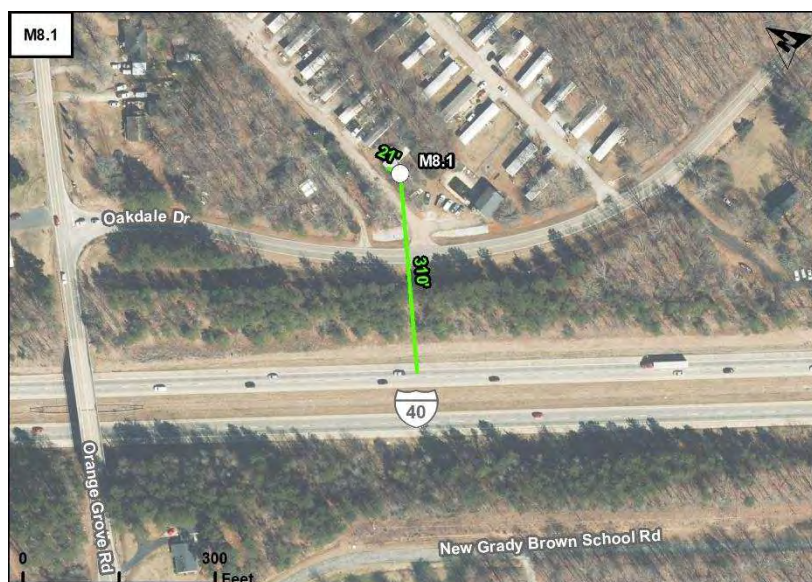
WEIGHTING (circle one)

A

Lin.

Location Description – M8.1- 2210 Chris Dr.

SITE SKETCH:



Start Time: 9:36 **AM/PM**

Duration: 20 minutes

Wind Speed: 10 mph

Wind Direction: SW

Temperature: 40°F

Humidity: 30%

Site M8.1 Leq: 60.2 dB(A)
Calibration offset: 0.02 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	496	42	77	0	0	70
I-40 WB	478	47	62	1	0	70
Orange Grove Road NB	55	3	0	0	0	45
Orange Grove Road SB	45	0	0	0	0	45
Oakdale Dr EB	8	3	0	1	0	40
Oakdale Dr WB	15	5	0	1	0	40

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	9:36	59.3	61.7
2	9:37	59.6	62.9
3	9:38	61.3	67.6
4	9:39	59.9	61.2
5	9:40	60.8	65.0
6	9:41	58.9	61.7
7	9:42	62.6	68.6
8	9:43	62.2	68.1
9	9:44	60.3	61.8
10	9:45	60.7	62.6
11	9:46	59.7	61.3
12	9:47	60.0	61.6
13	9:48	59.8	61.1
14	9:49	58.6	62.0
15	9:50	60.1	63.7
16	9:51	60.4	62.2
17	9:52	60.0	62.1
18	9:53	58.9	61.5
19	9:54	58.6	61.6
20	9:55	59.4	61.6

Ambient Noise Monitoring Site M8.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M9.1, M9.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 11/18/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M9.1 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
M9.2 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M9.1- 2335 Blair Dr; M9.2- 2331 Blair Dr

SITE SKETCH:



Start Time:
9:38 **AM**/PM

Duration:
20 minutes

Wind Speed: 9 mph

Wind Direction: SW

Temperature: 60°F

Humidity: 88%

Site M9.1 Leq: 69.0 dB(A)
Calibration offset: 0.00 dB(A)

Site M9.2 Leq: 64.5 dB(A)
Calibration offset: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	632	37	71	0	0	70
I-40 WB	678	49	78	0	0	70

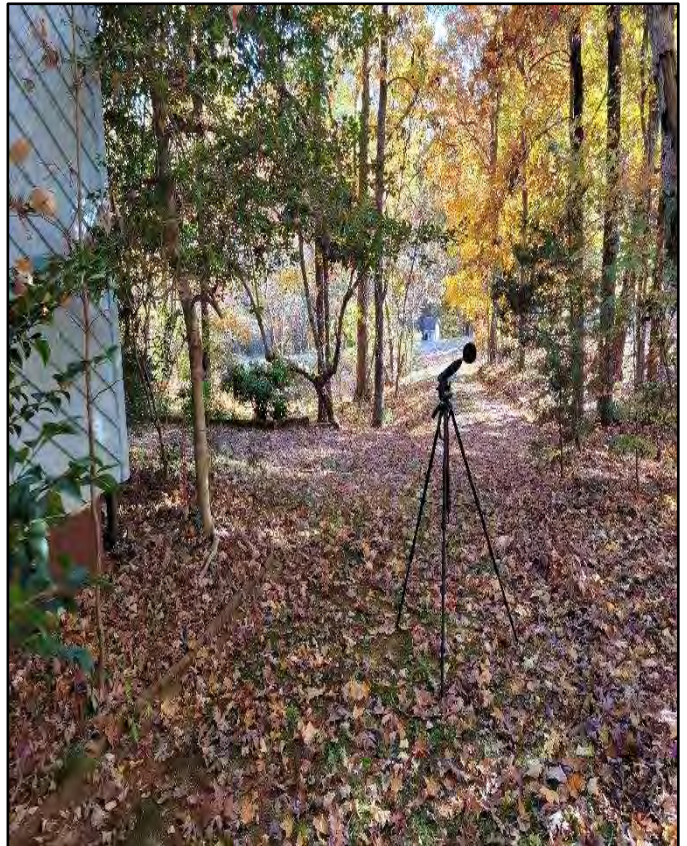
LOG SHEET

#	1 Minute Period Starting	Measured Leq M9.1 (dBA)	Lmax	Measured Leq M9.2 (dBA)	Lmax
1	9:38	69.3	72.2	65.1	67.5
2	9:39	68.9	71.9	64.4	67.2
3	9:40	68.8	71.4	64.6	66.9
4	9:41	68.8	72.1	63.2	66.2
5	9:42	67.0	72.4	63.6	67.1
6	9:43	69.6	73.3	64.1	66.5
7	9:44	69.9	72.0	65.9	68.5
8	9:45	69.3	71.3	64.7	66.9
9	9:46	69.3	71.0	65.1	66.8
10	9:47	69.4	73.0	64.9	67.4
11	9:48	67.2	69.3	62.9	64.5
12	9:49	68.8	71.8	64.4	66.8
13	9:50	69.5	71.8	64.5	66.9
14	9:51	68.5	71.4	64.4	66.9
15	9:52	69.1	71.0	64.2	66.0
16	9:53	69.0	71.2	64.7	66.1
17	9:54	68.8	71.6	64.6	66.8
18	9:55	69.8	73.2	65.3	68.0
19	9:56	68.3	70.9	64.1	66.0
20	9:57	68.8	70.4	64.3	65.7

Ambient Noise Monitoring Site M9.1



Ambient Noise Monitoring Site M9.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M10.1, M10.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, Old NC-86 Date: 11/15/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M10.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M10.2 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M10.1- 3303 Old NC 86 ; M10.2- 3319 Old NC 86

SITE SKETCH:



Start Time: 5:17 AM/PM

Duration: 20 minutes

Wind Speed: 1 mph

Wind Direction: NW

Temperature: 45°F

Humidity: 50%

Site M10.1 Leq: 61.2 dB(A)
Calibration offset: 0.02 dB(A)

Site M10.2 Leq: 59.1 dB(A)
Calibration offset: -0.02 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	587	23	32	1	0	70
I-40 WB	818	27	40	1	0	70
I-40 EB Off-Ramp	45	3	0	0	0	50
Old NC86 NB	110	2	0	0	0	45
Old NC86 SB	104	1	0	0	0	45

LOG SHEET

#	1 Minute Period Starting	Measured Leq M10.1 (dBA)	Lmax	Measured Leq M10.2 (dBA)	Lmax
1	17:17	62.4	66.6	62.5	67.9
2	17:18	60.3	65.7	58.3	60.7
3	17:19	60.1	64.0	58.3	61.4
4	17:20	62.1	66.7	60.0	64.0
5	17:21	60.9	63.2	58.8	60.2
6	17:22	61.8	66.1	59.6	63.5
7	17:23	61.1	64.4	58.8	61.0
8	17:24	62.3	66.7	60.5	66.0
9	17:25	61.6	67.1	58.9	61.8
10	17:26	61.3	65.6	58.8	61.1
11	17:27	61.4	64.7	58.3	60.8
12	17:28	62.9	68.6	60.1	64.9
13	17:29	61.2	67.4	58.6	66.1
14	17:30	61.1	64.6	58.7	61.7
15	17:31	60.8	64.8	58.4	61.8
16	17:32	60.2	62.8	57.9	60.9
17	17:33	61.0	65.6	58.3	62.1
18	17:34	59.4	62.8	57.6	59.7
19	17:35	59.7	67.0	56.4	64.4
20	17:36	60.9	64.4	59.0	64.6

Ambient Noise Monitoring Site M10.1



Ambient Noise Monitoring Site M10.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M11.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, Old NC-86 Date: 11/16/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M11.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

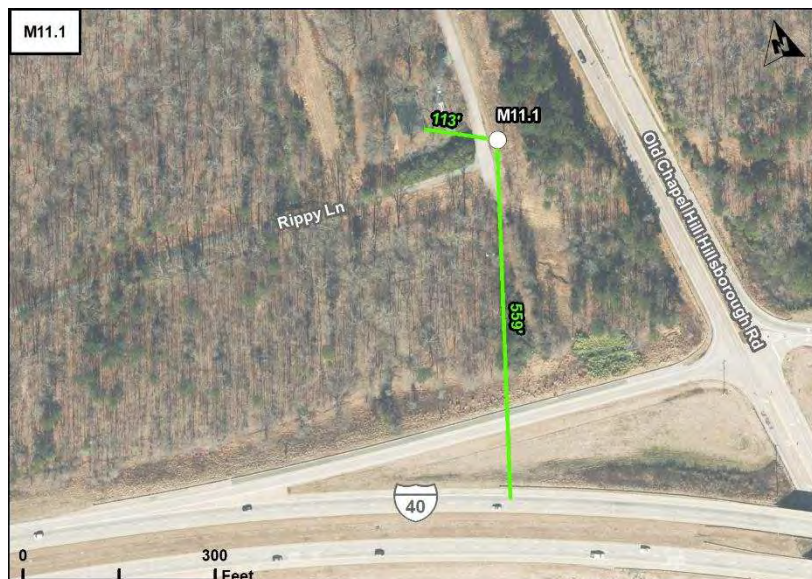
WEIGHTING (circle one)

A

Lin.

Location Description – M11.1- 3013 Rippy Lane

SITE SKETCH:



Start Time:
11:37 AM/PM

Duration:
20 minutes

Wind Speed: 6 mph

Wind Direction: SW

Temperature: 61°F

Humidity: 35%

Site M11.1 Leq: 58.8 dB(A)
Calibration offset: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	401	32	52	0	0	70
I-40 WB	419	24	61	1	0	70
At the intersection of Old NC86 North Ramps						
Old NC86 NB Through	74	2	0	0	0	45
Old NC86 NB Left to On-Ramp	15	0	0	0	0	55
Old NC86 SB Through	56	4	0	0	0	45
Old NC86 SB Right to On-Ramp	23	2	0	0	0	55
I-40 WB Off Ramp Right	12	3	0	0	0	55
I-40 WB Off Ramp Left	21	2	0	0	0	55

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	11:37	59.5	62.1
2	11:38	57.6	60.5
3	11:39	58.1	61.3
4	11:40	58.5	60.7
5	11:41	60.1	62.8
6	11:42	57.0	59.2
7	11:43	59.1	61.3
8	11:44	60.3	63.8
9	11:45	59.2	62.3
10	11:46	59.6	64.2
11	11:47	59.0	63.3
12	11:48	59.0	62.1
13	11:49	57.6	61.1
14	11:50	58.6	61.3
15	11:51	58.7	60.9
16	11:52	58.5	60.9
17	11:53	58.4	62.0
18	11:54	58.3	61.4
19	11:55	58.2	61.1
20	11:56	58.7	62.1

Ambient Noise Monitoring Site M11.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M12.1, M12.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, Old NC-86 Date: 11/15/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M12.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M12.2 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M12.1- 3210 Old NC 86 ; M12.2- 3224 Old NC 86 Unit B

SITE SKETCH:



Start Time: 4:37 AM/PM

Duration: 20 minutes

Wind Speed: 1 mph

Wind Direction: NW

Temperature: 50°F

Humidity: 40%

Site M12.1 Leq: 66.6 dB(A)
 Calibration offset: 0.01 dB(A)

Site M12.2 Leq: 65.0 dB(A)
 Calibration offset: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	537	25	32	1	0	70
I-40 WB	786	19	59	2	0	70
At the intersection of Old NC86 South Ramps						
Old NC86 NB Through	95	2	0	0	0	45
Old NC86 NB Right to On-Ramp	69	2	0	0	0	45
Old NC86 SB Through	76	0	0	0	0	45
Old NC86 SB Left to On-Ramp	34	0	0	0	0	45
I-40 EB Off Ramp Left	8	1	0	0	0	55
I-40 EB Off Ramp Right	9	1	0	0	0	55

