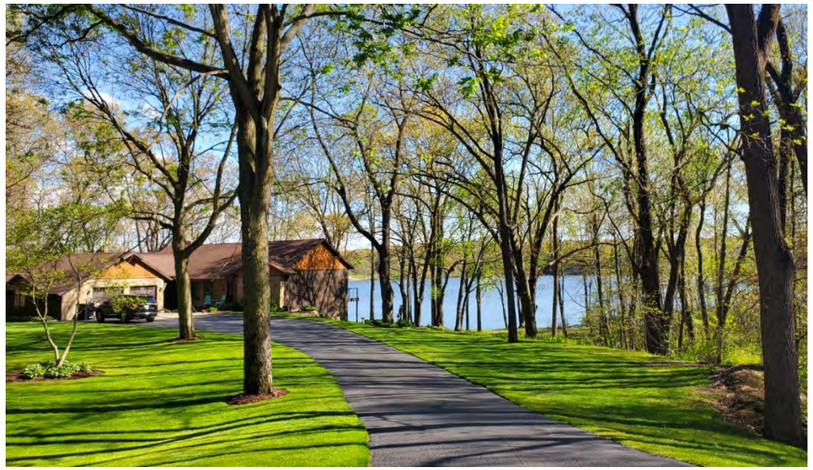
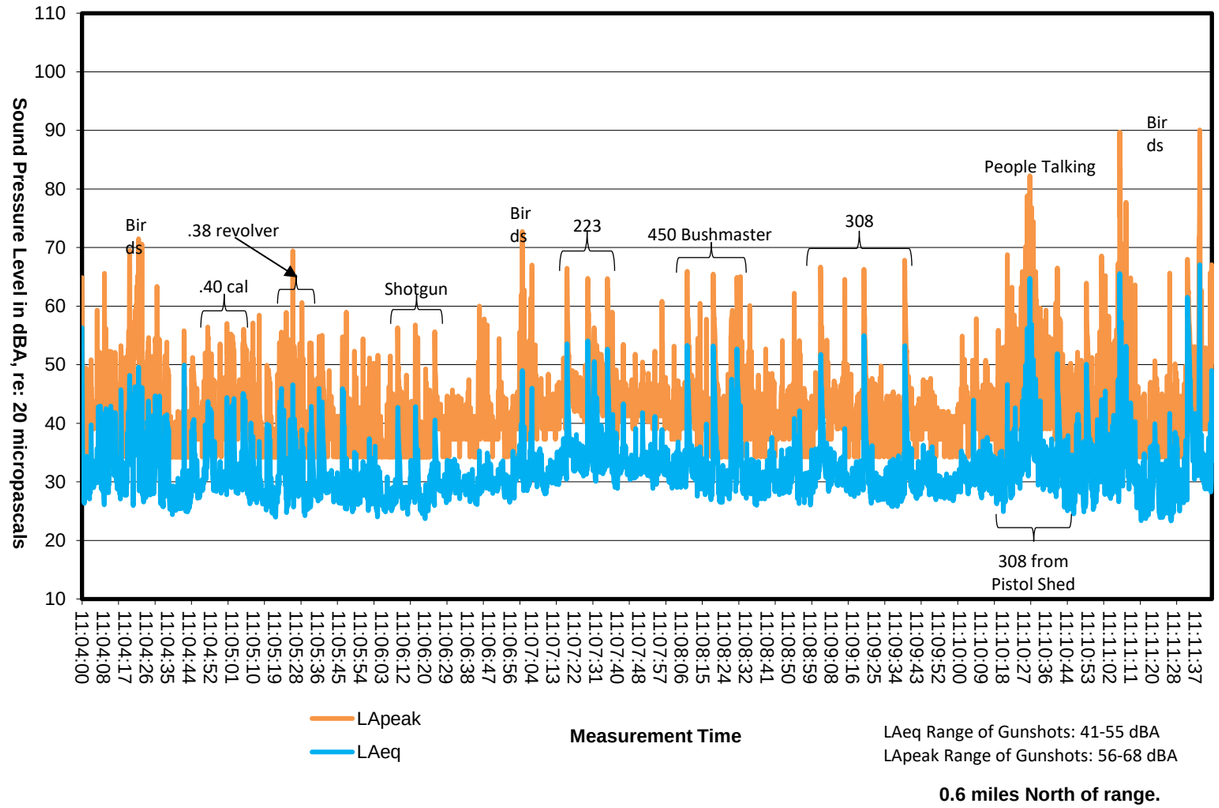


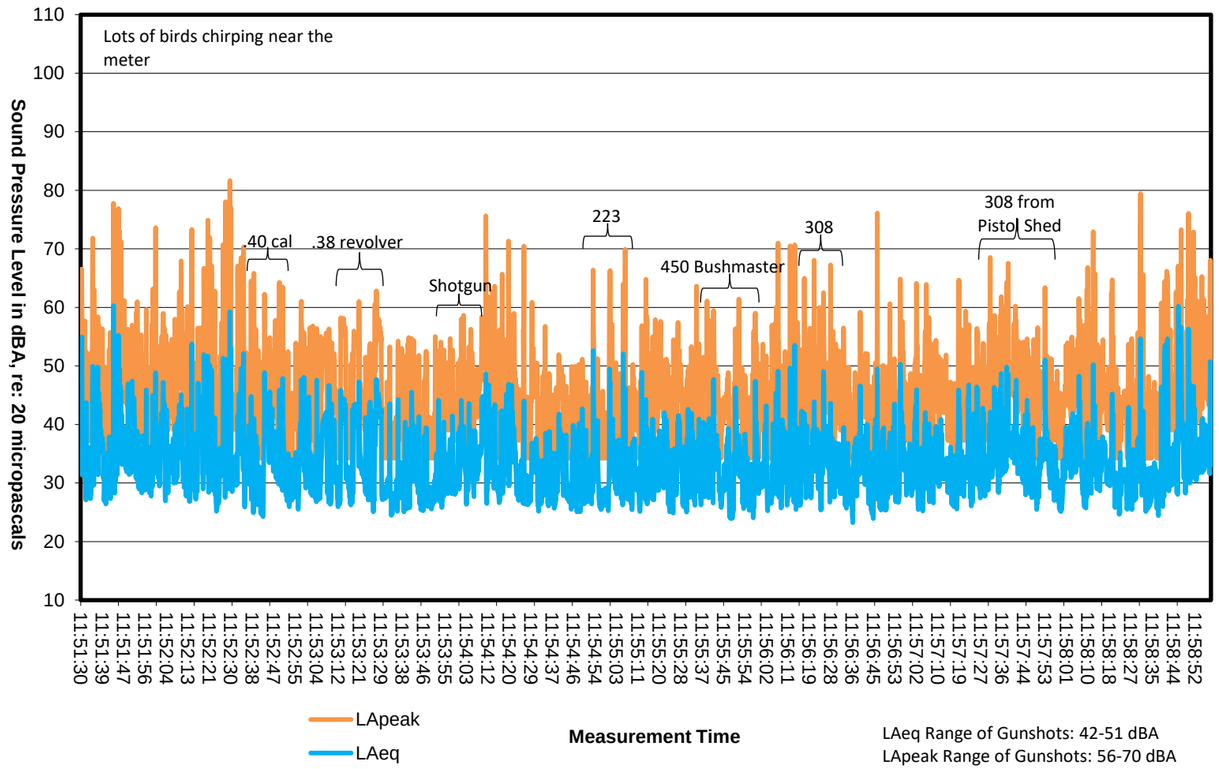
AS 1A approximately 0.59 miles north of the range at the cul-de-sac at 1838 118th Avenue.

ECHO POINT SHOOTING RANGE
Allegan, Michigan
May 13, 2021
File: EchoPt04_003
Measurement Location: AS1A | 0.6M North
Notes: Shots Audible



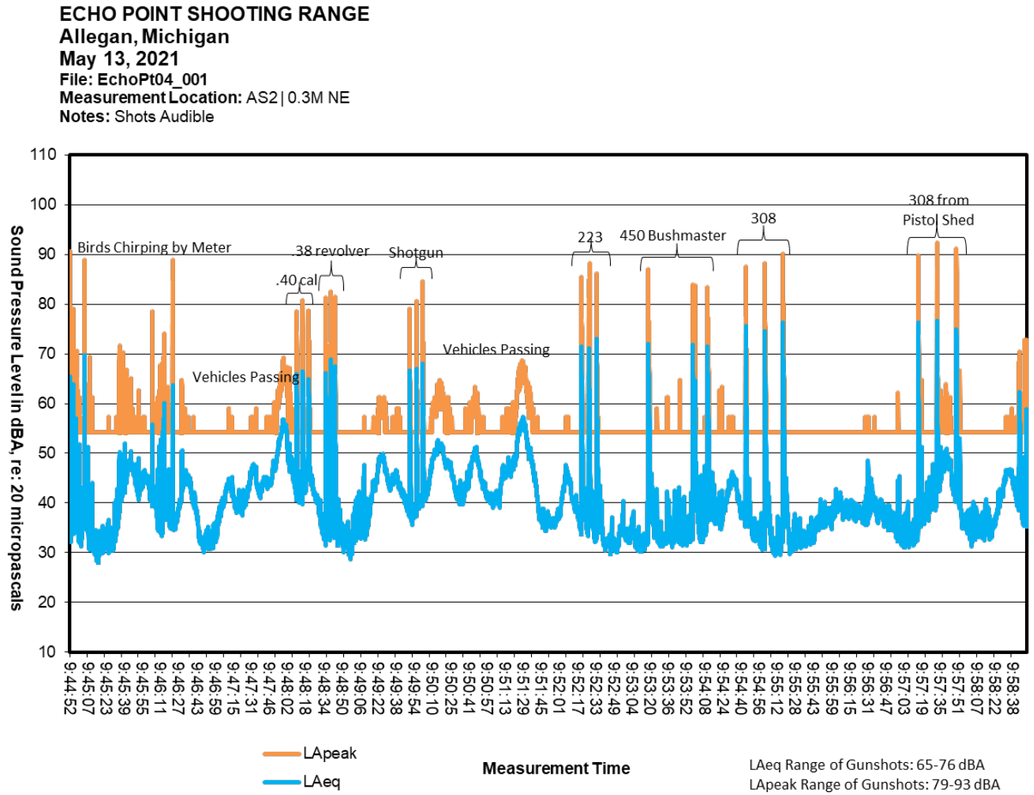
LAeq Range of Gunshots: 41-55 dBA
LApeak Range of Gunshots: 56-68 dBA

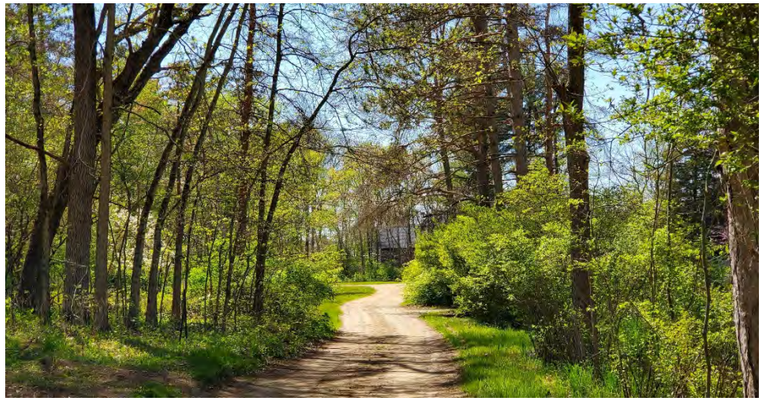
0.6 miles North of range.

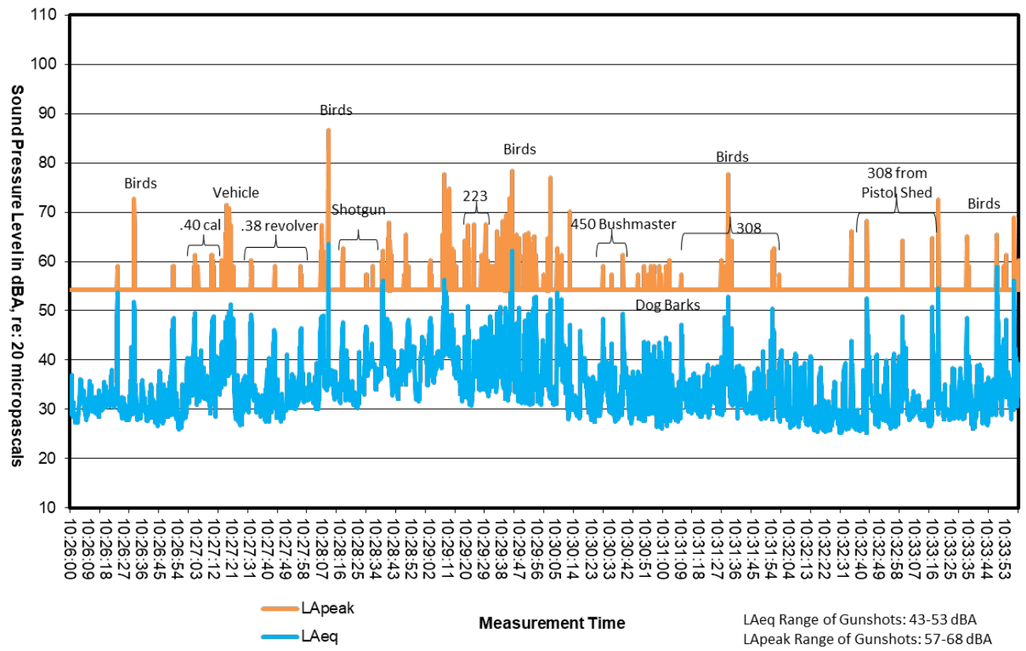


AS 1B approximately 0.65 miles north of the range at the in the parking lot of the residence at 118th Avenue on the north side of the street in the parking area in front of the studio.

AS 2 approximately 0.29 miles northeast of the range in the back yard of the residence at 3629 Bay View Drive.







AS 3 approximately 0.61 miles northeast of the range near the residential property at the west end of 3585 Shoreline Drive.

APPENDIX D: SUMMARY OF WEATHER CONDITIONS DURING THE ACOUSTICAL MESAUREMENTS MADE AT THE EXISTING RANGE SITE IN 2016 AND 2021

Table D-1. Summary table of weather conditions at the existing range site during the field measurements in 2016 and 2021.

Date	Time	Temperature (°F)	Barometric Pressure (inches of mercury)	Relative Humidity %	Wind Speed (mph)
2016					
09/28/16	9:41 am	62	29.15	57%	1 to 2
09/28/16	10:38 am	62	29.15	57%	1 to 2
09/28/16	11:14 am	61	29.19	69%	0 to 1.5
2021					
05/16/21	9:36 am	57	29.73	31%	1 to 2
05/16/21	10:05 am	59	29.74	39%	0 to 2.7
05/16/21	10:35 am	61	29.73	31%	0 to 2.7
05/16/21	11:22 am	61	29.70	20%	0 to 1.6
05/16/21	12:03 pm	63	29.71	27%	0 to 2.7

APPENDIX E: SUMMARY OF WEAPONS DATA USED IN THE COMPUTER MODEL STUDIES

Weapons used on the proposed 25-yard and 100-yard ranges

.223 Rifle
12-gauge Shotgun
.44 Handgun

Octave Band Sound Exposure Level Data for M-16 with .223 Rem. 55gr. power-locked hollow point rounds at a distance of 13 ft (4 meters)

Receiver Direction Relative to Direction of Gunfire	Octave Band Sound Exposure Level in dB					
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Front	109	118	121	121	118	115
Front/Side[1]	106	114	117	117	115	112
Side	103	109	112	113	112	109
Rear/Side[2]	100	106	109	110	110	107
Rear[4]	96	102	105	107	108	104

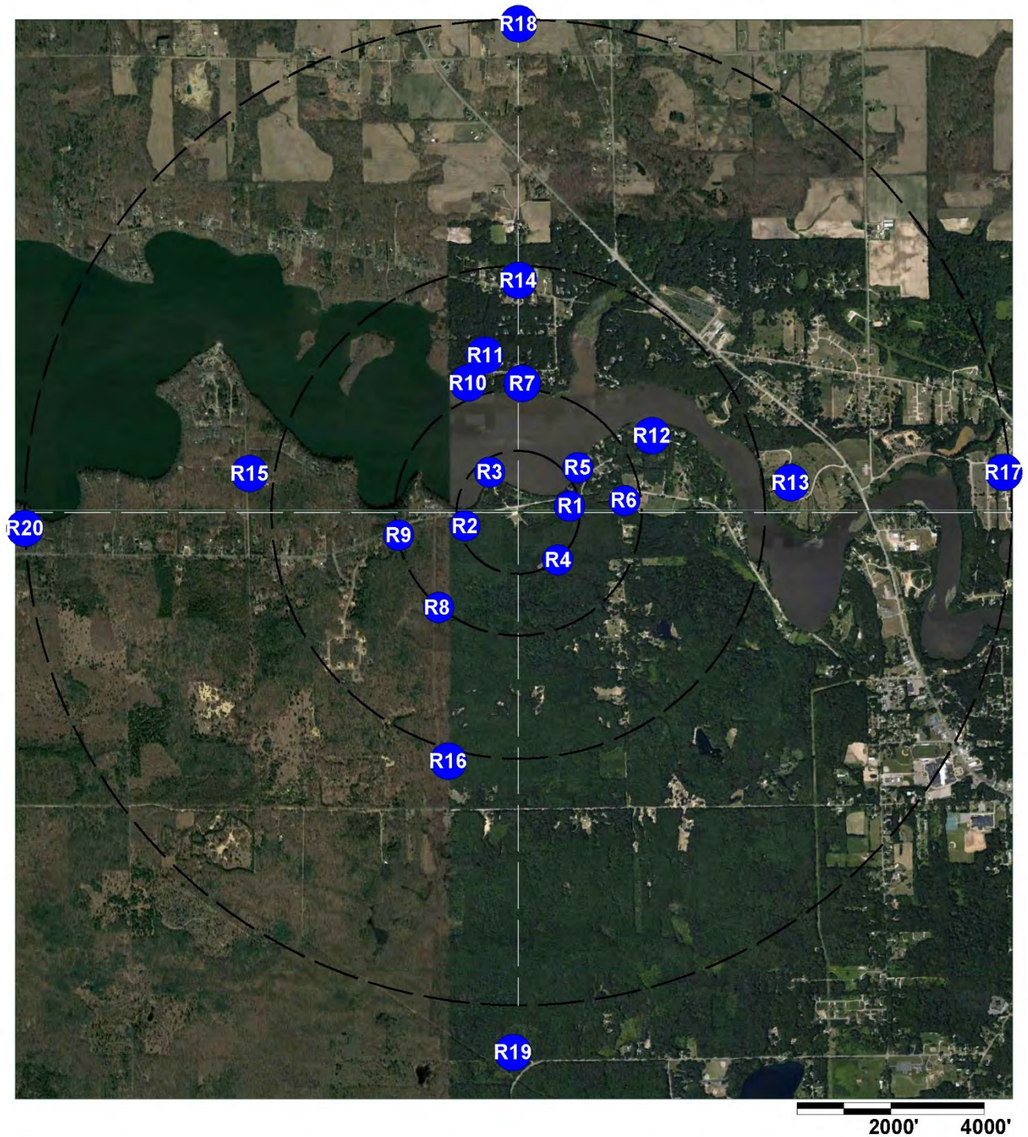
Octave Band Sound Exposure Level Data for a 12-gauge shotgun at a distance of 13 ft (4 meters)

Receiver Direction Relative to Direction of Gunfire	Octave Band Sound Exposure Level in dB					
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Front	111	118	119	119	116	112
Front/Side[2]	106	113	114	114	112	110
Side	101	108	109	109	109	107

Octave Band Sound Exposure Level Data for a .44 Remington Magnum with a 200 gr. hollow point hunting load ammunition at a distance of 13 ft (4 meters)

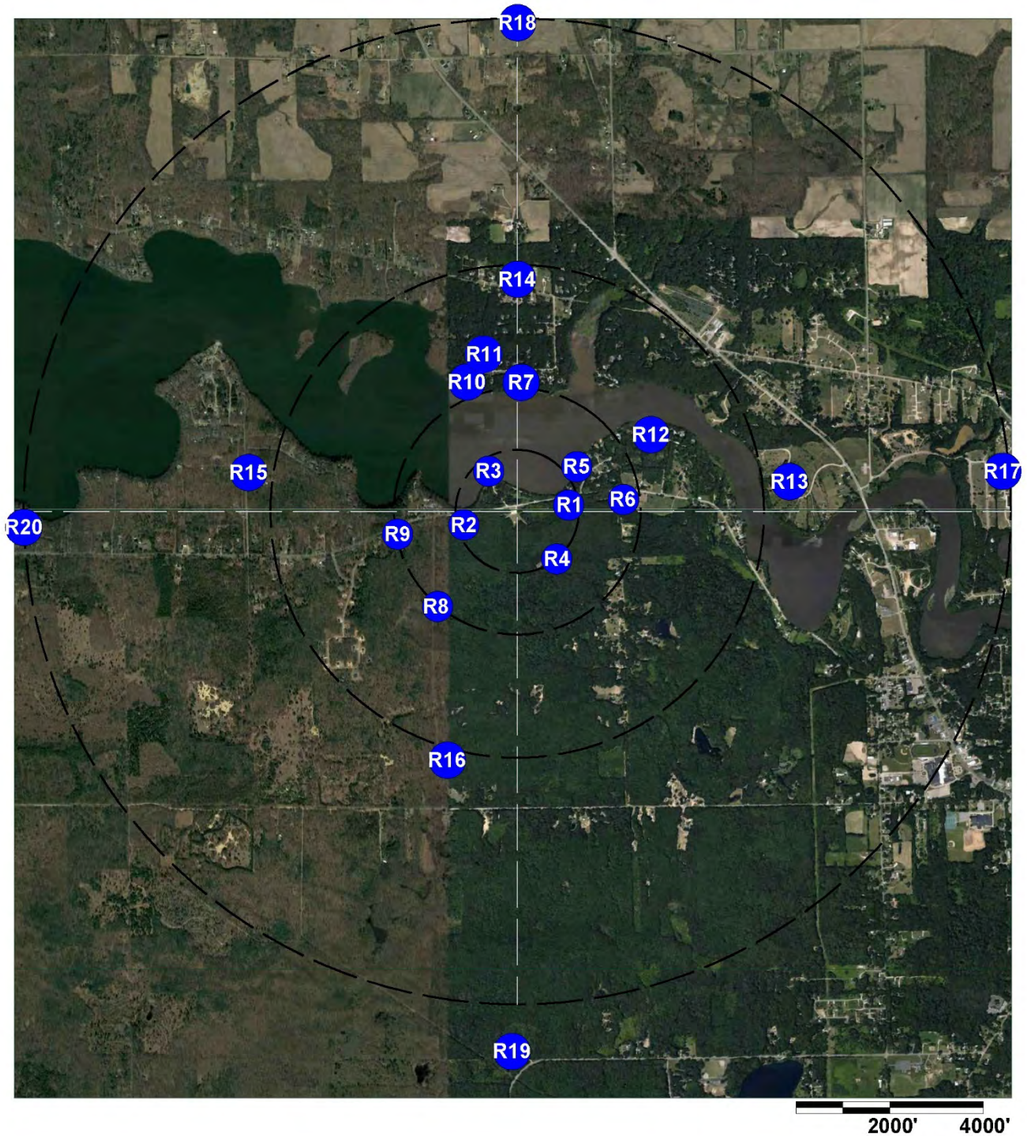
Receiver Direction Relative to Direction of Gunfire	Octave Band Sound Exposure Level in dB					
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Front	111	118	118	119	117	114
Front/Side[1]	108	114	116	117	115	112
Side	104	111	114	115	113	109
Rear/Side[2]	104	109	112	113	112	109
Rear[4]	104	107	110	111	111	108

Notes:
1. Sound levels were interpolated between the Front and Side conditions.
2. Sound levels were interpolated between the Rear and Side conditions.