LOG SHEET

#	1 Minute Period Starting	Measured Leq M12.1 (dBA)	Lmax	Measured Leq M12.2 (dBA)	Lmax
1	16:37	65.3	68.7	63.9	67.4
2	16:38	66.5	68.6	65.1	67.7
3	16:39	66.8	70.1	65.4	69.3
4	16:40	67.7	70.9	65.9	70.1
5	16:41	67.5	69.6	65.8	68.7
6	16:42	66.9	68.8	65.5	67.5
7	16:43	66.1	68.6	64.1	67.3
8	16:44	66.5	68.9	64.8	67.7
9	16:45	65.7	68.1	63.9	66.5
10	16:46	66.5	69.3	64.8	67.5
11	16:47	67.5	70.6	65.9	69.3
12	16:48	65.8	68.2	63.8	66.4
13	16:49	66.8	69.4	65.7	68.2
14	16:50	67.6	70.4	65.6	68.1
15	16:51	66.6	69.8	64.7	68.5
16	16:52	66.6	69.0	64.9	66.9
17	16:53	66.3	68.2	64.8	66.8
18	16:54	65.6	68.1	64.2	66.2
19	16:55	66.9	68.9	65.3	68.1
20	16:56	66.5	69.3	65.1	67.0

Ambient Noise Monitoring Site M12.1



Ambient Noise Monitoring Site M12.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M13.1, M13.2, M13.3

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 11/16/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M13.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M13.2 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
M13.3 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M13.1- 642 Alice Loop ; M13.2- 638 Alice Loop ; M13.3- 630 Alice Loop

SITE SKETCH:



Start Time: 9:20 **AM**/PM

Duration: 20 minutes

Wind Speed: 8 mph

Wind Direction: S

Temperature: 51°F

Humidity: 45%

Site M13.1 Leq: 64.1 dB(A)
Calibration offsets: 0.00 dB(A)

Site M13.2 Leq: 59.7 dB(A)
Calibration offsets: 0.00 dB(A)

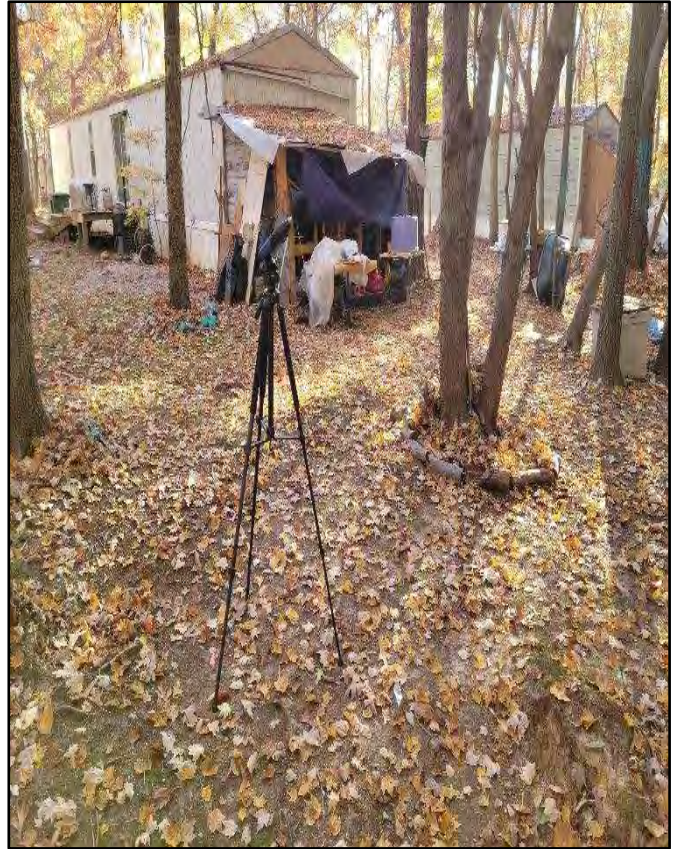
Site M13.3 Leq: 55.7 dB(A)
Calibration offsets: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	421	41	52	1	0	70
I-40 WB	495	40	78	0	0	70

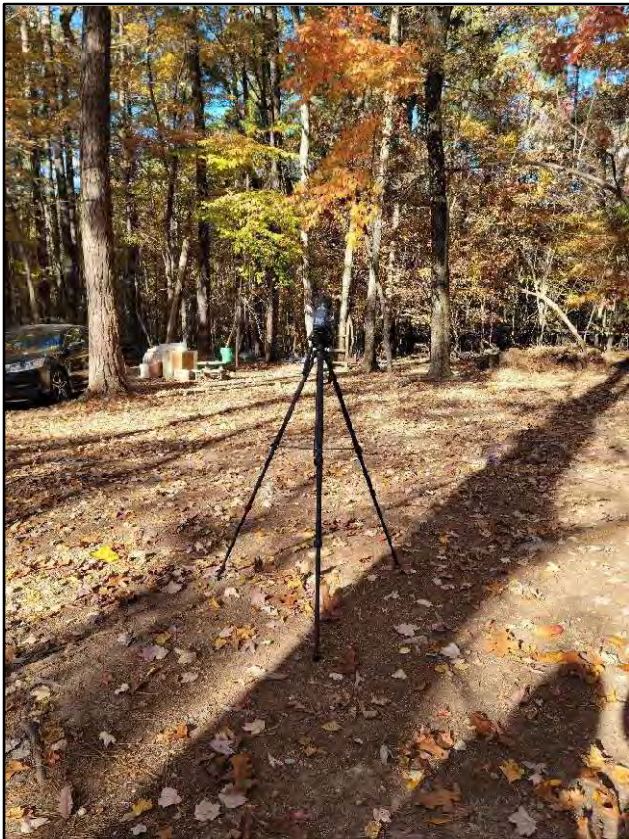
LOG SHEET

#	1 Minute Period Starting	Measured Leq M13.1 (dBA)	Lmax	Measured Leq M13.2 (dBA)	Lmax	Measured Leq M13.3 (dBA)	Lmax
1	9:20	62.4	65.1	59.5	61.0	56.4	60.3
2	9:21	63.5	66.4	58.9	60.9	55.5	57.5
3	9:22	64.3	68.2	60.7	62.9	56.9	58.4
4	9:23	66.4	73.3	61.2	64.4	57.4	58.9
5	9:24	63.5	66.8	59.7	61.4	56.1	57.9
6	9:25	63.9	66.1	60.2	61.6	56.7	58.5
7	9:26	63.6	66.7	59.5	60.9	56.5	59.0
8	9:27	63.9	65.9	60.0	61.5	56.4	58.2
9	9:28	65.2	70.0	60.5	64.4	56.6	59.5
10	9:29	64.5	67.5	60.0	62.8	55.6	57.4
11	9:30	64.9	67.4	60.3	62.0	56.3	57.2
12	9:31	63.9	66.9	59.3	60.9	55.3	57.1
13	9:32	63.1	66.2	59.1	61.0	55.0	56.2
14	9:33	62.8	65.1	58.6	60.3	54.3	55.8
15	9:34	63.5	65.2	58.7	59.9	54.1	55.3
16	9:35	64.0	67.4	59.2	61.1	54.6	56.4
17	9:36	64.9	67.4	59.8	61.3	54.9	57.3
18	9:37	63.7	66.3	59.3	61.2	54.9	58.6
19	9:38	63.3	65.7	58.8	61.6	53.9	55.6
20	9:39	64.3	66.0	59.7	60.9	55.2	56.5

Ambient Noise Monitoring Site M13.1



Ambient Noise Monitoring Site M13.2



Ambient Noise Monitoring Site M13.3



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M13.4, M13.5, M13.6

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 11/16/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M13.4 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M13.5 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M13.6 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M13.4- 662 Alice Loop ; M13.5- 674 Alice Loop ; M13.6- 675 Alice Loop

SITE SKETCH:



Start Time:
10:50 **AM**/PM

Duration:
20 minutes

Wind Speed: 8 mph

Wind Direction: S

Temperature: 58°F

Humidity: 35%

Site M13.4 Leq: 59.7 dB(A)
Calibration offset: N/A

Site M13.5 Leq: 56.4 dB(A)
Calibration offset: 0.00 dB(A)

Site M13.6 Leq: 53.6 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	519	44	59	0	0	70
I-40 WB	484	27	74	1	0	70

LOG SHEET

#	1 Minute Period Starting	Measured Leq M13.4 (dBA)	Lmax	Measured Leq M13.5 (dBA)	Lmax	Measured Leq M13.6 (dBA)	Lmax
1	10:50	60.5	64.4	57.3	60.7	55.1	58.6
2	10:51	58.9	62.4	55.2	58.8	53.5	55.2
3	10:52	60.0	62.3	56.3	59.1	52.6	54.6
4	10:53	59.8	62.0	56.3	58.5	54.0	59.0
5	10:54	59.6	62.0	56.4	58.3	53.4	56.4
6	10:55	59.2	62.5	56.2	60.8	53.9	57.1
7	10:56	60.3	64.0	57.0	61.2	54.7	58.2
8	10:57	60.7	64.7	57.7	61.0	53.8	56.1
9	10:58	61.1	64.0	57.2	60.2	54.2	56.3
10	10:59	59.9	62.6	56.4	58.2	53.7	55.9
11	11:00	59.3	63.8	55.7	60.2	52.7	56.1
12	11:01	59.9	65.9	57.7	63.2	53.9	58.1
13	11:02	61.1	66.6	56.5	60.3	54.0	57.2
14	11:03	59.3	61.3	55.7	57.8	53.1	57.8
15	11:04	59.7	64.5	56.6	61.4	52.5	56.2
16	11:05	60.3	62.8	57.3	59.8	53.3	56.3
17	11:06	58.8	61.3	55.5	58.4	52.8	54.3
18	11:07	57.4	59.8	54.3	56.3	51.9	53.0
19	11:08	57.9	60.5	55.7	58.4	55.0	60.6
20	11:09	58.3	61.6	55.4	57.7	53.2	59.8

Ambient Noise Monitoring Site M13.4



Ambient Noise Monitoring Site M13.5



Ambient Noise Monitoring Site M13.6



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M14.1, M14.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M14.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M14.2 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

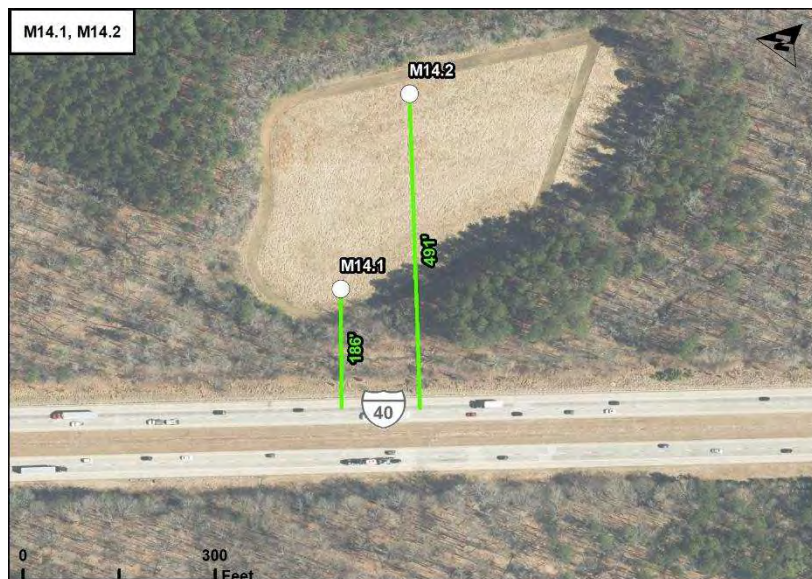
WEIGHTING (circle one)

A

Lin.

Location Description – M14.1- 4215 NC 86 S; M14.2- 4215 NC 86 S

SITE SKETCH:



Start Time: 10:34 **AM**/PM

Duration: 20 minutes

Wind Speed: 10 mph

Wind Direction: WSW

Temperature: 44°F

Humidity: 56%

Site M14.1 Leq: 67.6 dB(A)
Calibration offset: 0.01 dB(A)

Site M14.2 Leq: 64.3 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	509	23	76	1	0	70
I-40 WB	494	34	84	1	0	70

LOG SHEET

#	1 Minute Period Starting	Measured Leq M14.1 (dBA)	Lmax	Measured Leq M14.2 (dBA)	Lmax
1	10:34	67.9	70.5	64.9	67.0
2	10:35	67.1	69.3	64.4	65.6
3	10:36	68.8	71.3	65.0	66.2
4	10:37	67.9	70.6	64.8	66.6
5	10:38	65.9	70.6	63.2	66.4
6	10:39	68.2	70.9	64.3	66.3
7	10:40	69.5	72.3	65.8	67.6
8	10:41	66.7	70.7	64.6	67.1
9	10:42	67.7	71.9	64.6	67.7
10	10:43	67.1	69.3	63.6	65.9
11	10:44	68.4	72.3	65.5	68.2
12	10:45	67.7	72.8	63.6	66.8
13	10:46	67.3	71.6	64.7	67.4
14	10:47	67.6	72.6	64.6	68.5
15	10:48	66.8	70.0	63.8	68.6
16	10:49	64.6	67.5	61.7	63.0
17	10:50	67.8	71.4	64.3	66.7
18	10:51	67.8	70.3	63.6	65.1
19	10:52	65.7	67.7	62.3	63.4
20	10:53	68.0	70.7	64.7	67.5

Ambient Noise Monitoring Site M14.1



Ambient Noise Monitoring Site M14.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M15.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, New Hope Church Rd Date: 11/15/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M15.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M15.1- 4334 Vallie Hi Ln. Unit B

SITE SKETCH:



Start Time: 2:16 AM/PM

Duration: 20 minutes

Wind Speed: 8 mph

Wind Direction: WNW

Temperature: 53°F

Humidity: 32%

Site M15.1 Leq: 53.8 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	733	28	43	0	0	70
I-40 WB	734	33	68	0	0	70
At the intersection of New Hope Church Rd South Ramps						
New Hope Church Road NB through	49	2	0	0	0	45
New Hope Church Road NB Right	33	1	0	0	0	45
New Hope Church Road SB through	50	1	0	0	0	45
New Hope Church Road SB Left	10	1	0	0	0	45
I-40 Off-Ramp Right	21	1	0	0	0	55
I-40 Off-Ramp Left	8	0	0	0	0	55
New Hope Church Road NB through	49	2	0	0	0	45

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	14:16	54.0	56.8
2	14:17	56.6	62.1
3	14:18	53.7	55.6
4	14:19	55.9	60.1
5	14:20	54.0	57.3
6	14:21	53.4	55.7
7	14:22	52.8	54.9
8	14:23	52.9	55.5
9	14:24	52.1	54.3
10	14:25	52.0	55.2
11	14:26	53.4	58.9
12	14:27	54.3	58.4
13	14:28	56.4	63.3
14	14:29	52.7	55.6
15	14:30	53.2	55.6
16	14:31	52.3	56.0
17	14:32	52.7	56.4
18	14:33	52.7	56.4
19	14:34	51.4	57.5
20	14:35	54.1	58.7

Ambient Noise Monitoring Site M15.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M16.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, New Hope Church Rd Date: 11/15/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M16.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

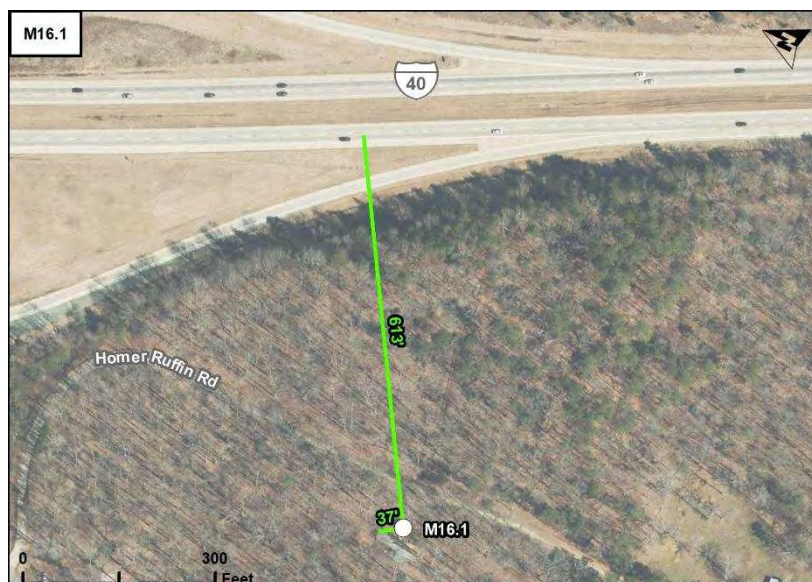
WEIGHTING (circle one)

A

Lin.

Location Description – M16.1- 5111 Homer Ruffin Rd.

SITE SKETCH:



Start Time: 3:50 AM/PM

Duration: 20 minutes

Wind Speed: 6 mph

Wind Direction: WNW

Temperature: 53°F

Humidity: 30%

Site M16.1 Leq: 53.8 dB(A)

Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	652	19	43	0	0	70
I-40 WB	817	25	62	1	0	70
At the intersection of New Hope Church Rd South Ramps						
New Hope Church Road NB Through	73	3	0	2	0	45
New Hope Church Road NB Right	22	1	0	0	0	45
New Hope Church Road SB Through	52	2	0	0	0	45
New Hope Church Road SB Left	5	0	0	0	0	45
I-40 Off-Ramp Left	8	1	0	0	0	55
I-40 Off-Ramp Right	15	1	0	0	0	55

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	15:50	54.6	61.9
2	15:51	54.0	54.8
3	15:52	54.7	56.2
4	15:53	53.4	54.9
5	15:54	53.0	55.1
6	15:55	52.8	54.8
7	15:56	53.4	54.7
8	15:57	54.1	55.5
9	15:58	53.1	55.8
10	15:59	54.4	55.9
11	16:00	53.9	55.3
12	16:01	53.4	55.1
13	16:02	53.8	55.4
14	16:03	53.4	55.3
15	16:04	54.2	55.3
16	16:05	54.1	55.2
17	16:06	52.3	53.5
18	16:07	54.2	55.4
19	16:08	55.0	60.4
20	16:09	52.9	54.9

Ambient Noise Monitoring Site M16.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M17.1, M17.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M17.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M17.2 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

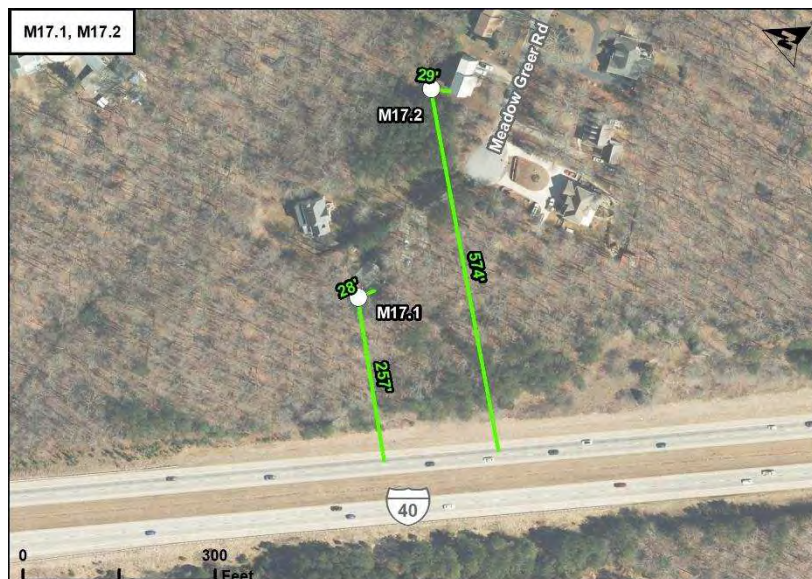
WEIGHTING (circle one)

A

Lin.

Location Description – M17.1- 6027 Meadow Greer Rd; M17.2- 6019 Meadow Greer Rd

SITE SKETCH:



Start Time: 11:29 AM/PM

Duration: 20 minutes

Wind Speed: 11 mph

Wind Direction: WSW

Temperature: 50°F

Humidity: 49%

Site M17.1 Leq: 66.6 dB(A)
Calibration offset: 0.01 dB(A)

Site M17.2 Leq: 54.2 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	557	26	68	0	0	70
I-40 WB	480	39	54	1	0	70

LOG SHEET

#	1 Minute Period Starting	Measured Leq M17.1 (dBA)	Lmax	Measured Leq M17.2 (dBA)	Lmax
1	11:29	68.0	70.6	55.7	59.0
2	11:30	65.3	67.3	54.5	57.4
3	11:31	66.2	68.6	54.8	59.1
4	11:32	67.4	69.5	54.7	56.3
5	11:33	66.4	69.8	53.8	55.7
6	11:34	66.1	68.7	53.7	55.1
7	11:35	67.6	69.2	54.8	56.7
8	11:36	65.5	68.0	53.3	54.5
9	11:37	66.2	68.6	53.5	56.5
10	11:38	65.8	68.6	53.5	56.5
11	11:39	66.6	68.8	53.7	55.5
12	11:40	66.6	69.1	53.5	55.2
13	11:41	65.9	67.5	53.2	54.3
14	11:42	66.2	67.8	53.7	54.7
15	11:43	66.8	68.9	53.9	55.0
16	11:44	65.6	68.3	53.4	54.4
17	11:45	66.8	70.2	54.8	56.6
18	11:46	67.4	70.0	55.1	56.4
19	11:47	66.8	69.1	54.6	55.8
20	11:48	67.6	69.2	55.3	56.1

Ambient Noise Monitoring Site M17.1



Ambient Noise Monitoring Site M17.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M18.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, Millhouse Rd Date: 11/18/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M18.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

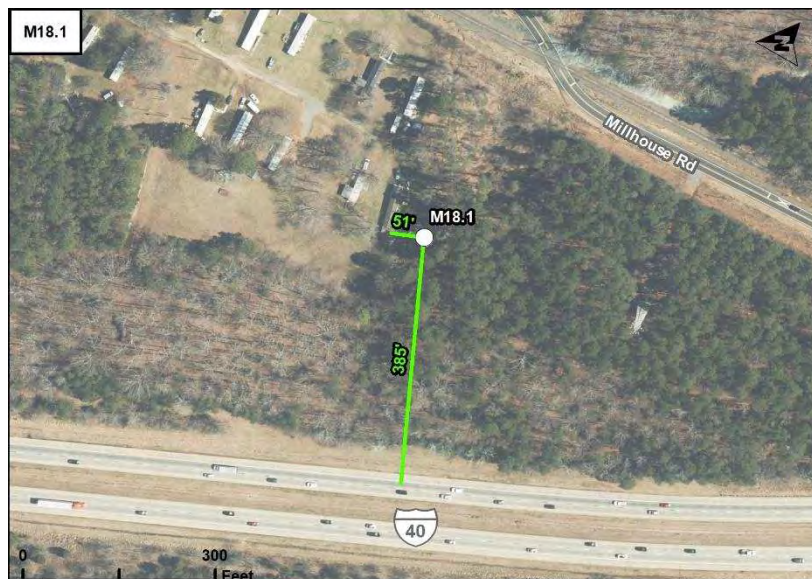
WEIGHTING (circle one)

A

Lin.

Location Description – M18.1- 5954 Neal Tapps Rd

SITE SKETCH:



Start Time: 4:54 AM/PM

Duration: 20 minutes

Wind Speed: 10 mph

Wind Direction: SW

Temperature: 63°F

Humidity: 85%

Site M18.1 Leq: 62.1 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	620	26	73	2	1	70
I-40 WB	614	32	77	0	1	70
Millhouse Road NB	13	1	0	0	0	30
Millhouse Road SB	14	0	0	0	0	30

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	16:54	60.9	62.4
2	16:55	62.2	63.6
3	16:56	62.1	65.1
4	16:57	62.4	64.8
5	16:58	61.2	62.9
6	16:59	62.0	64.1
7	17:00	62.5	65.7
8	17:01	62.7	66.2
9	17:02	61.5	63.8
10	17:03	60.7	62.1
11	17:04	62.6	65.1
12	17:05	62.2	63.7
13	17:06	62.0	63.4
14	17:07	61.4	62.6
15	17:08	62.5	64.1
16	17:09	62.7	67.4
17	17:10	61.3	62.7
18	17:11	62.4	63.6
19	17:12	63.2	65.1
20	17:13	62.5	63.9

Ambient Noise Monitoring Site M18.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M19.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-30, Millhouse Rd Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M19.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

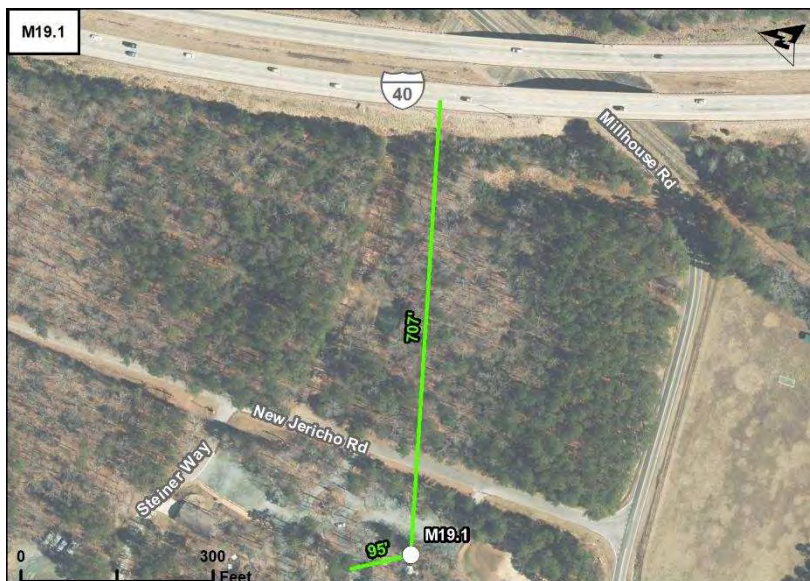
WEIGHTING (circle one)

A

Lin.