RECEIVERS		COMPUTER MODEL SCENARIOS (Estimated Insertion Loss Relative to the Range from 2016)									ORIENTATION RELATIVE TO D.O.F
		2016	A	B	C	D	E	F	G	H	
1	0.20 mi ENE - 2M - old/new	0	-3	-4	-5	-13	-15	-14	-14	-18	SIDE-REAR
2	0.25 mi W - 4M - old/new	0	-12	-14	-14	-14	-14	-14	-14	-15	SIDE-FRONT
3	0.25 mi NNW - 1M - old/new	0	-1	-1	-1	-5	-7	-6	-8	-10	SIDE-REAR
4	0.25 mi SE - 2T old/new	0	-17	-19	-19	-19	-19	-19	-19	-19	SIDE-FRONT
5	0.29 mi - NNE - AS2	0	2	2	2	1	-2	2	-5	-10	REAR
6	0.43 mi ENE - 6M - old/new	0	-9	-10	-10	-10	-10	-10	-13	-14	SIDE
7	0.50 mi N - 5M - old/new	0	0	0	0	-5	-8	-5	-10	-16	REAR
8	0.50 mi SW – 7T - old/new	0	-8	-5	-5	-5	-5	-5	-8	-8	FRONT
9	0.51 mi W - 8M - old/new	0	-12	-14	-14	-14	-14	-14	-12	-15	FRONT-SIDE
10	1.60 mi NNW - AS1A - new	0	1	1	1	-1	-3	-3	-5	-10	REAR
11	1.60 mi N - AS1B - new	0	0	0	0	-4	-6	-4	-9	-13	REAR
12	0.62 mi NNE - AS3	0	0	0	0	0	0	0	-4	-7	SIDE-REAR
13	1.00 mi E - 11M - old/new	0	-15	-15	-15	-15	-15	-15	-15	-15	SIDE
14	1.00 mi N - 10M - old/new	0	-4	-4	-4	-4	-5	-4	-6	-11	REAR
15	1.10 mi W -14M - old/new	0	-13	-13	-13	-13	-14	-14	-13	-14	SIDE-REAR
16	1.10 mi SSW - 13M New - old/new	0	-1	-1	-1	-1	-1	-1	-1	-1	FRONT
17	2.00 mi E - 16M - old/new	0	-13	-13	-13	-13	-13	-13	-13	-14	SIDE
18	2.00 mi N - 15M - old/new	0	0	0	0	-1	-4	-2	-7	-10	REAR
19	2.00 mi S - 17M - old/new	0	-6	-6	-6	-6	-6	-6	-6	-6	FRONT
20	2.00 mi W - 18M - old/new	0	-10	-10	-10	-10	-11	-11	-10	-11	SIDE
		Firing Range in its Original Configuration in 2016	**Model A:** Firing range with initial phase of noise mitigation	**Model B:** Extend side berms; add 10 ft. tall wall above berms	**Model C:** Model B w/extended berm within property line	**Model D:** Model C; 10 ft. wall rear wall across facility	**Model E:** Model C; 20 ft. tall rear wall across facility	**Model F:** Site entry relocated; 20 ft. tall walls above side [illegible]	**Model G:** Model A and 14 ft. tall shed rear walls	**Model H:** Model F and 14 ft. tall shed rear walls	

Figure 1. Summary of resulting insertion loss values for the range prior to any renovations in 2016, and various noise mitigation scenarios



RECEIVERS		COMPUTER MODEL SCENARIOS (Estimated Insertion Loss Relative to the Range with Initial Phase of Noise Mitigation - Model A)								ORIENTATION RELATIVE TO D.O.F
		A	B	C	D	E	F	G	H	
1	0.20 mi ENE - 2M - old/new	0	-1	-1	-10	-12	-11	-10	-14	SIDE-REAR
2	0.25 mi W - 4M - old/new	0	-1	-1	-1	-2	-2	-2	-2	SIDE-FRONT
3	0.25 mi NNW - 1M - old/new	0	0	0	-5	-7	-5	-8	-10	SIDE-REAR
4	0.25 mi SE - 2T old/new	0	-2	-2	-2	-2	-2	-2	-2	SIDE-FRONT
5	0.29 mi - NNE - AS2	0	0	0	-1	-4	0	-7	-12	REAR
6	0.43 mi ENE - 6M - old/new	0	-1	-1	-1	-1	-1	-4	-4	SIDE
7	0.50 mi N - 5M - old/new	0	0	0	-5	-8	-5	-10	-16	REAR
8	0.50 mi SW – 7T - old/new	0	2	2	2	2	2	0	0	FRONT
9	0.51 mi W - 8M - old/new	0	-2	-2	-2	-2	-2	-1	-3	FRONT-SIDE
10	1.60 mi NNW - AS1A - new	0	0	0	-2	-4	-4	-6	-11	REAR
11	1.60 mi N - AS1B - new	0	0	0	-4	-6	-4	-9	-13	REAR
12	0.62 mi NNE - AS3	0	0	0	0	0	0	-4	-8	SIDE-REAR
13	1.00 mi E - 11M - old/new	0	0	0	0	0	0	0	0	SIDE
14	1.00 mi N - 10M - old/new	0	0	0	0	-1	0	-2	-7	REAR
15	1.10 mi W -14M - old/new	0	0	0	0	-1	-1	0	-1	SIDE-REAR
16	1.10 mi SSW - 13M New - old/new	0	0	0	0	0	0	0	0	FRONT
17	2.00 mi E - 16M - old/new	0	0	0	0	0	0	0	0	SIDE
18	2.00 mi N - 15M - old/new	0	0	0	-1	-4	-2	-7	-10	REAR
19	2.00 mi S - 17M - old/new	0	0	0	0	0	0	0	0	FRONT
20	2.00 mi W - 18M - old/new	0	0	0	0	-1	-1	0	-2	SIDE

Model A: Firing range with initial phase of noise mitigation

Model B: Extend side berms; add 10 ft. tall wall above berms

Model C: Model B w/extended berm within property line

Model D: Model C; 10 ft. wall rear wall across facility

Model E: Model C; 20 ft. tall rear wall across facility

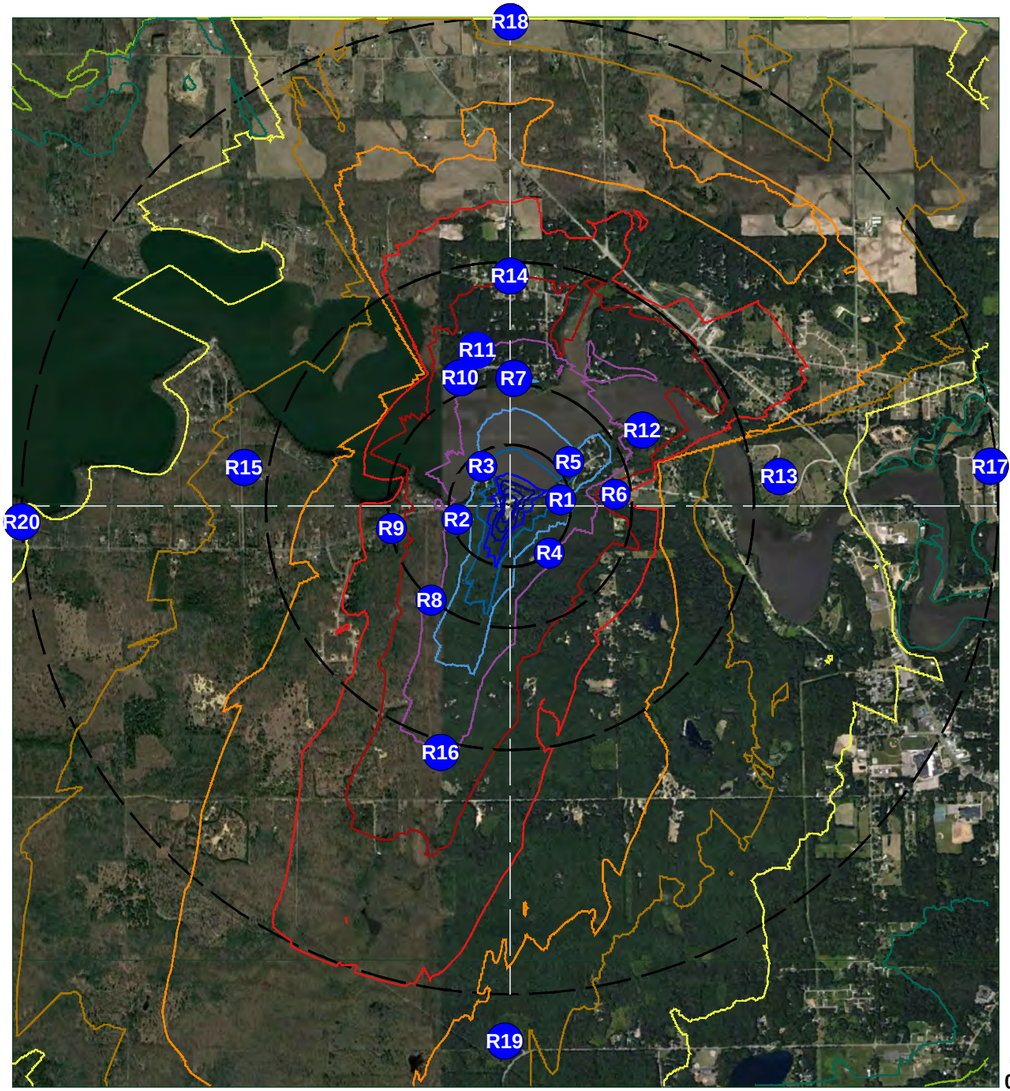
Model F: Site entry relocated; 20 ft. tall walls above side berms; 20 ft. rear walls

Model G: Model A and 14 ft. tall shed rear walls

Model H: Model F and 14 ft. tall shed rear walls

Figure 2. Summary of resulting insertion loss values for the current firing range with the initial phase of noise mitigation and various noise mitigation scenarios

NOISE CONTOUR MAP



NOISE CONTOUR LEVELS

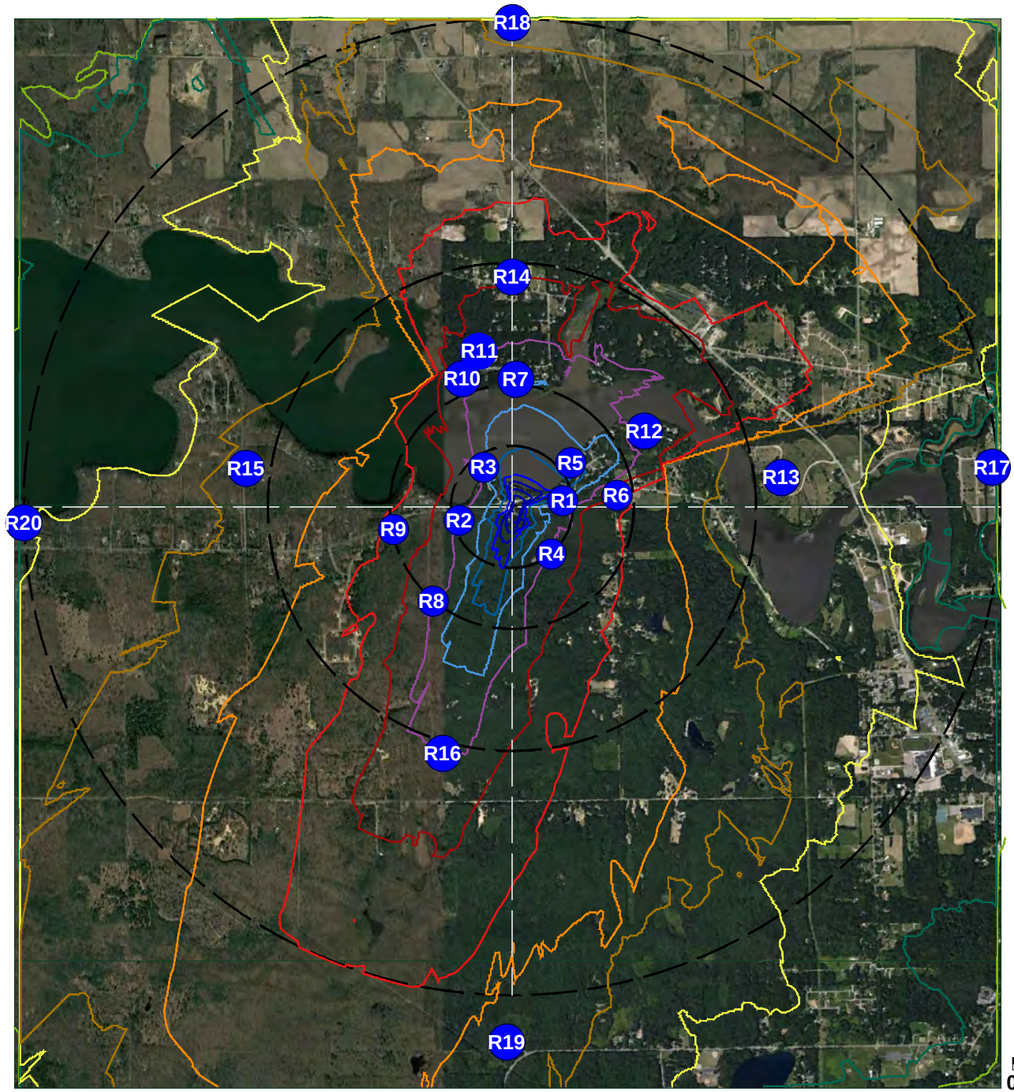
90 dBA	60 dBA
85 dBA	55 dBA
80 dBA	50 dBA
75 dBA	45 dBA
70 dBA	40 dBA
65 dBA	35 dBA