Location Description – M19.1- 6211 New Jericho Rd

SITE SKETCH:



Start Time: 12:04 AM/PM

Duration: 20 minutes

Wind Speed: 11 mph

Wind Direction: SW :

Temperature: 55°F

Humidity: 34%

Site M19.1 Leq: 57.7 dB(A)
 Calibration offset: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	510	15	61	1	0	70
I-40 WB	423	19	54	0	0	70
Millhouse Road NB	10	0	0	0	0	30
Millhouse Road SB	15	0	0	0	0	30

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	12:04	57.8	60.6
2	12:05	58.2	60.4
3	12:06	57.4	59.9
4	12:07	57.9	58.9
5	12:08	57.4	59.8
6	12:09	57.7	59.8
7	12:10	56.3	58.6
8	12:11	57.6	59.2
9	12:12	57.4	60.4
10	12:13	58.4	59.8
11	12:14	56.6	58.4
12	12:15	57.2	58.3
13	12:16	57.5	59.2
14	12:17	59.1	60.7
15	12:18	58.9	60.6
16	12:19	56.4	58.0
17	12:20	57.4	59.1
18	12:21	58.0	61.1
19	12:22	57.6	59.8
20	12:23	58.1	59.5

Ambient Noise Monitoring Site M19.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M20.1, M20.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, Millhouse Rd Date: 01/18/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M20.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11570
M20.2 - Sound Level Meter	Larson Davis Model 831C	SN330808	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M20.1- 1794 Avery Way; M20.2- 1772 Avery Way

SITE SKETCH:



Start Time: 2:24 AM/PM

Duration: 20 minutes

Wind Speed: 8 mph

Wind Direction: W

Temperature: 48°F

Humidity: 35%

Site M20.1 Leq: 68.7 dB(A)
 Calibration offset: -0.01 dB(A)

Site M20.2 Leq: 65.9 dB(A)
 Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	607	31	65	0	0	70
I-40 WB	587	33	68	0	0	70
Millhouse Road NB	15	0	0	0	0	30
Millhouse Road SB	13	0	0	0	0	30

LOG SHEET

#	1 Minute Period Starting	Measured Leq M20.1 (dBA)	Lmax	Measured Leq M20.2 (dBA)	Lmax
1	14:24	66.4	71.9	62.4	68.6
2	14:25	67.6	72.0	64.7	68.7
3	14:26	67.7	71.3	64.4	67.1
4	14:27	66.4	72.7	62.7	67.2
5	14:28	67.5	72.5	64.7	70.2
6	14:29	68.9	71.2	65.4	67.6
7	14:30	68.5	72.6	65.1	69.1
8	14:31	67.4	70.4	63.8	66.8
9	14:32	65.4	71.0	61.6	65.1
10	14:33	67.1	71.5	63.7	67.9
11	14:34	68.4	73.7	64.9	68.2
12	14:35	67.2	71.9	63.8	68.1
13	14:36	68.3	72.3	64.9	67.9
14	14:37	71.9	82.9	69.8	80.9
15	14:38	69.5	77.4	65.6	75.6
16	14:39	73.5	85.2	72.0	82.9
17	14:40	68.3	73.5	65.2	71.1
18	14:41	67.7	71.1	64.7	68.4
19	14:42	69.2	72.5	65.8	68.9
20	14:43	68.7	71.3	66.1	68.1

Ambient Noise Monitoring Site M20.1



Ambient Noise Monitoring Site M20.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M22a.1, M22a.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 01/18/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M22a.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M22a.2 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M22a.1- 2014 Clyde Rd ; M22a.2- 2015 Clyde Rd

SITE SKETCH:



Start Time: 4:01 AM **PM**

Duration: 20 minutes

Wind Speed: 3 mph

Wind Direction: W

Temperature: 47°F

Humidity: 35%

Site M22a.1 Leq: 71.3 dB(A)
 Calibration offset: -0.02 dB(A)

Site M22a.2 Leq: 67.7 dB(A)
 Calibration offset: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	613	19	39	0	0	70
I-40 WB	816	39	75	2	0	70

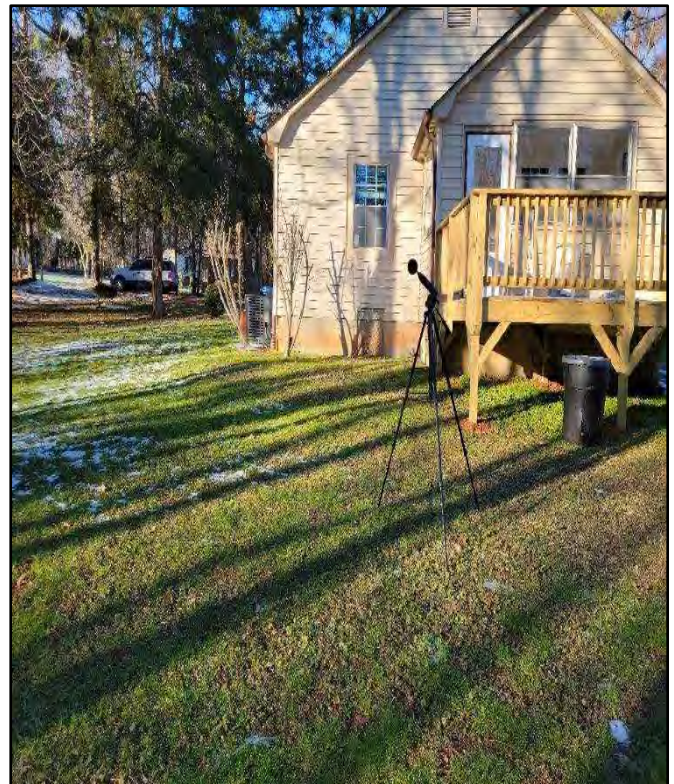
LOG SHEET

#	1 Minute Period Starting	Measured Leq M22a.1 (dBA)	Lmax	Measured Leq M22a.2 (dBA)	Lmax
1	16:01	71.8	85.3	68.5	70.4
2	16:02	71.8	73.4	68.1	70.7
3	16:03	72.0	75.2	67.4	71.1
4	16:04	68.6	72.6	66.2	69.5
5	16:05	71.7	78.7	68.5	71.0
6	16:06	71.5	74.0	66.3	68.5
7	16:07	69.6	72.4	66.5	72.2
8	16:08	69.9	77.2	65.7	69.4
9	16:09	70.3	73.2	65.8	68.8
10	16:10	69.0	72.3	68.5	72.5
11	16:11	73.4	77.4	69.5	74.5
12	16:12	71.6	79.4	68.5	74.1
13	16:13	71.1	74.9	67.3	70.6
14	16:14	72.5	76.3	69.4	72.0
15	16:15	71.6	74.9	67.1	68.6
16	16:16	70.7	72.7	68.1	70.7
17	16:17	72.1	74.7	67.0	70.7
18	16:18	71.5	76.0	68.7	71.3
19	16:19	71.1	75.3	66.7	70.0
20	16:20	70.7	74.3	66.4	69.0

Ambient Noise Monitoring Site M22a.1



Ambient Noise Monitoring Site M22a.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M22b.1, M22b.2, M22b.3

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, NC-86 Date: 01/18/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M22b.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M22b.2 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M22b.3 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M22b.1- 302 Old Moze Trail ; M22b.2- 508 Hurricane Alley ; M22b.3- 528 Hurricane Alley

SITE SKETCH:



Start Time: 3:27 AM/PM

Duration: 20 minutes

Wind Speed: 6 mph

Wind Direction: W

Temperature: 47°F

Humidity: 35%

Site M22b.1 Leq: 63.7 dB(A)
Calibration offset: 0.02 dB(A)

Site M22b.2 Leq: 60.9 dB(A)
Calibration offset: 0.00 dB(A)

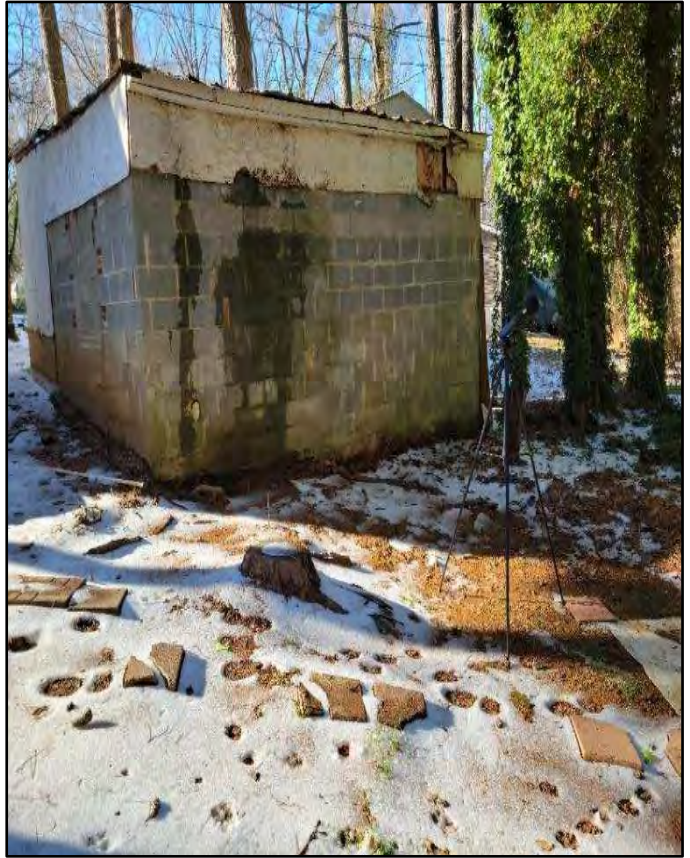
Site M22b.3 Leq: 55.4 dB(A)
Calibration offset: -0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	501	22	29	0	0	70
I-40 WB	436	27	32	0	0	70
I-40 WB On-Ramp	27	2	0	0	0	55
NC 86 NB	55	9	1	0	0	45
NC 86 SB	61	15	0	1	0	45

LOG SHEET

#	1 Minute Period Starting	Measured Leq M22b.1 (dBA)	Lmax	Measured Leq M22b.2 (dBA)	Lmax	Measured Leq M22b.3 (dBA)	Lmax
1	15:27	63.7	69.6	60.9	63.1	56.0	80.4
2	15:28	64.7	69.7	61.6	64.0	55.4	57.7
3	15:29	59.9	67.8	61.5	64.9	55.8	57.8
4	15:30	66.7	72.6	61.7	64.1	54.9	56.9
5	15:31	60.3	67.1	60.4	62.4	55.1	56.8
6	15:32	62.2	67.6	61.2	63.6	54.1	56.5
7	15:33	63.3	67.5	59.3	62.4	54.1	55.8
8	15:34	62.0	69.2	61.1	63.3	54.9	57.0
9	15:35	59.3	65.4	59.8	61.1	55.4	56.8
10	15:36	64.7	71.9	60.8	63.5	53.7	57.1
11	15:37	66.2	72.2	59.4	62.0	53.6	54.4
12	15:38	62.7	70.2	60.2	64.4	55.9	57.6
13	15:39	63.4	70.0	62.3	64.6	55.8	57.3
14	15:40	62.8	70.0	59.5	60.9	54.7	57.7
15	15:41	68.0	78.0	60.7	62.0	56.7	58.7
16	15:42	64.2	70.6	61.8	64.0	55.3	56.6
17	15:43	63.0	68.9	61.6	64.0	57.1	59.8
18	15:44	62.4	69.7	61.2	63.7	55.8	60.7
19	15:45	62.1	68.4	60.4	61.8	55.8	60.2
20	15:46	60.3	68.7	60.9	63.0	56.4	59.7

Ambient Noise Monitoring Site M22b.1



Ambient Noise Monitoring Site M22b.2



Ambient Noise Monitoring Site M22b.3



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M23.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, Whitfield Rd, NC-86 Date: 11/17/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M23.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

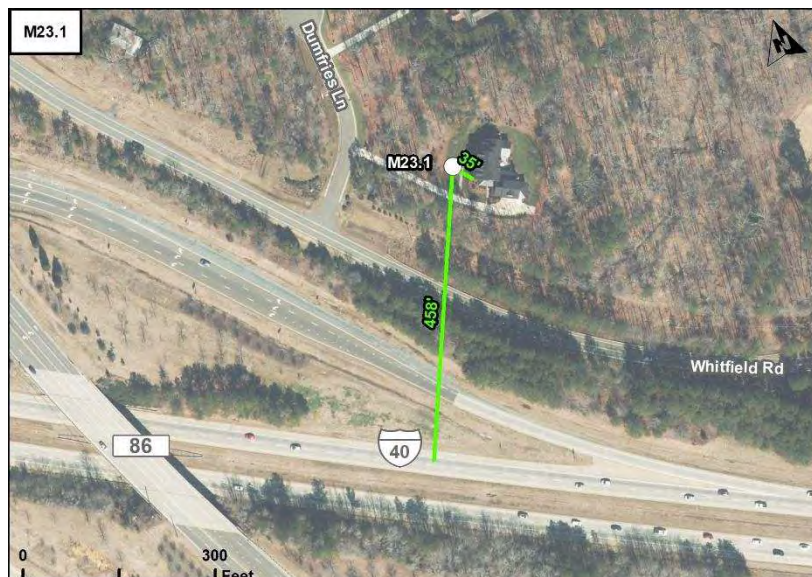
WEIGHTING (circle one)

A

Lin.

Location Description – M23.1- 7106 Dumfries Ln.

SITE SKETCH:



Start Time: 3:33 AM/PM

Duration: 20 minutes

Wind Speed: 9 mph

Wind Direction: SSW

Temperature: 73°F

Humidity: 39%

Site M23.1 Leq: 61.5 dB(A)

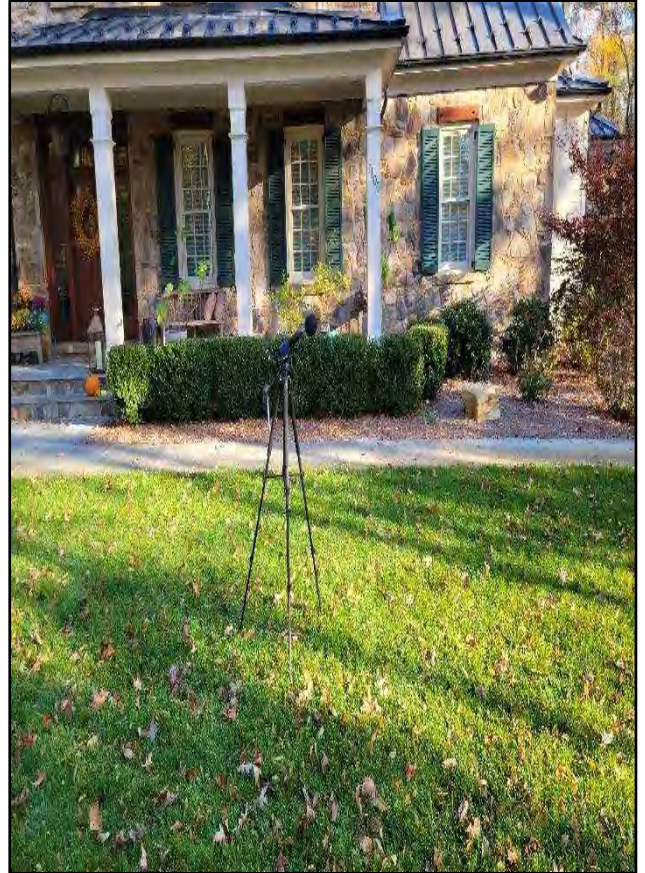
Calibration offset: 0.02 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	628	22	51	1	0	70
I-40 WB	812	64	28	0	0	70
Whitfield Road EB	49	0	0	0	0	45
Whitfield Road WB	41	0	0	0	0	45
At the intersection of NC 86 North Ramps						
NC 86 SB Through	120	1	0	1	0	45
NC 86 SB Right to On-Ramp	9	0	0	0	0	45
NC 86 NB Through	142	0	1	3	0	45
NC 86 NB Left to On-Ramp	169	3	0	1	0	45
Off Ramp - Right	72	0	3	1	0	55
Off Ramp - Left	24	0	0	0	0	55

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	15:33	62.4	64.2
2	15:34	62.8	65.1
3	15:35	62.4	64.0
4	15:36	62.9	64.6
5	15:37	61.7	63.4
6	15:38	60.9	62.6
7	15:39	61.7	63.3
8	15:40	60.2	62.1
9	15:41	61.1	62.4
10	15:42	60.8	62.9
11	15:43	61.4	63.0
12	15:44	61.1	62.4
13	15:45	60.9	62.5
14	15:46	61.1	62.7
15	15:47	61.2	62.5
16	15:48	61.2	62.4
17	15:49	62.8	66.3
18	15:50	60.5	62.3
19	15:51	60.4	61.7
20	15:52	60.7	62.2

Ambient Noise Monitoring Site M23.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M24.1, M24.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, MLK Blvd. Date: 01/18/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M24.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M24.2 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

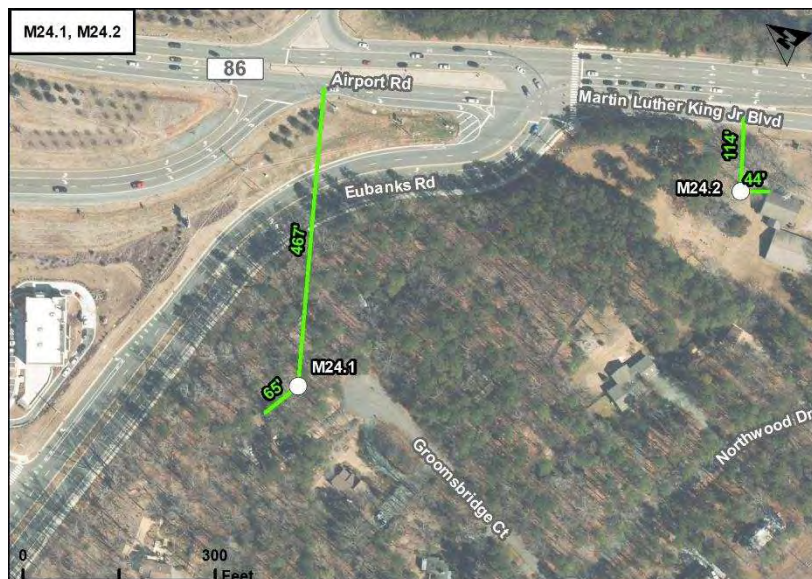
WEIGHTING (circle one)

A

Lin.

Location Description – M24.1- 104 Groomsbridge Ct.; M24.2- 7707 NC 86 S

SITE SKETCH:



Start Time: 12:19 AM/PM

Duration: 20 minutes

Wind Speed: 6 mph

Wind Direction: W

Temperature: 45°F

Humidity: 40%

Site M24.1 Leq: 56.8 dB(A)
 Calibration offset: 0.00 dB(A)

Site M24.2 Leq: 61.0 dB(A)
 Calibration offset: -0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	431	22	37	0	0	70
I-40 WB	510	26	28	0	0	70
I-40 EB Exit Ramp Left	17	1	0	0	0	55
I-40 EB Exit Ramp Right	31	0	0	0	0	55
At the intersection of MLK Blvd and Eubanks Road						
MLK Blvd NB Through	109	2	0	0	0	45
MLK Blvd NB Left	84	0	0	1	0	45
MLK Blvd SB Through	208	2	0	1	0	45
MLK Blvd SB Right	52	0	1	0	0	45
Eubanks EB Left	141	5	1	0	0	45
Eubanks EB Right	120	2	1	0	0	45

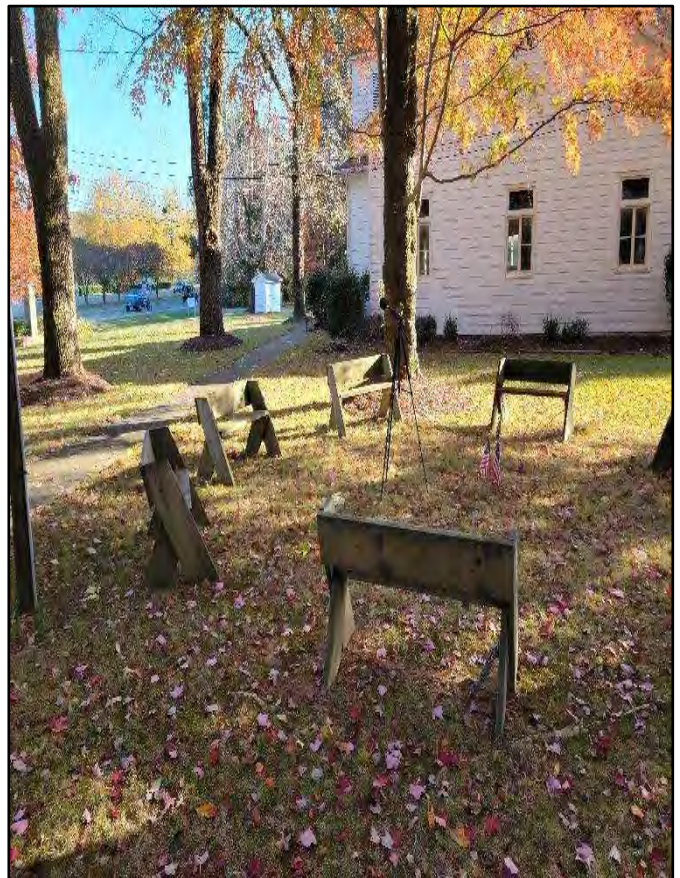
LOG SHEET

#	1 Minute Period Starting	Measured Leq M24.1 (dBA)	Lmax	Measured Leq M24.2 (dBA)	Lmax
1	12:19	57.4	59.2	59.7	62.8
2	12:20	57.0	58.7	61.7	66.8
3	12:21	56.9	58.8	57.9	62.2
4	12:22	56.9	59.7	59.8	63.1
5	12:23	57.1	59.0	60.0	62.2
6	12:24	56.6	58.5	60.0	63.0
7	12:25	56.8	58.4	65.8	75.8
8	12:26	55.4	57.3	58.2	62.3
9	12:27	56.7	58.8	62.2	67.8
10	12:28	57.9	59.7	61.3	64.5
11	12:29	58.4	60.5	60.7	63.6
12	12:30	58.2	60.1	60.5	63.4
13	12:31	56.5	58.6	61.6	72.3
14	12:32	55.2	57.3	60.2	66.3
15	12:33	55.7	57.7	60.2	62.6
16	12:34	56.2	58.0	58.4	62.6
17	12:35	56.3	58.2	60.7	65.3
18	12:36	57.0	59.4	62.7	69.7
19	12:37	56.2	59.0	60.1	64.0
20	12:38	55.7	57.6	60.4	63.8

Ambient Noise Monitoring Site M24.1



Ambient Noise Monitoring Site M24.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M25.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 11/17/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M25.1 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

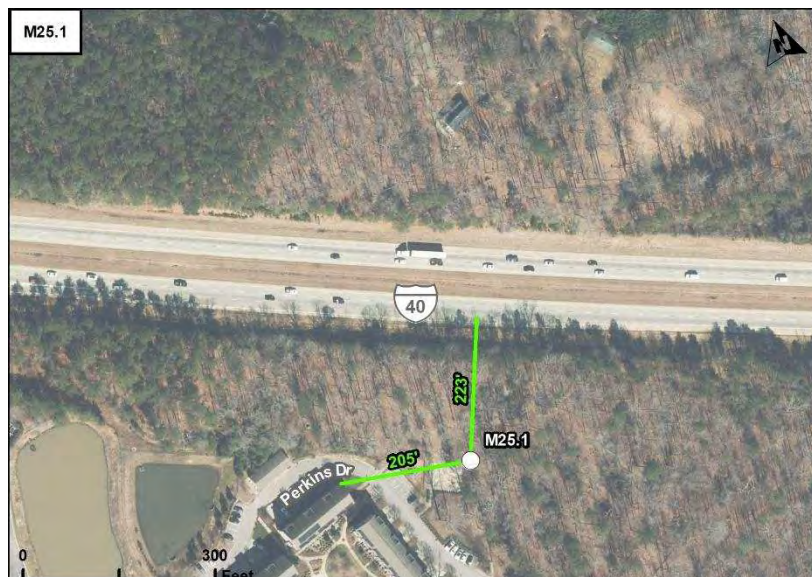
WEIGHTING (circle one)

A

Lin.

Location Description – M25.1- 702 Perkins Dr

SITE SKETCH:



Start Time: 11:00 **AM/PM**

Duration: 20 minutes

Wind Speed: 5 mph

Wind Direction: SSW

Temperature: 65°F

Humidity: 59%

Site M25.1 Leq: 66.5 dB(A)

Calibration offset: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB (Ramp not Included)	639	32	72	2	0	70
I-40 WB	602	42	70	0	0	70
I-40 WB On-Ramp	124	1	3	0	0	55

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	11:00	67.0	68.6
2	11:01	65.1	68.2
3	11:02	66.4	68.9
4	11:03	67.7	71.2
5	11:04	66.6	69.3
6	11:05	67.2	68.7
7	11:06	66.8	68.9
8	11:07	65.9	68.0
9	11:08	67.9	70.4
10	11:09	66.2	68.7
11	11:10	65.8	67.3
12	11:11	66.7	68.3
13	11:12	66.2	68.2
14	11:13	66.0	67.6
15	11:14	66.9	69.1
16	11:15	66.8	68.7
17	11:16	65.7	67.0
18	11:17	67.3	68.9
19	11:18	66.2	68.1
20	11:19	65.1	68.1

Ambient Noise Monitoring Site M25.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M26.1, M26.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M26.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M26.2 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M26.1- 109 Foxridge Rd; M26.2- 113 Foxridge Rd

SITE SKETCH:



Start Time: 1:13 AM/PM

Duration: 20 minutes

Wind Speed: 11 mph

Wind Direction: SW

Temperature: 56°F

Humidity: 39%

Site M26.1 Leq: 68.8 dB(A)
Calibration offset: 0.01 dB(A)

Site M26.2 Leq: 63.3 dB(A)
Calibration offset: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	511	19	61	0	0	70
I-40 WB	545	21	53	0	0	70

LOG SHEET

#	1 Minute Period Starting	Measured Leq M26.1 (dBA)	Lmax	Measured Leq M26.2 (dBA)	Lmax
1	13:13	68.2	72.9	62.7	65.3
2	13:14	69.6	73.1	64.3	65.4
3	13:15	69.9	72.9	64.1	65.5
4	13:16	67.5	71.3	62.0	65.1
5	13:17	69.1	72.5	63.7	65.7
6	13:18	69.0	71.1	63.3	64.7
7	13:19	68.3	71.1	62.8	65.6
8	13:20	69.5	72.0	63.8	65.4
9	13:21	66.9	70.2	62.5	64.1
10	13:22	68.6	71.4	62.7	64.9
11	13:23	68.5	71.7	63.5	65.2
12	13:24	69.3	73.2	63.2	65.4
13	13:25	68.9	73.5	63.3	65.4
14	13:26	68.5	70.5	63.0	64.8
15	13:27	68.9	72.8	63.3	66.4
16	13:28	68.4	71.3	63.0	64.2
17	13:29	69.9	78.2	64.0	68.6
18	13:30	68.9	71.6	63.7	67.0
19	13:31	68.5	71.5	63.4	65.1
20	13:32	68.6	71.5	62.9	65.6

Ambient Noise Monitoring Site M26.1



Ambient Noise Monitoring Site M26.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M27.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M27.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M27.1- 151 Schultz St
SITE SKETCH:



Start Time: 2:32 AM/PM

Duration: 20 minutes

Wind Speed: 13 mph*

Wind Direction: SSW

Temperature: 56°F

Humidity: 30%

Site M27.1 Leq: 60.3 dB(A)
 Calibration offset: 0.00 dB(A)

* The wind speeds at this location was noted from the weatherunderground.com website. The field observed wind speed during the monitoring sessions was calm and no substantial wind noise was prevalent during noise monitoring session at this location.