MODEL A: 15' tall side berms and sheds

NOISE SENSITIVE RECEIVERS		ESTIMATED INSERTION LOSS RANGE YR. 2016
R1	0.20 mi ENE - 2M - old/new	-3
R2	0.25 mi W - 4M - old/new	-12
R3	0.25 mi NNW - 1M - old/new	-1
R4	0.25 mi SE - 2T old/new	-17
R5	0.29 mi - NNE - AS2	+2
R6	0.43 mi ENE - 6M - old/new	-9
R7	0.50 mi N - 5M - old/new	0
R8	0.50 mi SW - 7T - old/new	-8
R9	0.51 mi W - 8M - old/new	-12
R10	1.60 mi NNW - AS1A - new	+1
R11	1.60 mi N - AS1B - new	0
R12	0.62 mi NNE - AS3	0
R13	1.00 mi E - 11M - old/new	-15
R14	1.00 mi N - 10M - old/new	-4
R15	1.10 mi W -14M - old/new	-13
R16	1.10 mi SSW - 13M New - old/new	-1
R17	2.00 mi E - 16M - old/new	-13
R18	2.00 mi N - 15M - old/new	0
R19	2.00 mi S - 17M - old/new	-6
R20	2.00 mi W - 18M - old/new	-10

Figure 3. Aerial map showing the resulting noise contours from the existing firing range | Model A

NOISE CONTOUR MAP



NOISE CONTOUR LEVELS

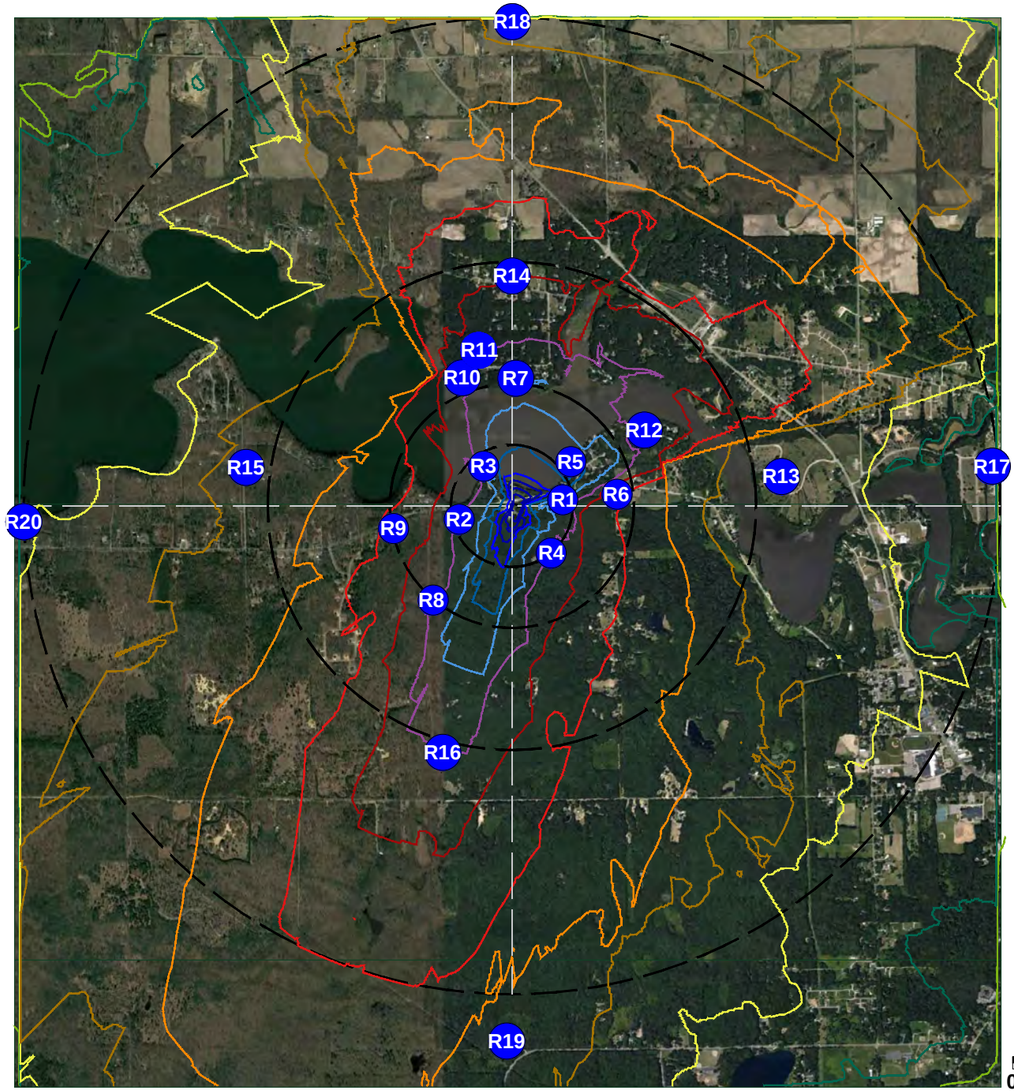
90 dBA	60 dBA
85 dBA	55 dBA
80 dBA	50 dBA
75 dBA	45 dBA
70 dBA	40 dBA
65 dBA	35 dBA

MODEL B: extend side bermon east side of range; add 10' tall wall above berms

NOISE SENSITIVE RECEIVERS		ESTIMATED INSERTION LOSS RANGE YR. 2016	ESTIMATED INSERTION LOSS CURRENT RANGE YR. 2021
R1	0.20 mi ENE - 2M - old/new	-4	-1
R2	0.25 mi W - 4M - old/new	-14	-1
R3	0.25 mi NNW - 1M - old/new	-1	0
R4	0.25 mi SE - 2T old/new	-19	-2
R5	0.29 mi - NNE - AS2	+2	0
R6	0.43 mi ENE - 6M - old/new	-10	-1
R7	0.50 mi N - 5M - old/new	0	0
R8	0.50 mi SW - 7T - old/new	-5	+2
R9	0.51 mi W - 8M - old/new	-14	-2
R10	1.60 mi NNW - AS1A - new	+1	0
R11	1.60 mi N - AS1B - new	0	0
R12	0.62 mi NNE - AS3	0	0
R13	1.00 mi E - 11M - old/new	-15	0
R14	1.00 mi N - 10M - old/new	-4	0
R15	1.10 mi W -14M - old/new	-13	0
R16	1.10 mi SSW - 13M New - old/new	-1	0
R17	2.00 mi E - 16M - old/new	-13	0
R18	2.00 mi N - 15M - old/new	0	0
R19	2.00 mi S - 17M - old/new	-6	0
R20	2.00 mi W - 18M - old/new	-10	0

Figure 4. Aerial map showing the resulting noise contours from the existing firing range | Model B

NOISE CONTOUR MAP



NOISE CONTOUR LEVELS

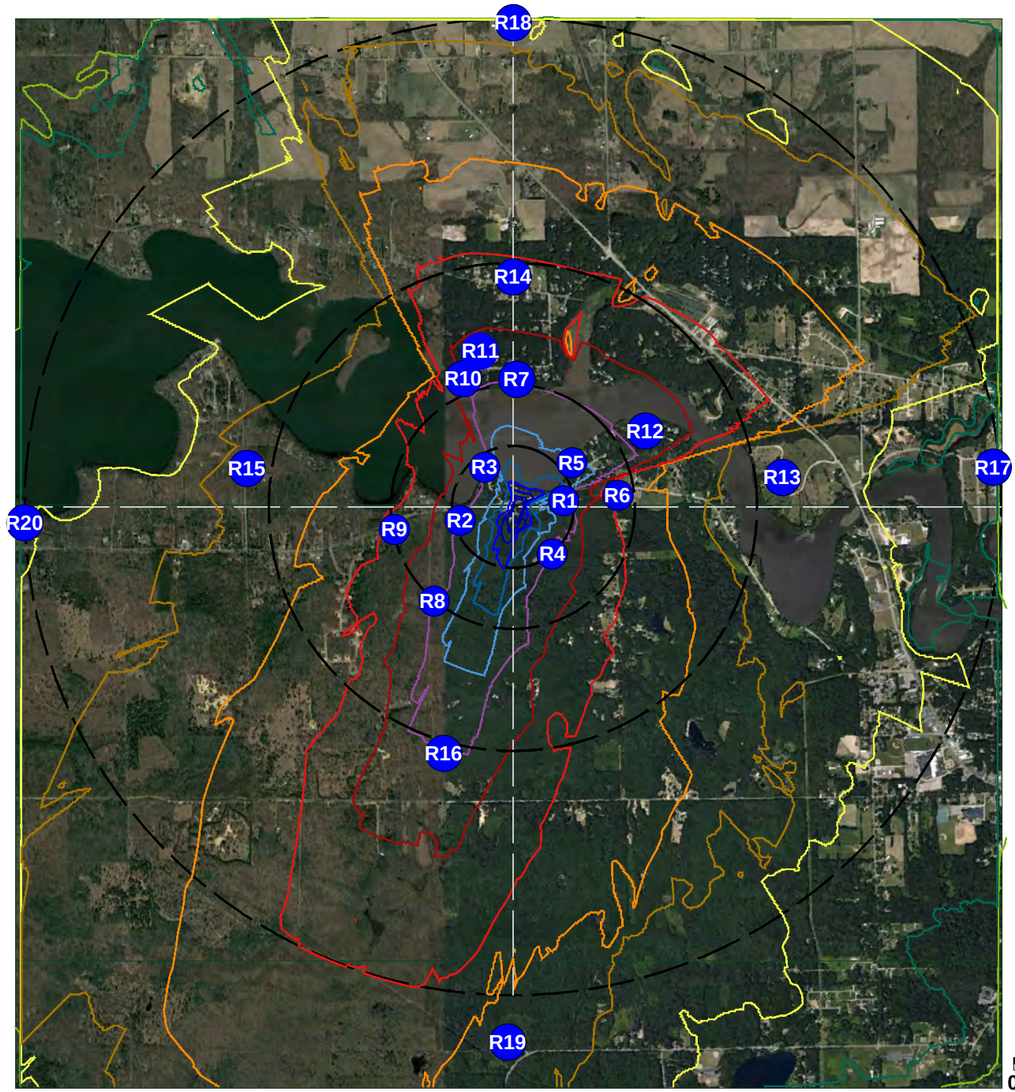
90 dBA	60 dBA
85 dBA	55 dBA
80 dBA	50 dBA
75 dBA	45 dBA
70 dBA	40 dBA
65 dBA	35 dBA

MODEL C: Model B with extended berm on the east side of the range to be within property line

NOISE SENSITIVE RECEIVERS		ESTIMATED INSERTION LOSS EXISTING RANGE YR. 2016	ESTIMATED INSERTION LOSS CURRENT RANGE YR. 2021
R1	0.20 mi ENE - 2M - old/new	-5	-1
R2	0.25 mi W - 4M - old/new	-14	-1
R3	0.25 mi NNW - 1M - old/new	-1	0
R4	0.25 mi SE - 2T old/new	-19	-2
R5	0.29 mi - NNE - AS2	+2	0
R6	0.43 mi ENE - 6M - old/new	-10	-1
R7	0.50 mi N - 5M - old/new	0	0
R8	0.50 mi SW - 7T - old/new	-5	+2
R9	0.51 mi W - 8M - old/new	-14	-2
R10	1.60 mi NNW - AS1A - new	+1	0
R11	1.60 mi N - AS1B - new	0	0
R12	0.62 mi NNE - AS3	0	0
R13	1.00 mi E - 11M - old/new	-15	0
R14	1.00 mi N - 10M - old/new	-4	0
R15	1.10 mi W -14M - old/new	-13	0
R16	1.10 mi SSW - 13M New - old/new	-1	0
R17	2.00 mi E - 16M - old/new	-13	0
R18	2.00 mi N - 15M - old/new	0	0
R19	2.00 mi S - 17M - old/new	-6	0
R20	2.00 mi W - 18M - old/new	-10	0

Figure 5. Aerial map showing the resulting noise contours from the existing firing range | Model C