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	450	21	69	0	0	70
I-40 WB	507	20	63	0	0	70

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	14:32	59.0	61.5
2	14:33	60.8	63.1
3	14:34	65.6	72.2
4	14:35	60.8	63.5
5	14:36	60.2	61.7
6	14:37	58.3	60.6
7	14:38	59.5	61.8
8	14:39	59.2	60.8
9	14:40	58.6	61.3
10	14:41	59.3	61.3
11	14:42	58.9	60.7
12	14:43	60.6	61.8
13	14:44	59.3	61.8
14	14:45	61.0	62.9
15	14:46	59.7	62.4
16	14:47	59.7	62.0
17	14:48	59.8	62.0
18	14:49	60.1	61.4
19	14:50	60.0	61.5
20	14:51	59.4	60.7

Ambient Noise Monitoring Site M27.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M28.1, M28.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M28.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M28.2 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M28.1- 22 Mafolie Ct; M28.2- 18 Mafolie Ct

SITE SKETCH:



Start Time: 1:54 AM/PM

Duration: 20 minutes

Wind Speed: 11 mph

Wind Direction: SW

Temperature: 57°F

Humidity: 40%

Site M28.1 Leq: 66.8 dB(A)
Calibration offset: 0.00 dB(A)

Site M28.2 Leq: 59.1 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	575	20	48	3	0	70
I-40 WB	602	31	50	0	0	70

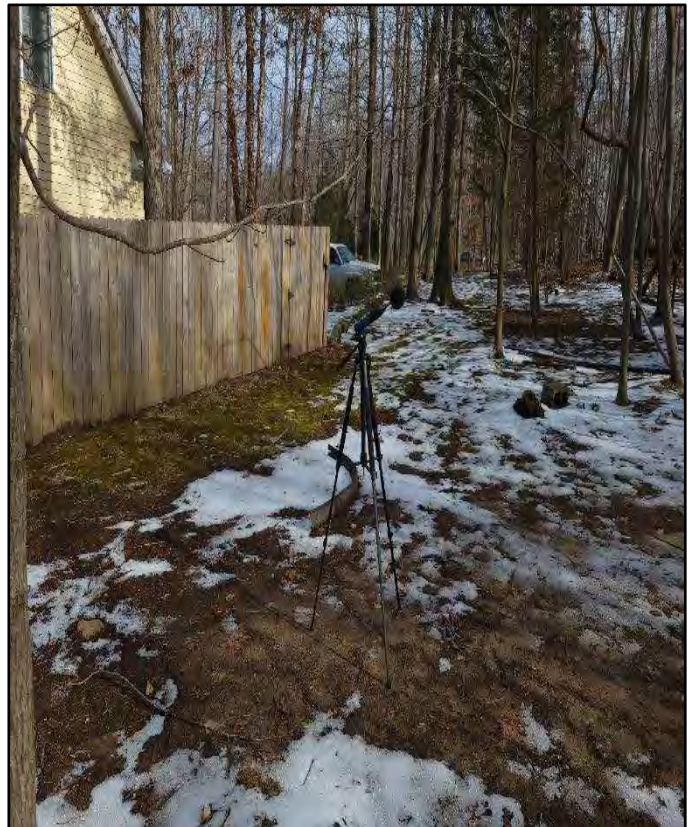
LOG SHEET

#	1 Minute Period Starting	Measured Leq M28.1 (dBA)	Lmax	Measured Leq M28.2 (dBA)	Lmax
1	13:54	66.3	69.2	59.4	61.4
2	13:55	66.8	71.9	59.2	62.3
3	13:56	65.3	67.3	57.7	59.6
4	13:57	66.4	71.5	58.6	63.2
5	13:58	66.4	69.5	58.7	61.0
6	13:59	67.3	69.6	59.4	61.6
7	14:00	66.4	67.9	59.1	61.4
8	14:01	67.7	69.2	59.4	61.2
9	14:02	67.4	70.4	59.8	62.3
10	14:03	66.5	68.9	58.5	61.1
11	14:04	66.1	71.6	58.7	62.3
12	14:05	67.1	69.3	59.9	61.8
13	14:06	67.6	69.8	59.6	62.5
14	14:07	66.3	69.2	58.3	63.2
15	14:08	67.4	69.9	59.7	61.7
16	14:09	67.2	69.0	58.7	61.0
17	14:10	66.8	68.2	59.7	61.9
18	14:11	67.5	69.7	59.9	62.2
19	14:12	66.8	68.6	58.6	61.1
20	14:13	66.3	68.8	59.0	62.6

Ambient Noise Monitoring Site M28.1



Ambient Noise Monitoring Site M28.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M29.1, M29.2, M29.3

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 11/16/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M29.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M29.2 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
M29.3 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M29.1- 750 Weaver Dairy Rd Unit 172 ; M29.2- 750 Weaver Dairy Rd Unit 171 ; M29.3- 750 Weaver Dairy Rd Unit 146

SITE SKETCH:



Start Time: 1:55 AM/PM

Duration: 20 minutes

Wind Speed: 6 mph

Wind Direction: S

Temperature: 61°F

Humidity: 35%

Site M29.1 Leq: 61.4 dB(A)
Calibration offset: 0.00 dB(A)

Site M29.2 Leq: 59.6 dB(A)
Calibration offset: 0.00 dB(A)

Site M29.3 Leq: 55.3 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	618	20	61	1	0	70
I-40 WB	644	34	89	1	0	70

LOG SHEET

#	1 Minute Period Starting	Measured Leq M29.1 (dBA)	Lmax	Measured Leq M29.2 (dBA)	Lmax	Measured Leq M29.3 (dBA)	Lmax
1	13:55	61.0	63.0	58.9	60.6	54.8	56.8
2	13:56	60.5	62.7	58.9	61.1	54.7	57.1
3	13:57	61.8	63.6	60.2	62.8	56.0	58.7
4	13:58	61.2	63.3	58.8	60.7	55.5	57.3
5	13:59	60.7	62.7	58.9	61.4	54.7	56.7
6	14:00	58.2	60.8	55.8	58.2	52.6	54.9
7	14:01	60.5	62.4	58.9	60.3	54.4	56.3
8	14:02	61.7	63.6	59.7	62.1	55.8	58.3
9	14:03	61.2	62.4	59.1	60.7	55.3	56.9
10	14:04	61.4	62.7	59.7	61.0	55.4	57.1
11	14:05	63.9	67.1	62.4	68.1	56.9	58.8
12	14:06	59.8	61.2	58.2	60.3	54.1	57.2
13	14:07	61.5	62.5	59.4	60.6	55.7	57.7
14	14:08	62.3	65.5	60.7	65.8	55.5	56.7
15	14:09	63.2	66.5	62.0	67.0	55.9	56.6
16	14:10	61.2	62.4	59.7	61.4	55.6	57.4
17	14:11	60.8	62.5	58.7	60.9	55.1	57.3
18	14:12	61.0	62.5	59.1	60.7	55.2	56.7
19	14:13	61.0	63.1	59.3	61.2	55.1	57.1
20	14:14	61.7	63.9	59.7	62.1	56.1	58.4

Ambient Noise Monitoring Site M29.1



Ambient Noise Monitoring Site M29.2



Ambient Noise Monitoring Site M29.3



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M29.4, M29.5, M29.6

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 11/16/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M29.4 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M29.5 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M29.6 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

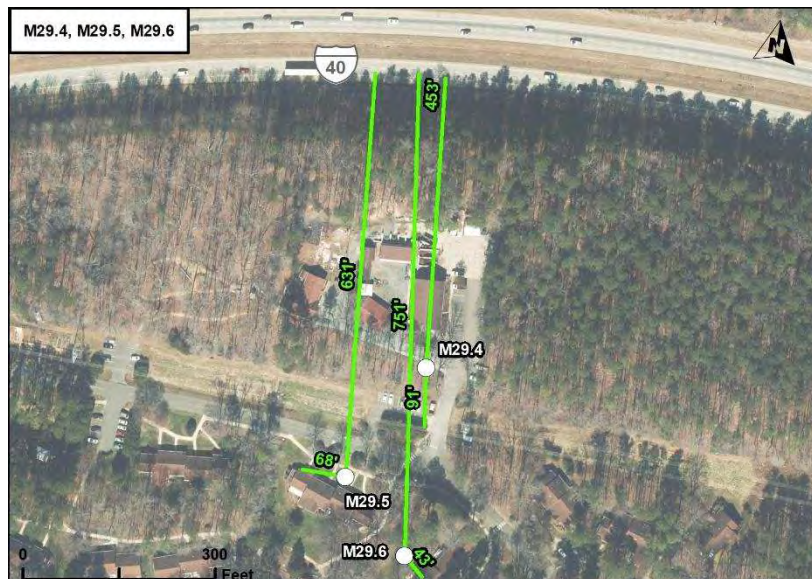
WEIGHTING (circle one)

A

Lin.

Location Description – M29.4- 750 Weaver Dairy Rd ; M29.5- 750 Weaver Dairy Rd Unit 182 ; M29.6- 750 Weaver Dairy Rd Unit 186

SITE SKETCH:



Start Time: 2:45 AM/PM

Duration: 20 minutes

Wind Speed: 6 mph

Wind Direction: S

Temperature: 63°F

Humidity: 32%

Site M29.4 Leq: 58.9 dB(A)
Calibration offset: 0.00 dB(A)

Site M29.5 Leq: 55.0 dB(A)
Calibration offset: 0.00 dB(A)

Site M29.6 Leq: 53.6 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	693	22	58	0	0	70
I-40 WB	722	40	81	2	0	70

LOG SHEET

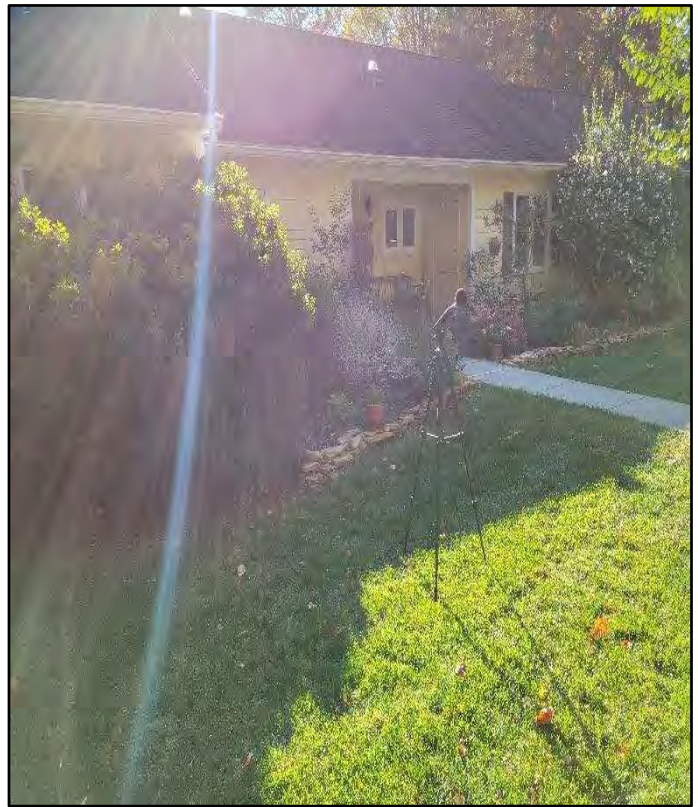
#	1 Minute Period Starting	Measured Leq M29.4 (dBA)	Lmax	Measured Leq M29.5 (dBA)	Lmax	Measured Leq M29.6 (dBA)	Lmax
1	14:45	59.4	63.8	54.5	59.7	52.8	54.1
2	14:46	63.9	72.6	62.6*	71.7	56.0	60.4
3	14:47	73.1*	82.2	61.4*	68.5	55.4	58.0
4	14:48	62.3	80.0	53.6	54.6	52.9	55.4
5	14:49	58.1	62.8	59.9	70.2	53.0	54.5
6	14:50	72.5*	85.1	59.0	70.3	55.6	59.5
7	14:51	57.1	58.9	53.4	54.7	52.3	53.5
8	14:52	58.1	59.5	54.2	55.6	53.0	54.6
9	14:53	57.6	58.8	53.5	54.8	53.1	54.2
10	14:54	57.1	58.1	53.1	54.3	52.6	53.7
11	14:55	57.6	60.4	53.8	55.4	52.9	54.2
12	14:56	58.1	59.1	54.2	56.6	53.5	54.4
13	14:57	57.5	58.8	53.5	54.7	52.8	54.1
14	14:58	58.2	60.3	54.3	55.5	53.3	54.7
15	14:59	57.9	58.8	53.9	54.7	53.3	53.8
16	15:00	57.1	57.8	53.6	54.4	52.7	53.3
17	15:01	57.3	58.4	54.0	56.6	53.0	53.8
18	15:02	58.7	61.2	55.1	57.9	54.0	54.9
19	15:03	58.3	59.5	54.5	55.0	53.7	54.2
20	15:04	57.6	60.5	53.9	56.2	53.1	54.3

* Leq1min data point removed from data set due to lawn mower causing a substantial spike.

Ambient Noise Monitoring Site M29.4



Ambient Noise Monitoring Site M29.5



Ambient Noise Monitoring Site M29.6



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M30.1, M30.2

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, Sunrise Rd Date: 11/17/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M30.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M30.2 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M30.1- 1023 Northridge Ln. ; M30.2- 1017 Northridge Ln.

SITE SKETCH:



Start Time: 4:31 AM/PM

Duration: 20 minutes

Wind Speed: 10 mph

Wind Direction: SW

Temperature: 70°F

Humidity: 42%

Site M30.1 Leq: 64.9 dB(A)
Calibration offset: 0.00 dB(A)

Site M30.2 Leq: 57.0 dB(A)
Calibration offset: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	832	22	46	1	0	70
I-40 WB	1,075	53	28	1	0	70
Sunrise Road NB	37	1	0	0	0	45
Sunrise Road SB	48	0	0	1	0	45

LOG SHEET

#	1 Minute Period Starting	Measured Leq M30.1 (dBA)	Lmax	Measured Leq M30.2 (dBA)	Lmax
1	16:31	64.7	66.8	56.9	62.9
2	16:32	64.7	65.7	56.8	57.6
3	16:33	64.2	65.8	56.1	57.4
4	16:34	65.2	66.5	57.4	58.6
5	16:35	65.0	66.3	57.0	58.1
6	16:36	65.2	66.6	57.2	58.0
7	16:37	65.4	67.4	57.4	58.2
8	16:38	65.1	67.4	57.3	58.7
9	16:39	64.6	67.3	56.9	58.7
10	16:40	64.5	66.2	56.6	57.4
11	16:41	64.7	66.0	56.9	57.9
12	16:42	65.1	66.8	57.0	58.2
13	16:43	64.6	66.3	57.2	58.6
14	16:44	66.1	69.8	57.5	58.8
15	16:45	65.1	66.9	57.2	58.5
16	16:46	64.9	66.6	56.9	58.3
17	16:47	65.4	66.4	57.3	57.8
18	16:48	63.8	65.9	56.0	57.0
19	16:49	63.9	65.5	56.1	57.1
20	16:50	65.7	66.9	57.4	58.4

Ambient Noise Monitoring Site M30.1



Ambient Noise Monitoring Site M30.2



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M31.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M31.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M31.1- 7326 Sunrise Rd

SITE SKETCH:



Start Time:
4:14 AM/PM

Duration:
20 minutes

Wind Speed: 10 mph

Wind Direction: SSW

Temperature: 58°F

Humidity: 35%

Site M31.1 Leq: 72.1 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	724	25	47	0	0	70
I-40 WB	689	31	54	0	0	70

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	16:14	71.2	73.4
2	16:15	72.3	74.8
3	16:16	72.3	74.2
4	16:17	72.3	74.5
5	16:18	71.6	74.1
6	16:19	71.9	73.8
7	16:20	72.1	74.3
8	16:21	71.2	72.9
9	16:22	72.2	73.5
10	16:23	72.1	74.2
11	16:24	73.8	79.5
12	16:25	71.3	73.0
13	16:26	72.0	75.0
14	16:27	71.8	73.7
15	16:28	72.3	74.8
16	16:29	73.1	74.8
17	16:30	71.1	72.9
18	16:31	72.1	74.0
19	16:32	72.1	75.1
20	16:33	71.5	73.4

Ambient Noise Monitoring Site M31.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M32.1, M32.2, M32.3

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 11/16/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M32.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M32.2 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
M32.3 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M32.1- 104 Yukon Ln ; M32.2- 105 Yukon Ln; M32.3- 3830 Sweeten Creek Rd

SITE SKETCH:



Start Time: 3:49 AM/PM

Duration: 20 minutes

Wind Speed: 6 mph

Wind Direction: SSW

Temperature: 65°F

Humidity: 35%

Site M32.1 Leq: 67.7 dB(A)
Calibration offset: -0.01 dB(A)

Site M32.2 Leq: 60.7 dB(A)
Calibration: 0.00dB(A)

Site M32.3 Leq: 56.7 dB(A)
Calibration: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	890	72	88	1	0	70
I-40 WB	924	79	92	2	0	70

LOG SHEET

#	1 Minute Period Starting	Measured Leq M32.1 (dBA)	Lmax	Measured Leq M32.2 (dBA)	Lmax	Measured Leq M32.3 (dBA)	Lmax
1	15:49	67.7	69.4	60.0	62.1	56.5	57.9
2	15:50	67.1	69.1	59.6	61.9	56.0	57.9
3	15:51	66.6	69.1	59.4	61.1	55.6	57.8
4	15:52	67.4	69.0	60.9	63.1	56.1	57.3
5	15:53	67.9	70.3	60.8	62.2	56.9	58.9
6	15:54	68.1	70.2	60.3	62.8	57.0	60.0
7	15:55	67.0	69.2	60.9	62.7	55.8	57.2
8	15:56	67.5	69.9	60.4	62.8	56.5	58.5
9	15:57	67.9	69.9	60.2	62.0	56.9	58.7
10	15:58	66.6	67.9	60.7	62.2	55.6	56.7
11	15:59	67.9	69.3	61.5	63.4	57.3	58.3
12	16:00	69.1	70.5	61.2	63.6	58.4	62.4
13	16:01	67.3	69.1	60.9	62.4	56.7	58.3
14	16:02	67.5	69.4	60.4	61.9	56.2	57.8
15	16:03	67.4	68.8	61.1	62.9	56.5	57.8
16	16:04	68.2	69.7	60.9	62.6	57.1	58.2
17	16:05	67.5	69.6	60.9	62.3	56.5	58.5
18	16:06	67.9	69.4	60.9	62.8	56.6	57.8
19	16:07	68.4	70.1	61.3	62.4	57.0	58.2
20	16:08	68.0	69.5	61.2	62.5	57.2	59.0

Ambient Noise Monitoring Site M32.1



Ambient Noise Monitoring Site M32.2



Ambient Noise Monitoring Site M32.3



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M32.4, M32.5, M32.6

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 11/16/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M32.4 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M32.5 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
M32.6 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M32.4- 4002 Sweeten Creek Rd ; M32.5- 100 Landing Dr ; M32.6- 103 Landing Dr

SITE SKETCH:



Start Time: 4:30 AM/PM

Duration: 20 minutes

Wind Speed: 5 mph

Wind Direction: SE

Temperature: 60°F

Humidity: 45%

Site M32.4 Leq: 62.5 dB(A)
Calibration offset: 0.01 dB(A)

Site M32.5 Leq: 54.4 dB(A)
Calibration offset: 0.01 dB(A)

Site M32.6 Leq: 50.2 dB(A)
Calibration offset: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	930	95	111	0	4	75
I-40 WB	1,069	89	108	2	0	75

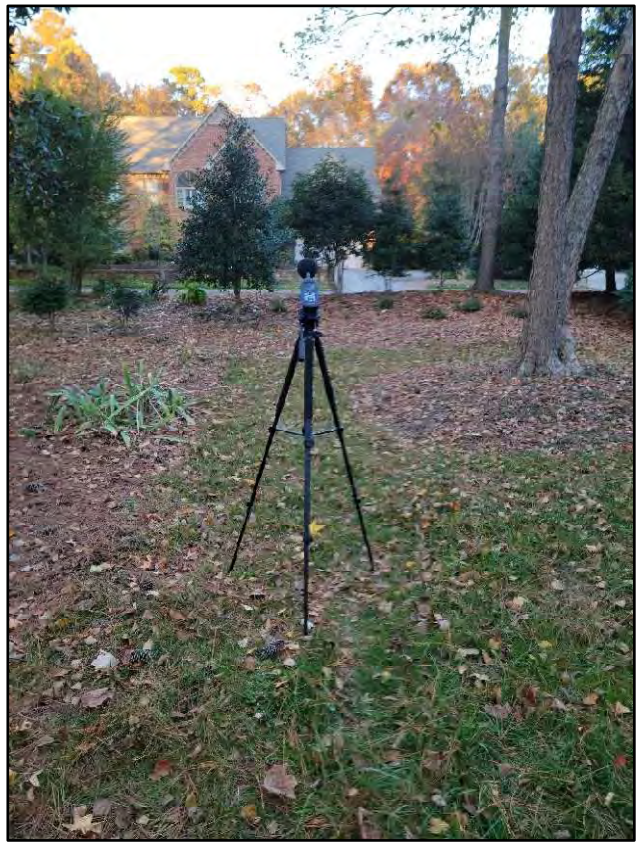
LOG SHEET

#	1 Minute Period Starting	Measured Leq M32.4 (dBA)	Lmax	Measured Leq M32.5 (dBA)	Lmax	Measured Leq M32.6 (dBA)	Lmax
1	16:30	62.4	63.5	54.2	56.0	49.6	50.4
2	16:31	63.0	64.2	54.4	55.5	50.0	50.6
3	16:32	62.2	63.4	53.2	54.4	49.5	50.2
4	16:33	62.6	64.1	53.8	55.2	49.7	50.9
5	16:34	63.3	64.5	54.7	55.9	50.5	51.0
6	16:35	62.3	63.5	53.8	54.8	49.7	50.5
7	16:36	62.7	63.9	54.4	55.9	50.4	51.1
8	16:37	63.0	64.0	54.4	55.1	50.6	53.0
9	16:38	63.5	64.5	55.1	56.4	51.0	51.5
10	16:39	62.8	64.8	54.4	56.4	50.6	51.5
11	16:40	62.9	64.5	54.4	56.0	50.4	51.6
12	16:41	62.6	63.6	54.2	55.1	50.3	51.2
13	16:42	62.8	64.1	54.3	55.2	50.4	51.0
14	16:43	63.2	64.1	55.4	57.3	51.1	51.7
15	16:44	62.7	64.2	55.2	56.8	50.6	52.2
16	16:45	62.5	64.8	55.0	56.3	50.8	51.8
17	16:46	62.2	63.3	54.5	55.6	50.3	51.3
18	16:47	60.8	62.4	54.1	56.8	49.6	51.0
19	16:48	61.2	62.7	53.9	54.6	49.5	50.5
20	16:49	61.4	63.5	53.7	54.7	49.5	50.7

Ambient Noise Monitoring Site M32.4



Ambient Noise Monitoring Site M32.5



Ambient Noise Monitoring Site M32.6



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M32.7, M32.8, M32.9

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 11/16/2021

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M32.7 - Sound Level Meter	Larson Davis Model 831C	SN330809	11571
M32.8 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
M32.9 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M32.7- 604 Perry Creek Dr ; M32.8- 406 Silver Creek Trail ; M32.9- 403 Silver Creek Trail

SITE SKETCH:



Start Time: 5:24 AM/PM

Duration: 20 minutes

Wind Speed: 1 mph

Wind Direction: SSE

Temperature: 53°F

Humidity: 56%

Site M32.7 Leq: 65.8 dB(A)
Calibration offset: 0.00 dB(A)

Site M32.8 Leq: 59.8 dB(A)
Calibration offset: 0.01 dB(A)

Site M32.9 Leq: 57.3 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	872	21	28	0	0	70
I-40 WB	998	19	34	0	0	70

LOG SHEET

#	1 Minute Period Starting	Measured Leq M32.7 (dBA)	Lmax	Measured Leq M32.8 (dBA)	Lmax	Measured Leq M32.9 (dBA)	Lmax
1	17:24	65.2	67.6	59.3	62.6	56.9	60.4
2	17:25	65.9	69.0	59.7	61.7	57.4	59.8
3	17:26	65.2	67.3	59.7	61.0	57.0	58.4
4	17:27	65.5	68.5	59.4	62.9	56.7	58.4
5	17:28	66.0	67.7	60.7	62.9	57.8	59.1
6	17:29	65.3	68.7	59.0	60.9	56.7	58.9
7	17:30	66.4	68.3	60.3	62.3	57.5	58.6
8	17:31	66.7	70.5	60.2	62.6	57.6	58.9
9	17:32	63.6	67.8	58.9	62.6	56.4	58.6
10	17:33	66.3	68.1	59.7	61.0	56.8	58.2
11	17:34	65.5	67.6	59.6	61.1	57.1	58.2
12	17:35	65.2	68.0	59.7	61.0	57.1	58.2
13	17:36	64.9	68.4	58.9	61.0	56.2	57.6
14	17:37	66.4	67.9	60.0	61.4	57.4	59.2
15	17:38	65.7	68.3	60.2	61.7	57.6	58.6
16	17:39	75.2*	85.2*	66.0	74.9	63.3	71.5
17	17:40	66.7	69.0	60.1	61.7	57.3	58.8
18	17:41	66.2	68.6	60.1	62.1	58.3	60.0
19	17:42	66.2	68.6	59.7	60.7	57.4	58.2
20	17:43	65.4	67.4	59.9	61.5	57.9	58.7

* Leq1min data point removed from data set due to leaf blower causing a substantial spike.