NOISE CONTOUR MAP



NOISE CONTOUR LEVELS

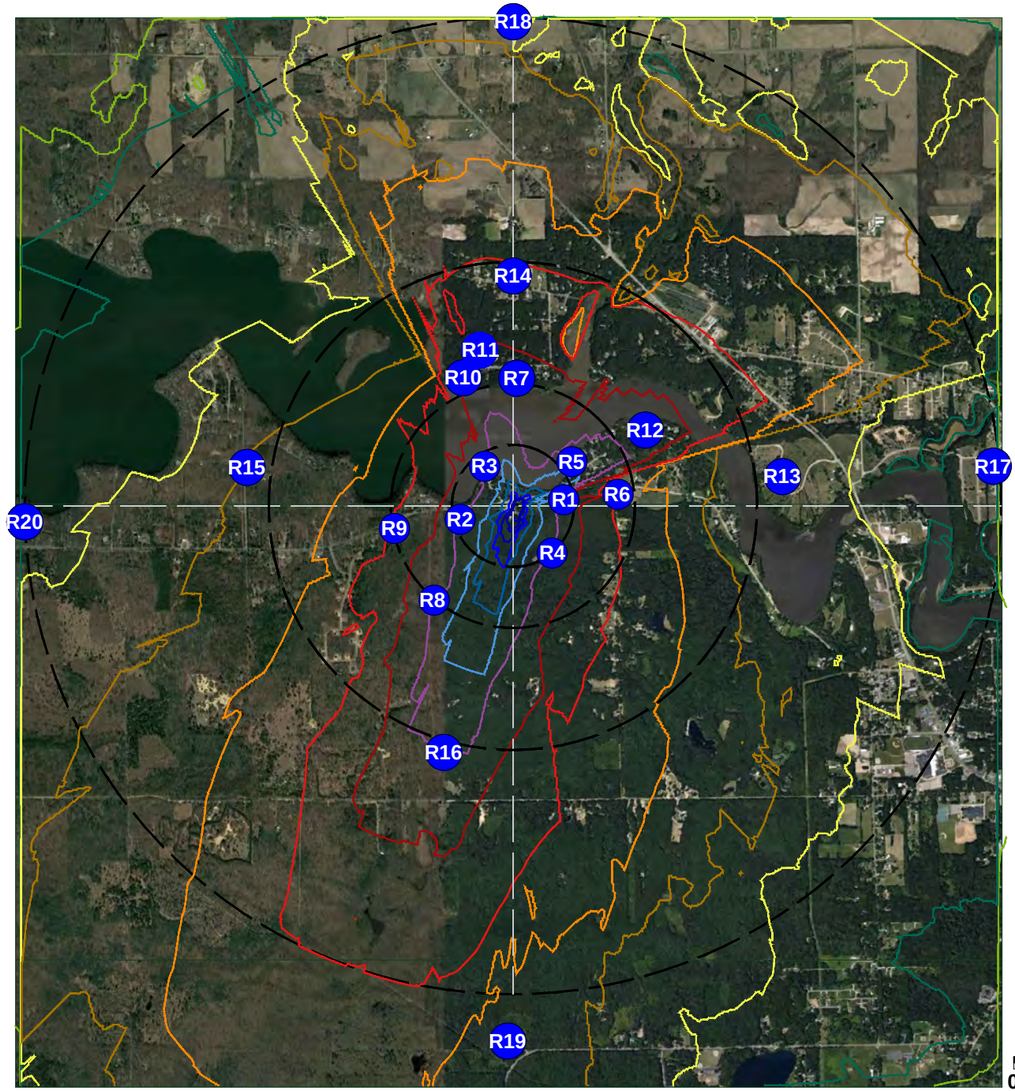
90 dBA	60 dBA
85 dBA	55 dBA
80 dBA	50 dBA
75 dBA	45 dBA
70 dBA	40 dBA
65 dBA	35 dBA

MODEL D: Model C and 10 ft. tall rear wall across facility

NOISE SENSITIVE RECEIVERS		ESTIMATED INSERTION LOSS* EXISTING RANGE YR. 2016	ESTIMATED INSERTION LOSS* CURRENT RANGE YR. 2021
R1	0.20 mi ENE - 2M - old/new	-13	-10
R2	0.25 mi W - 4M - old/new	-14	-1
R3	0.25 mi NNW - 1M - old/new	-5	-5
R4	0.25 mi SE - 2T old/new	-19	-2
R5	0.29 mi - NNE - AS2	+1	-1
R6	0.43 mi ENE - 6M - old/new	-10	-1
R7	0.50 mi N - 5M - old/new	-5	-5
R8	0.50 mi SW - 7T - old/new	-5	+2
R9	0.51 mi W - 8M - old/new	-14	-2
R10	1.60 mi NNW - AS1A - new	-1	-2
R11	1.60 mi N - AS1B - new	-4	-4
R12	0.62 mi NNE - AS3	0	0
R13	1.00 mi E - 11M - old/new	-15	0
R14	1.00 mi N - 10M - old/new	-4	0
R15	1.10 mi W -14M - old/new	-13	0
R16	1.10 mi SSW - 13M New - old/new	-1	0
R17	2.00 mi E - 16M - old/new	-13	0
R18	2.00 mi N - 15M - old/new	-1	-1
R19	2.00 mi S - 17M - old/new	-6	0
R20	2.00 mi W - 18M - old/new	-10	0

Figure 6. Aerial map showing the resulting noise contours from the existing firing range | Model D

NOISE CONTOUR MAP



NOISE CONTOUR LEVELS

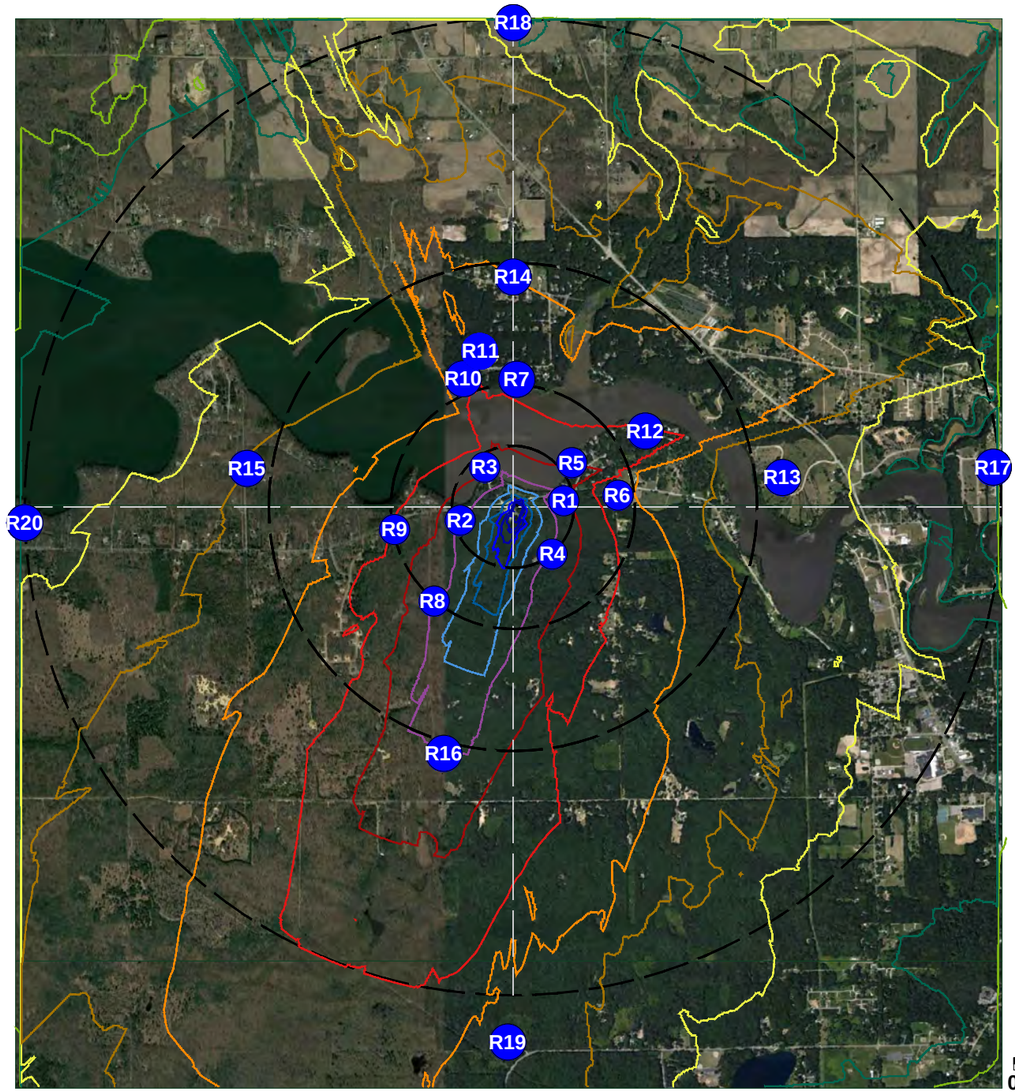
90 dBA	60 dBA
85 dBA	55 dBA
80 dBA	50 dBA
75 dBA	45 dBA
70 dBA	40 dBA
65 dBA	35 dBA

MODEL E: Model C and 20 ft. tall rear wall across facility

NOISE SENSITIVE RECEIVERS		ESTIMATED INSERTION LOSS* EXISTING RANGE YR. 2016	ESTIMATED INSERTION LOSS* CURRENT RANGE YR. 2021
R1	0.20 mi ENE - 2M - old/new	-15	-12
R2	0.25 mi W - 4M - old/new	-14	-2
R3	0.25 mi NNW - 1M - old/new	-7	-7
R4	0.25 mi SE - 2T old/new	-19	-2
R5	0.29 mi - NNE - AS2	-2	-4
R6	0.43 mi ENE - 6M - old/new	-10	-1
R7	0.50 mi N - 5M - old/new	-8	-8
R8	0.50 mi SW - 7T - old/new	-5	+2
R9	0.51 mi W - 8M - old/new	-14	-2
R10	1.60 mi NNW - AS1A - new	-3	-4
R11	1.60 mi N - AS1B - new	-6	-6
R12	0.62 mi NNE - AS3	0	0
R13	1.00 mi E - 11M - old/new	-15	0
R14	1.00 mi N - 10M - old/new	-5	-1
R15	1.10 mi W -14M - old/new	-14	-1
R16	1.10 mi SSW - 13M New - old/new	-1	0
R17	2.00 mi E - 16M - old/new	-13	0
R18	2.00 mi N - 15M - old/new	-4	-4
R19	2.00 mi S - 17M - old/new	-6	0
R20	2.00 mi W - 18M - old/new	-11	-1

Figure 7. Aerial map showing the resulting noise contours from the existing firing range | Model E