Ambient Noise Monitoring Site M32.7



Ambient Noise Monitoring Site M32.8



Ambient Noise Monitoring Site M32.9



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M33.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40 Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M33.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

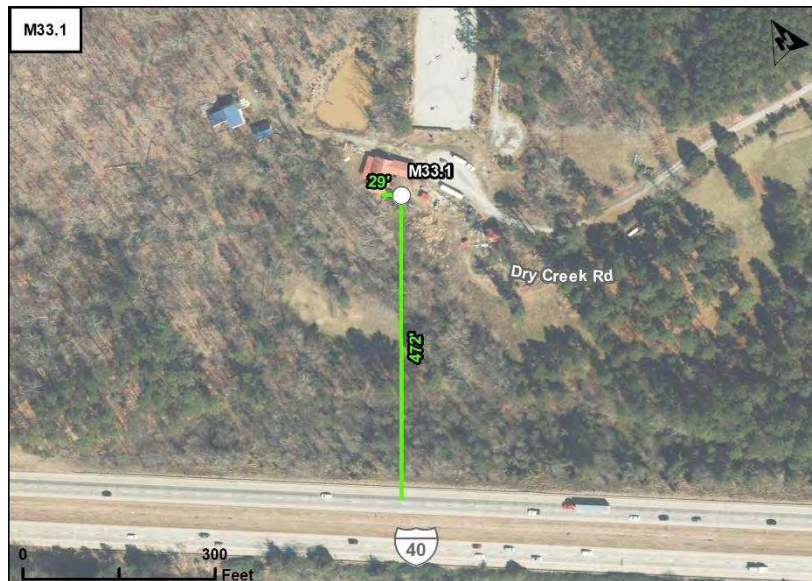
WEIGHTING (circle one)

A

Lin.

Location Description – M33.1- 4500 Dry Creek Rd

SITE SKETCH:



Start Time:
4:14 AM/PM

Duration:
20 minutes

Wind Speed: 10 mph

Wind Direction: SSW

Temperature: 58°F

Humidity: 35%

Site M33.1 Leq: 62.3 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	724	25	47	0	0	70
I-40 WB	689	31	54	0	0	70

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	16:14	61.5	65.7
2	16:15	62.0	63.7
3	16:16	62.3	64.1
4	16:17	61.1	63.3
5	16:18	62.5	64.4
6	16:19	60.7	61.8
7	16:20	61.3	63.0
8	16:21	61.6	62.6
9	16:22	61.9	64.5
10	16:23	67.9	76.7
11	16:24	60.7	63.0
12	16:25	60.6	63.7
13	16:26	61.9	67.3
14	16:27	60.9	63.1
15	16:28	62.8	65.5
16	16:29	61.8	64.5
17	16:30	62.2	64.1
18	16:31	62.0	65.1
19	16:32	61.2	63.2
20	16:33	62.3	64.5

Ambient Noise Monitoring Site M33.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M34.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, Erwin Rd Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M34.1 - Sound Level Meter	Larson Davis Model 831C	SN330808	11570
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M34.1- 411 Erwin Rd

SITE SKETCH:



Start Time:
3:19 AM/PM

Duration:
20 minutes

Wind Speed: 11 mph

Wind Direction: SW

Temperature: 58°F

Humidity: 35%

Site M34.1 Leq: 65.2 dB(A)
Calibration offset: 0.01 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	720	34	59	2	0	70
I-40 WB	810	38	48	0	0	70
Erwin Road NB	101	8	0	0	0	50
Erwin Road SB	141	11	2	0	0	50

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	15:19	65.2	67.3
2	15:20	65.2	68.2
3	15:21	65.0	66.6
4	15:22	64.5	66.1
5	15:23	64.8	67.7
6	15:24	64.4	66.2
7	15:25	65.5	67.7
8	15:26	65.0	66.2
9	15:27	65.5	67.6
10	15:28	66.1	68.9
11	15:29	64.6	67.5
12	15:30	64.5	69.6
13	15:31	64.6	66.0
14	15:32	66.0	67.8
15	15:33	66.4	70.1
16	15:34	65.2	67.0
17	15:35	64.8	67.1
18	15:36	64.8	66.1
19	15:37	65.6	68.9
20	15:38	66.5	68.7

Ambient Noise Monitoring Site M34.1



SHORT-TERM TRAFFIC NOISE MONITORING LOG SHEET

Reading: M35.1

Project Description: STIP Project No. I-3306A – I-40 Widening, Orange and Durham Counties

Noise Source: I-40, Erwin Rd Date: 01/19/2022

Personnel: Mukul Pal, Jackson Garvey, Kraemer Scott, Fiona Cardova, Jarvis Turner

Equipment	Type	Microphone	Serial #
M35.1 - Sound Level Meter	Larson Davis Model 831C	SN330807	11569
Calibrator	Larson Davis Cal200		4467

SLM SETTINGS (circle one)

FAST

SLOW

WEIGHTING (circle one)

A

Lin.

Location Description – M35.1- 390 Erwin Rd

SITE SKETCH:



Start Time:
3:19 AM/PM

Duration:
20 minutes

Wind Speed: 11 mph

Wind Direction: SW

Temperature: 58°F

Humidity: 35%

Site M35.1 Leq: 63.1 dB(A)
Calibration offset: 0.00 dB(A)

Direction	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Recorded Speed
I-40 EB	720	34	59	2	0	70
I-40 WB	810	38	48	0	0	70
Erwin Road NB	101	8	0	0	0	50
Erwin Road SB	141	11	2	0	0	50

LOG SHEET

#	1 Minute Period Starting	Measured Leq (dBA)	Lmax
1	15:19	63.9	68.3
2	15:20	63.1	66.4
3	15:21	62.5	65.8
4	15:22	62.6	66.9
5	15:23	63.0	65.6
6	15:24	63.4	66.2
7	15:25	62.9	66.2
8	15:26	62.2	64.8
9	15:27	64.1	66.5
10	15:28	63.5	67.0
11	15:29	60.1	64.6
12	15:30	63.5	68.2
13	15:31	62.6	65.8
14	15:32	63.1	65.3
15	15:33	64.9	70.8
16	15:34	63.4	65.5
17	15:35	62.6	65.4
18	15:36	63.0	66.4
19	15:37	63.4	66.0
20	15:38	61.9	64.7

Ambient Noise Monitoring Site M35.1



Calibration Certificate

Certificate Number 2021006850

Customer:

HDR Engineering Inc
1601 Utica Avenue South
St. Louis Park, MN 55416, United States

Model Number	PRM831	Procedure Number	D0001.8383
Serial Number	071151	Technician	Ashley Anderson
Test Results	Pass	Calibration Date	9 Jun 2021
Initial Condition	As Manufactured	Calibration Due	
Description	Larson Davis 1/2" Preamplifier for Model 831 Type 1	Temperature	23.72 °C ± 0.01 °C
		Humidity	51.6 %RH ± 0.5 %RH
		Static Pressure	86.07 kPa ± 0.03 kPa
Evaluation Method	Tested electrically using a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.		
Compliance Standards	Compliant to Manufacturer Specifications		

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Standards Used

Description	Cal Date	Cal Due	Cal Standard
Larson Davis Model 2900 Real Time Analyzer	03/05/2021	03/05/2022	003003
Hart Scientific 2626-H Temperature Probe	02/04/2021	08/04/2022	006767
Agilent 34401A DMM	07/07/2020	07/07/2021	007165
SRS DS360 Ultra Low Distortion Generator	08/19/2020	08/19/2021	007167

Calibration Certificate

Certificate Number 2021006857

Customer:

HDR Engineering Inc
1601 Utica Avenue South
St. Louis Park, MN 55416, United States

Model Number	PRM831	Procedure Number	D0001.8383
Serial Number	071152	Technician	Ashley Anderson
Test Results	Pass	Calibration Date	9 Jun 2021
Initial Condition	As Manufactured	Calibration Due	
Description	Larson Davis 1/2" Preamplifier for Model 831 Type 1	Temperature	23.74 °C ± 0.01 °C
		Humidity	52.8 %RH ± 0.5 %RH
		Static Pressure	85.99 kPa ± 0.03 kPa
Evaluation Method	Tested electrically using a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.		
Compliance Standards	Compliant to Manufacturer Specifications		

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Standards Used

Description	Cal Date	Cal Due	Cal Standard
Larson Davis Model 2900 Real Time Analyzer	03/05/2021	03/05/2022	003003
Hart Scientific 2626-H Temperature Probe	02/04/2021	08/04/2022	006767
Agilent 34401A DMM	07/07/2020	07/07/2021	007165
SRS DS360 Ultra Low Distortion Generator	08/19/2020	08/19/2021	007167

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Calibration Certificate

Certificate Number 2021006859

Customer:

HDR Engineering Inc
1601 Utica Avenue South
St. Louis Park, MN 55416, United States

Model Number	PRM831	Procedure Number	D0001.8383
Serial Number	071153	Technician	Ashley Anderson
Test Results	Pass	Calibration Date	9 Jun 2021
Initial Condition	As Manufactured	Calibration Due	
Description	Larson Davis 1/2" Preamplifier for Model 831 Type 1	Temperature	23.73 °C ± 0.01 °C
		Humidity	51.6 %RH ± 0.5 %RH
		Static Pressure	85.97 kPa ± 0.03 kPa
Evaluation Method	Tested electrically using a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.		
Compliance Standards	Compliant to Manufacturer Specifications		

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Standards Used

Description	Cal Date	Cal Due	Cal Standard
Larson Davis Model 2900 Real Time Analyzer	03/05/2021	03/05/2022	003003
Hart Scientific 2626-H Temperature Probe	02/04/2021	08/04/2022	006767
Agilent 34401A DMM	07/07/2020	07/07/2021	007165
SRS DS360 Ultra Low Distortion Generator	08/19/2020	08/19/2021	007167

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Calibration Certificate

Certificate Number 2021010034

Customer:

HDR Engineering Inc
1601 Utica Avenue South
St. Louis Park, MN 55416, United States

Model Number	CAL200	Procedure Number	D0001.8386
Serial Number	4467	Technician	Scott Montgomery
Test Results	Pass	Calibration Date	17 Aug 2021
Initial Condition	Adjusted	Calibration Due	17 Aug 2022
Description	Larson Davis CAL200 Acoustic Calibrator	Temperature	24 °C ± 0.3 °C
		Humidity	33 %RH ± 3 %RH
		Static Pressure	101.1 kPa ± 1 kPa

Evaluation Method The data is acquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. Test points marked with a † in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Standards Used

Description	Cal Date	Cal Due	Cal Standard
Larson Davis Model 2900 Real Time Analyzer	04/01/2021	04/01/2022	001051
Agilent 34401A DMM	03/02/2021	03/02/2022	002588
Microphone Calibration System	02/24/2021	02/24/2022	005446
1/2" Preamplifier	08/27/2020	08/27/2021	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	08/09/2021	08/09/2022	006507
1/2 inch Microphone - RI - 200V	09/24/2020	09/24/2021	006511
Hart Scientific 2626-H Temperature Probe	02/04/2021	08/04/2022	006767
Pressure Transducer	06/28/2021	06/28/2022	007310

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Initial Assessment

Certificate Number 2021010033

Customer:

HDR Engineering Inc
1601 Utica Avenue South
St. Louis Park, MN 55416, United States

Model Number	CAL200	Procedure Number	D0001.8386
Serial Number	4467	Technician	Scott Montgomery
Test Results	Pass	Calibration Date	17 Aug 2021
Initial Condition	As Received	Calibration Due	
Description	Larson Davis CAL200 Acoustic Calibrator	Temperature	24 °C ± 0.3 °C
		Humidity	33 %RH ± 3 %RH
		Static Pressure	101.3 kPa ± 1 kPa

Evaluation Method The data is acquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Standards Used

Description	Cal Date	Cal Due	Cal Standard
Larson Davis Model 2900 Real Time Analyzer	04/01/2021	04/01/2022	001051
Agilent 34401A DMM	03/02/2021	03/02/2022	002588
Microphone Calibration System	02/24/2021	02/24/2022	005446
1/2" Preampifier	08/27/2020	08/27/2021	006506
Larson Davis 1/2" Preampifier 7-pin LEMO	08/09/2021	08/09/2022	006507
1/2 inch Microphone - RI - 200V	09/24/2020	09/24/2021	006511
Hart Scientific 2626-H Temperature Probe	02/04/2021	08/04/2022	006767
Pressure Transducer	06/28/2021	06/28/2022	007310

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