NOISE CONTOUR MAP



NOISE CONTOUR LEVELS

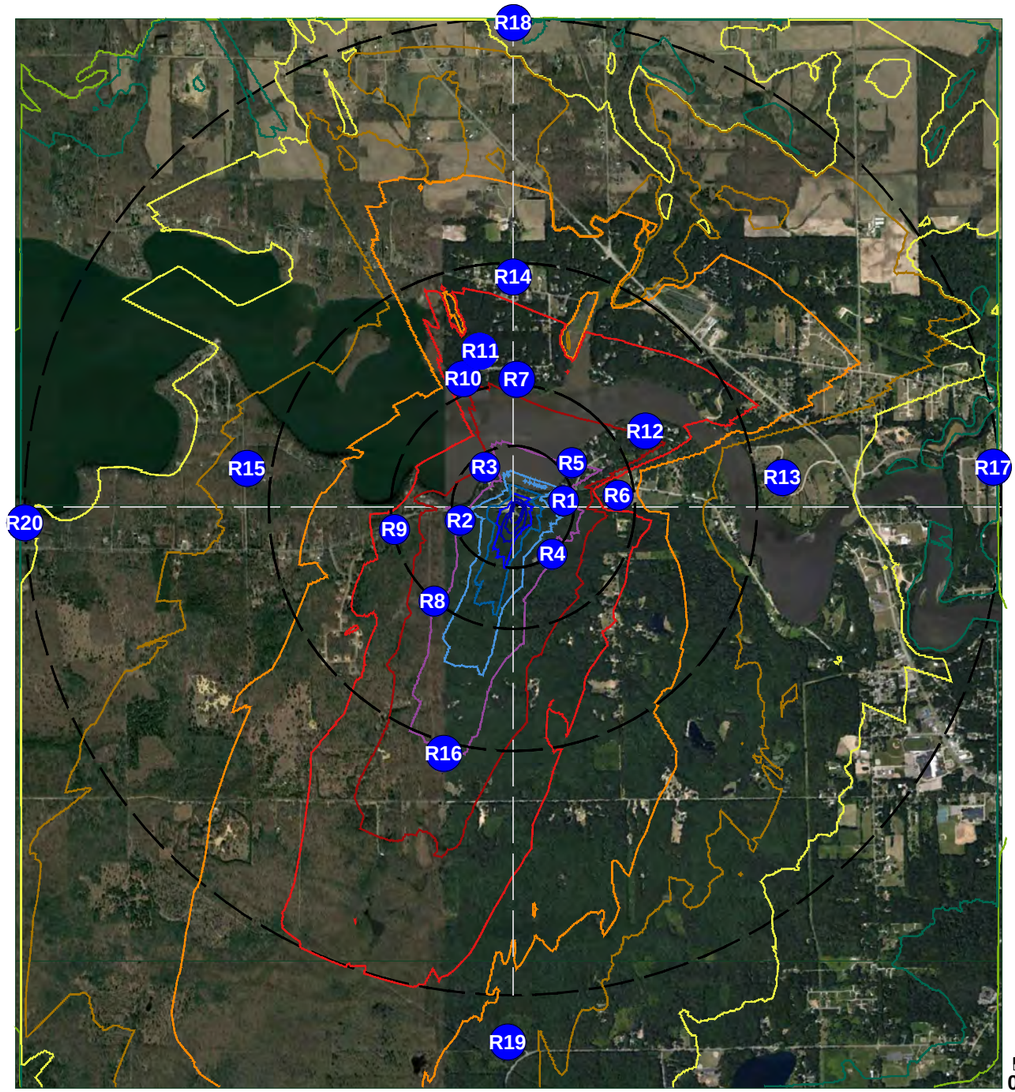
90 dBA	60 dBA
85 dBA	55 dBA
80 dBA	50 dBA
75 dBA	45 dBA
70 dBA	40 dBA
65 dBA	35 dBA

MODEL F: Entry to site relocated to the northeast; side berms extended; 20 ft. tall rear walls behind range, and 20 ft. tall walls above side berms

NOISE SENSITIVE RECEIVERS		ESTIMATED INSERTION LOSS* EXISTING RANGE YR. 2016	ESTIMATED INSERTION LOSS* CURRENT RANGE YR. 2021
R1	0.20 mi ENE - 2M - old/new	-14	-11
R2	0.25 mi W - 4M - old/new	-14	-2
R3	0.25 mi NNW - 1M - old/new	-6	-5
R4	0.25 mi SE - 2T old/new	-19	-2
R5	0.29 mi - NNE - AS2	+2	0
R6	0.43 mi ENE - 6M - old/new	-10	-1
R7	0.50 mi N - 5M - old/new	-5	-5
R8	0.50 mi SW - 7T - old/new	-5	+2
R9	0.51 mi W - 8M - old/new	-14	-2
R10	1.60 mi NNW - AS1A - new	-3	-4
R11	1.60 mi N - AS1B - new	-4	-4
R12	0.62 mi NNE - AS3	0	0
R13	1.00 mi E - 11M - old/new	-15	0
R14	1.00 mi N - 10M - old/new	-4	0
R15	1.10 mi W -14M - old/new	-14	-1
R16	1.10 mi SSW - 13M New - old/new	-1	0
R17	2.00 mi E - 16M - old/new	-13	0
R18	2.00 mi N - 15M - old/new	-2	-2
R19	2.00 mi S - 17M - old/new	-6	0
R20	2.00 mi W - 18M - old/new	-11	-1

Figure 8. Aerial map showing the resulting noise contours from the existing firing range | Model F

NOISE CONTOUR MAP



NOISE CONTOUR LEVELS

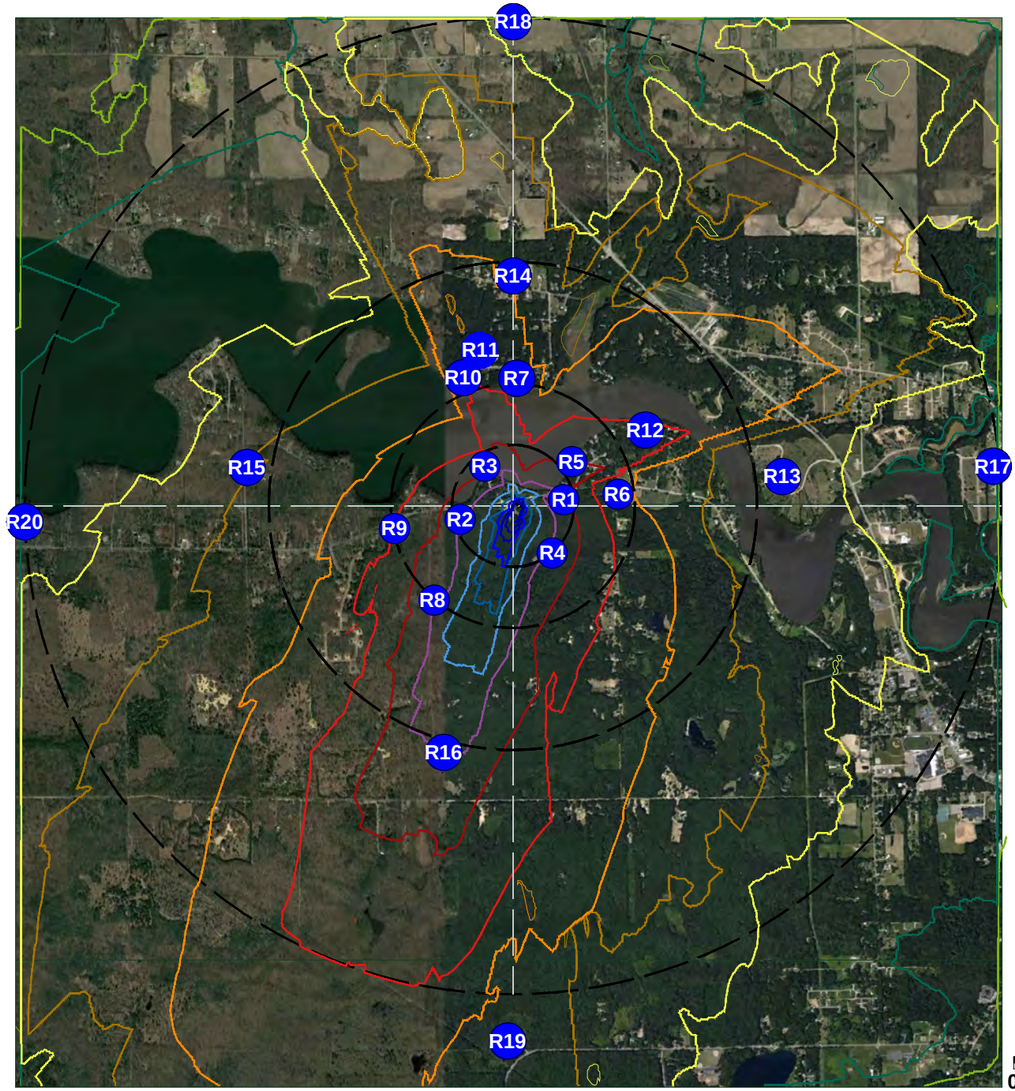
90 dBA	60 dBA
85 dBA	55 dBA
80 dBA	50 dBA
75 dBA	45 dBA
70 dBA	40 dBA
65 dBA	35 dBA

MODEL G: Model A and 14 ft. tall shed rear walls

NOISE SENSITIVE RECEIVERS		ESTIMATED INSERTION LOSS* EXISTING RANGE YR. 2016	ESTIMATED INSERTION LOSS* CURRENT RANGE YR. 2021
R1	0.20 mi ENE - 2M - old/new	-14	-10
R2	0.25 mi W - 4M - old/new	-14	-2
R3	0.25 mi NNW - 1M - old/new	-8	-8
R4	0.25 mi SE - 2T old/new	-19	-2
R5	0.29 mi - NNE - AS2	-5	-7
R6	0.43 mi ENE - 6M - old/new	-13	-4
R7	0.50 mi N - 5M - old/new	-10	-10
R8	0.50 mi SW - 7T - old/new	-8	0
R9	0.51 mi W - 8M - old/new	-12	-1
R10	1.60 mi NNW - AS1A - new	-5	-6
R11	1.60 mi N - AS1B - new	-9	-9
R12	0.62 mi NNE - AS3	-4	-4
R13	1.00 mi E - 11M - old/new	-15	0
R14	1.00 mi N - 10M - old/new	-6	-2
R15	1.10 mi W -14M - old/new	-13	0
R16	1.10 mi SSW - 13M New - old/new	-1	0
R17	2.00 mi E - 16M - old/new	-13	0
R18	2.00 mi N - 15M - old/new	-7	-7
R19	2.00 mi S - 17M - old/new	-6	0
R20	2.00 mi W - 18M - old/new	-10	0

Figure 9. Aerial map showing the resulting noise contours from the existing firing range | Model G

NOISE CONTOUR MAP



NOISE CONTOUR LEVELS

90 dBA	**60 dBA**
85 dBA	**55 dBA**
80 dBA	**50 dBA**
75 dBA	**45 dBA**
70 dBA	**40 dBA**
65 dBA	**35 dBA**

MODEL H: Entry to site relocated to the northeast; side berms extended; 20 ft. tall rear walls behind range, 20 ft. tall walls above side berms; and 14 ft. tall shed rear walls

NOISE SENSITIVE RECEIVERS		ESTIMATED INSERTION LOSS* EXISTING RANGE YR. 2016	ESTIMATED INSERTION LOSS* CURRENT RANGE YR. 2021
R1	0.20 mi ENE - 2M - old/new	-18	-14
R2	0.25 mi W - 4M - old/new	-15	-2
R3	0.25 mi NNW - 1M - old/new	-10	-10
R4	0.25 mi SE - 2T old/new	-19	-2
R5	0.29 mi - NNE - AS2	-10	-12
R6	0.43 mi ENE - 6M - old/new	-14	-4
R7	0.50 mi N - 5M - old/new	-16	-16
R8	0.50 mi SW - 7T - old/new	-8	0
R9	0.51 mi W - 8M - old/new	-15	-3
R10	1.60 mi NNW - AS1A - new	-10	-11
R11	1.60 mi N - AS1B - new	-13	-13
R12	0.62 mi NNE - AS3	-7	-8
R13	1.00 mi E - 11M - old/new	-15	0
R14	1.00 mi N - 10M - old/new	-11	-7
R15	1.10 mi W -14M - old/new	-14	-1
R16	1.10 mi SSW - 13M New - old/new	-1	0
R17	2.00 mi E - 16M - old/new	-14	0
R18	2.00 mi N - 15M - old/new	-10	-10
R19	2.00 mi S - 17M - old/new	-6	0
R20	2.00 mi W - 18M - old/new	-11	-2

Figure 10. Aerial map showing the resulting noise contours from the existing firing range | Model H

APPENDIX G: LIST OF GPS LOCATIONS FOR THE MEASUREMENT LOCATIONS OF THE EXISTING AMBIENT SOUND LEVELS AND THE SOUNDS OF FIREARMS EXPERIMENTS IN 2016 AND 2021

Table G-1. List of GPS coordinates for the locations where measurements of the existing ambient sound levels and sounds of firearms were measured during the 2016 and 2021 field studies near the existing Echo Point Shooting Range in Allegan, Michigan.

Receiver Location	North Coordinate	West Coordinate	Elevation
2016 and 2021 Measurement Locations			
1M	N42° 32.825'	W85° 54.448'	620 ft.
2M	N42° 32.722'	W85° 54.133'	650 ft.
2T	N42° 32.534'	W85° 54.157'	680 ft.
4M	N42° 32.699'	W85° 54.671'	640 ft.
5M	N42° 33.142'	W85° 54.361'	660 ft.
6M	N42° 32.712'	W85° 53.798'	640 ft.
7T	N42° 32.348'	W85° 54.732'	660 ft.
8M	N42° 32.621'	W85° 54.961'	690 ft.
10M	N42° 33.515'	W85° 54.397'	624 ft.
11M	N42° 32.777'	W85° 53.108'	630 ft.
13 New	N42° 31.840'	W85° 54.706'	700 ft.
14M	N42° 32.715'	W85° 55.612'	690 ft.
15M	N42° 34.417'	W85° 54.433'	770 ft.
16M	N42° 32.708'	W85° 52.023'	650 ft.
17M	N42° 30.805'	W85° 54.373'	750 ft.
18M	N42° 32.659'	W85° 56.728'	660 ft.
Additional 2021 Measurement Locations			
AS1A	N42° 33.178'	W85° 54.580'	679 ft.
AS1B	N42° 33.218'	W85° 54.490'	634 ft.
AS2	N42° 32.837'	W85° 54.088'	630 ft.
AS3	N42° 32.955'	W85° 53.730'	618 ft.

APPENDIX H:

STAFFING AND QUALIFICATIONS

FIRM QUALIFICATIONS

Siebein Associates, Inc. established in 1981 in Gainesville, Florida is a leading acoustical consulting firm that specializes in sound assessment and analysis for shooting ranges and noise mitigation design for facilities using a variety of small arms, heavy weapons, field measurement; research; development of computer programs; and design of state, federal, public, and military and police training facilities. This has included work for firing ranges around the world for the US military, federal agencies such as the FBI, Capitol Police and FLETC as well as police training and privately owned ranges. We have also conducted research on firearms noise measurement and mitigation for the National Rifle Association and the National Science Foundation.

The firm has worked on over 2,300 projects worldwide and is very experienced with work on police and recreational shooting facilities in the vicinity of residential neighborhoods. We have also worked with a number of municipalities to develop noise ordinances, participated in public hearings for noise impact related work, and worked on ANSI and ASTM committees to draft acoustical standards. Measurement, modeling and prediction of noise levels from impulsive sounds like gun fire in complex environments using field measures, computer models, and auralizations is a particular strength of the firm.

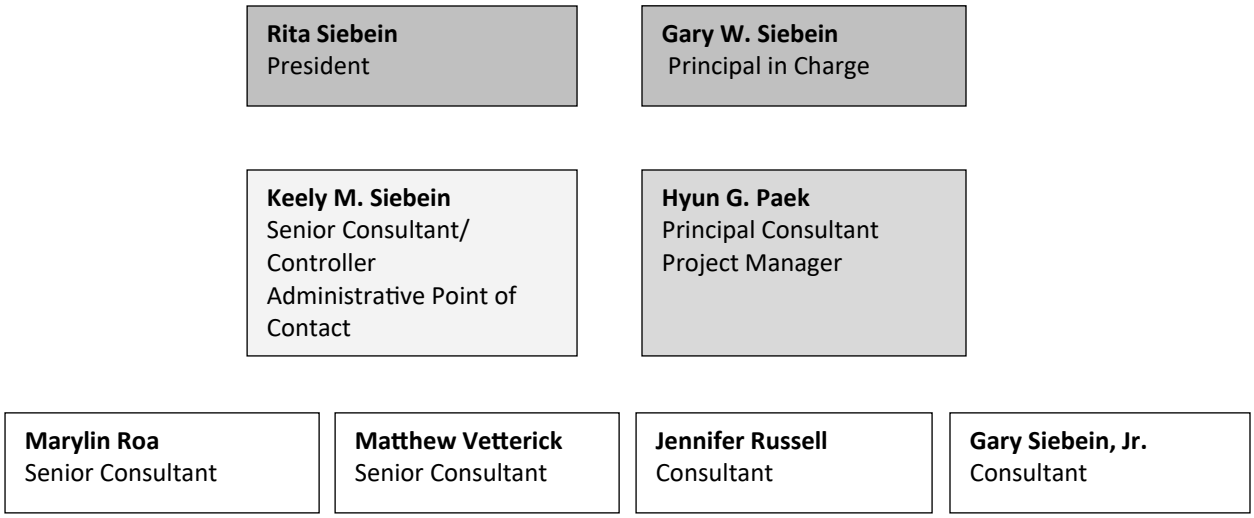


Figure 1. Organizational Chart

Table 1. Staff Roles and Responsibilities

Name	Role	Responsibility
Gary W. Siebein, FASA, FAIA	Principal-in-Charge	Experimental Design Field Measurements Quality Control Review of Work
Hyun Paek, ASA, INCE	Project Manager	Experimental Design Field Measurements Manage Data Analysis and Report Production
Keely Siebein, ASA, INCE, LEED AP BD+C	Administrative Point of Contact	Qualification and Proposal Preparation, Data Review
Gary Siebein, Jr., CTS, AVT	Environmental Noise Measurement, Consultant	Project Data Analysis and Field Measurements
Jennifer Russell, Assoc. AIA, ASA	Environmental Noise Measurement, Consultant	Project Data Analysis and Field Measurements
Marylin Roa, AIA, ASA, INCE	Senior Consultant	Project Data Analysis and Technical Assistance with Report Preparation
Matthew Vetterick, AIA, NCARB	Senior Consultant	Technical Assistance with Report Preparation

SELECTED PROJECT EXPERIENCE

ASYMMETRIC WARFARE GROUP INDOOR FIRING RANGE

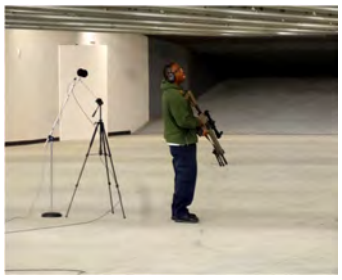
Fort AP Hill, Virginia

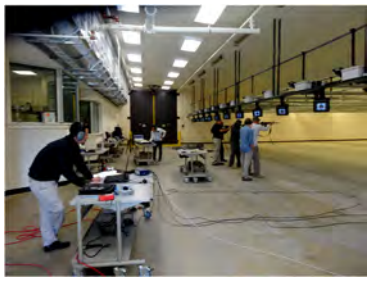
Siebein Associates, Inc. consultants constructed a state-of-the-art acoustical measurement instrumentation system in house to conduct short term acoustical measurements of overall-A-weighted and Z-weighted sound levels produced by firearms operations at the AWG 50M Indoor Range at Fort AP Hill. The measurements were taken as part of a study to validate the effectiveness of custom sound absorbent materials in firing ranges.

Prior to the installation of the acoustics panels, Siebein Associates consultants took acoustical measurements at four different locations inside the AWG Firing Range from three shooters firing three rounds in succession from M9 Beretta 9mm handguns, M4 Colt 5.56 rifles, and MK11 Mod 0, 7.62 caliber rifles. Three microphones with preamplifiers were placed two lanes over from the shooters at 15, 25, and 50 meters from the targets to record the sound levels. Additionally, a high pressure microphone was placed three meters from the shooters along with another high pressure microphone with preamplifier that was connected to a CESVA sound level meter.

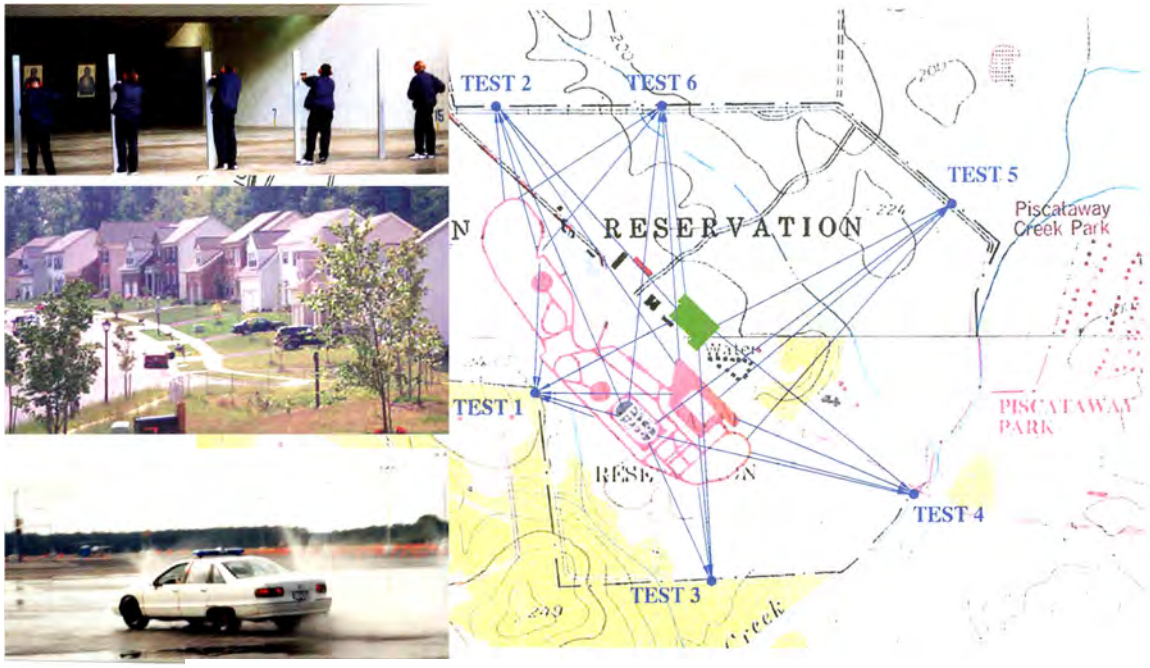
The high pressure microphone that was not recording to the CESVA was connected to an 8 Channel Data Acquisition System along with the three microphones. The data acquisition system digitized the data and transferred it to a laptop computer that acquired the four channels of data using Multi-Track Recording software.

To complete the study, the consultants traveled back to Fort AP Hill after the acoustical treatments had been applied inside the AWG Range and conducted identical tests that proved the addition of the sound absorbent material was successful in significantly reducing the sound levels.





SELECTED PROJECT EXPERIENCE



FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)
Cheltenham, Maryland

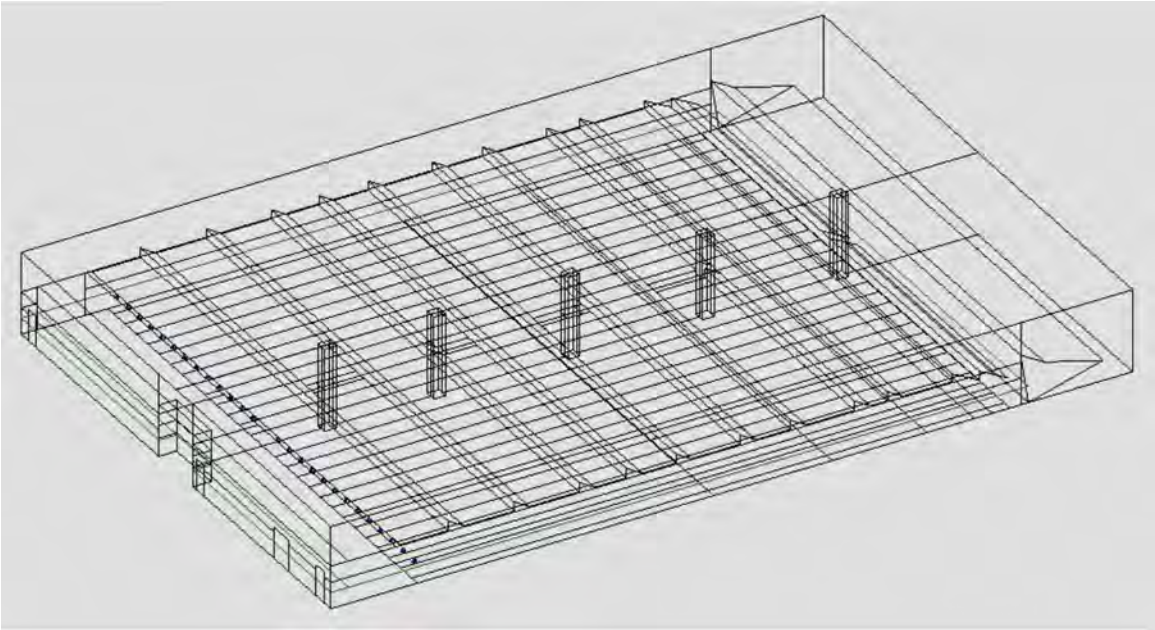
Siebein Associates conducted a sound assessment and noise analysis for new enclosed firing ranges and driving training facilities on nearby communities. Noise measurement levels were taken at over 40 locations in the community and the existing sonic environment was characterized using a combination of quantitative metrics such as Ldn's and soundscape terms. Field measurements were conducted of long term sound levels and individual event levels for firearms training at multiple indoor, partially enclosed and outdoor firing ranges at an existing facility. The data was used as source data in computer model studies using the SA Environmental Noise Analysis program of noise impacts from a number of design alternatives. The field measurements were also made at distances away from the sources that would be found at the proposed facility as a method to calibrate the model studies. A variety of mitigation options were explored and recommendations presented.

SELECTED PROJECT EXPERIENCE

FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)
Brunswick, Georgia

Siebein Associates conducted a sound assessment and noise analysis new partially enclosed firing ranges on near by communities. Long term sound levels were recorded at critical locations in the community where complaints had been received. Detailed measurements of individual training events were also made both close to the source and in the neighborhoods. These data were used in computer model studies using the SA Environmental Noise Analysis program of design alternatives including range location, orientation, materials and baffling systems. Physical scale models were also built of design options for the partially enclosed ranges to study the directional effects of sound diffracted out through the openings into the community. The effects of moving the sound sources to different firing positions within the range was found to account for much of the variability in acoustical measurements made in the neighborhood in previous studies. Recommendations for to minimize noise propagation into the neighborhood were presented and constructed.

SELECTED PROJECT EXPERIENCE



FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)
Charleston, South Carolina

Siebein Associates provided sound analysis and acoustical design recommendations for indoor firing ranges in Charleston, South Carolina. Mitigation to increase sound absorption and reduce harmful noise propagation was provided. A three-dimensional acoustic computer model was constructed to study sound propagation as shown in the Figure above.

SELECTED PROJECT EXPERIENCE

FBI FIRING RANGE ACOUSTICAL STUDY
Quantico, Virginia

Siebein Associates conducted a comprehensive evaluation of acoustic problems in large indoor/outdoor firing ranges; monitoring of OSHA noise exposure for instructors and students; development of software systems to evaluate hearing conservation issues from high-energy impulse noise from firearms; and integrated acoustical mitigation design for ranges with architectural, air-flow and lead abatement consultants.

SELECTED PROJECT EXPERIENCE

OKINAWA FIRING RANGE NOISE IMPACT STUDY

Okinawa, Japan

Siebein Associates conducted a sound assessment and analysis for expansion of range activities and construction for new ranges. Design criteria for off-site noise propagation were established by the military. The ranges were to be used for Special Forces firearms training activities. A combination of acoustical measurements at similar training facilities, computer model studies of proposed activities, and model calibration studies conducted in the field were used to evaluate proposed designs. Acoustical measurements of typical busy day training activities were recorded at for Army Special Forces operations at an existing facility. The acoustical data from the actual training activities were used in 4 different computer models to estimate sound levels at various locations around the proposed facility as affected by distance, topography and vegetation. Sophisticated military noise prediction programs were also used to independently estimate noise contours based on the projected number of personnel, rounds per day and weapons used in the training exercises. Methods to reduce sound levels were evaluated as well in a series of optimization studies.

SELECTED PROJECT EXPERIENCE

CITY OF VIRGINIA BEACH FIRING RANGE
Virginia Beach, Virginia

Siebein Associates worked with city and police personnel, and residents to conduct a sound assessment and analysis of existing firing range noise on nearby communities. A computer model study was constructed using the SA Environmental Analysis program of design alternatives to provide recommendations for mitigation.

SELECTED PROJECT EXPERIENCE

MAUMEE POLICE AND FIRE TRAINING FACILITY
Maumee, Ohio

Siebein Associates conducted a sound assessment and analysis for the proposed Maumee Fire and Police Training Facility to determine the noise impact of firearms training activities on the surrounding communities. Acoustic measurements were made at the proposed site and in the surrounding community of police officers firing shotguns and pistols at the site of the proposed Firing Range. Noise mitigation strategies were presented.

SELECTED PROJECT EXPERIENCE

BLALOCK LAKES CLAY PIGEON RANGE NOISE STUDY
Blalock, Georgia

Siebein Associates, Inc. conducted a sound assessment and analysis to determine noise mitigation strategies to reduce noise associated with clay pigeon shooting events at an adjoining residential property.

SELECTED PROJECT EXPERIENCE

UNITED STATES CAPITOL POLICE PRACTICAL APPLICATIONS CENTER
Cheltenham, Maryland

Siebein Associates conducted a sound assessment and analysis to establish acoustical design criteria for background noise levels from building and simulation equipment; selection of room finish materials; sound isolation between critical spaces; acoustical measurements and analysis to determine occupational hearing loss issues relative to the range usage by instructors and students during firearms training.

SELECTED PROJECT EXPERIENCE

CASEYVILLE RIFLE AND PISTOL CLUB
Masacoutah, Illinois

Constructed a computer model for proposed shooting range to produce noise contours for the projected number and types of weapons to be used at the new range.

MONTGOMERY COUNTY WEAPONS TRAINING CENTER
Conshohcken, Pennsylvania

Conducted acoustical analysis and design recommendations to reduce noise from gun fire within the firing range and reduce the transfer of gun fire noise to the Fire Academy classrooms and adjoining properties.

ROCKVILLE POLICE ACADEMY FIRING RANGE
Rockville, Maryland

Conducted acoustical analysis and design recommendations for the construction of a new firing range to allow for simultaneous use with adjacent offices and nearby classrooms. Acoustical measurements were taken of firearms training in the existing range to estimate noise impact at nearby receiver properties and to recommend acoustical upgrades to the construction of the building envelope.

AIS QUICK STUDY
Las Vegas, Nevada

Conducted acoustical analysis of sound levels of Quick Range structures in the Control Room and just outside the Range to determine compliance with the performance criteria based on OSHA and NIOSH permissible sound level limits. A computer model was constructed to study alternate range sizes to determine equivalent sound levels with substitute sizes and materials used for the ranges.

RHINO OUTDOOR OPEN GUN RANGE
Williston, Florida

Conducted sound assessment and analysis of shotgun blast noise from the Rhino Outdoors open gun range at the property line of adjacent and nearby residences and businesses to determine the extent to which the noise exceeds the noise level limit described in the Levy County Code of Ordinances.

SELECTED PROJECT EXPERIENCE

MARINE RECRUIT TRAINING FACILITY
Parris Island, South Carolina

Provided acoustical design of a U.S. Marine Corps Large Group Training Facility at Parris Island, South Carolina including room acoustic design, sound isolation for large public restrooms and mechanical equipment and interface with Marine audio-visual systems.

CITY OF PHOENIX POLICE TRAINING FACILITY
Phoenix, Arizona

Conducted acoustical analysis and design recommendations for existing outdoor and indoor firing ranges proposed for a major expansion of this large facility in suburban Phoenix.

DUVAL COUNTY SHERIFF'S OFFICE FIRING RANGE NOISE IMPACT STUDY
Jacksonville, Florida

Conducted acoustical measurements at existing indoor and outdoor firing ranges. Determined existing and future noise impact for expansion of outdoor ranges. Investigated enclosed and partially enclosed options for range development to minimize noise impact on nearby residences.

MANASSAS PARK NEW POLICE STATION INDOOR SHOOTING RANGE
Manassas Park, Virginia

Conducted acoustical analysis and design recommendations to reduce sound from fire arms in the firing range on the ground floor to offices above and to the side of the range. Conducted computer model studies using the SA Environmental Analysis program of design alternatives to proved recommendations for noise mitigation.

FLORIDA DEPARTMENT OF LAW ENFORCEMENT HEADQUARTERS
Tallahassee, Florida

Conducted acoustical measurements and design for indoor firing ranges located in close proximity to the Director's Office and other noise sensitive locations in this major headquarters facility for a large law enforcement agency.

SELECTED RELEVANT PUBLICATIONS

Field Measurements of Sound Pressure levels of Various Firearms

Research to document methods and a digital data acquisition system to record peak pressure levels, sound exposure levels and other metrics of interest produced by a variety of firearms. A catalog of peak pressure levels and octave band sound exposure levels for various firearms was produced to aid the NRA in assessing noise impacts of range facilities.

Field Measurement of the Insertion Loss of Earth Berms

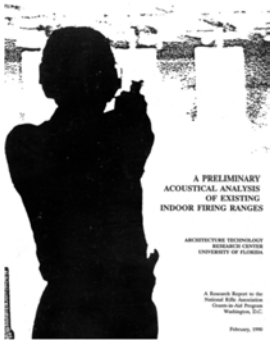
Field measurements of the insertion loss of earth berms surrounding outdoor firing ranges were compared with estimates of insertion loss calculated by a variety of methods in the literature. Advantages and disadvantages of various computational methods and field measurement techniques were evaluated. Presented to the National Rifle Association.

Preliminary Acoustical Analysis of Existing Indoor Firing Ranges

Research presented to the National Rifle Association (NRA) to document methods to accurately measure impulsive sounds produced by firearms; develop acoustical design guidelines for indoor firing ranges including transmission loss of wall, floor and ceiling assemblies and interior finish materials; and present case studies of the acoustical design of ranges.

"Project Design Phase Analysis Techniques to Evaluate the Acoustical Environment of Buildings and Listening to Buildings"

Developed a multi-channel digital data acquisition system to compute acoustical metrics based on impulse response theory to assess interior and exterior situations as part of 10 years of work. The system was used successfully in full size environments as diverse as concert halls, construction sites and firing ranges. It was also used in scale model studies of interior acoustical qualities in concert halls and exterior sound propagation in police training facilities. Impulse responses acquired in the field were also convolved or mixed with recorded sounds to present aural simulations of sounds as they were heard in complex environments. Case studies comparing full size and scale model measurements in actual design situations were presented. Presented to the National Science Foundation.



RESUMES OF SENIOR STAFF

Please see next pages.

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ARCHITECTURAL AND ENVIRONMENTAL ACOUSTICS

Intelligently designing architectural, urbane and natural soundscapes for creative and healthy living.

Gary W. Siebein, FASA, FAIA, NCARB

Senior Principal Consultant

AREAS OF EXPERTISE

Soundscape Planning and Design, Environmental Noise; Architectural Acoustic Design of Indoor and Outdoor Performance Spaces; Mechanical System Noise & Vibration Control

EDUCATION

M.A. (Architecture), 1980
University of Florida

Bachelor of Architecture, 1978
Rensselaer Polytechnic Institute

B.S. (Building Science), 1972
Rensselaer Polytechnic Institute

REGISTRATION

Registered Architect Florida # 8846
Registered Architect Georgia #RA014816
NCARB # 86214

AFFILIATIONS

Fellow, American Institute of Architects
Fellow, Acoustical Society of America
Member, NCAC
Member, ASTM
Member, ASHRAE

PROFESSIONAL EXPERIENCE

40 Years

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 16
gsiebein@siebeinacoustic.com

Gary W. Siebein, founder of Siebein Associates, has over 40 years' extensive experience in soundscape planning and design of communities and urban areas, acoustical design of performance spaces, environmental noise and assessment, human and community response to noise, and developing instrumentation for the measurement, monitoring and analysis of sounds in communities in the ways in which they are heard by people. He has completed work on over 2,300 projects worldwide for many clients including the NSF and other governmental agencies as well as clients in the private and public sectors. He is also a Professor Emeritus of the School of Architecture at the University of Florida where he directed a graduate program in building and environmental acoustics for 35 years. He is an international leader in acoustic and soundscape research. He has written five books, 16 book chapters, and over 200 technical papers and monographs in architectural and environmental acoustics that have been presented at regional, national and international professional society meetings.

Gary W. Siebein has consulted for military and law enforcement training facilities for over 40 years. He has designed methods to accurately measure, model and predict the effects of impulsive sounds such as gunfire and demolition blasts associated with military and police training activities on adjoining properties as part of environmental assessment and ICUZ processes. He has worked with the military, federal, state and local law enforcement agencies to develop comprehensive cost effective noise management plans for training facilities. This work has included design of baffled ranges, fully enclosed ranges, conducting community workshops and large scale experiments on sites to demonstrate acoustic effects of noise mitigation, computer modeling of noise contours, and auralization of sounds as they are heard at neighboring properties. He consults with communities to develop practical noise ordinances and is currently serving on an ANSI working group to develop a model community noise ordinance. He also serves on ASTM Committee E33 on Environmental Acoustics which develops testing standards for building and environmental acoustics.

EXPERIENCE

- Principal Consultant, Siebein Associates (1981-present)
  - ◊ Acoustical consulting commissions in private practice, including space shaping of theaters, interior and exterior noise control, mechanical system noise control, and sound system design.
- Faculty Member (Professor), University of Florida (1980-2015)
  - ◊ University Research Foundation Professor (1999-2002)
  - ◊ Director, Architecture Technology Research Center (1985-2015)
- Architectural design work in several small firms in southwestern Connecticut (1972-1980)

RELEVANT PROJECT EXPERIENCE (partial list)

- Albemarle Public Safety Training Facility Indoor and Outdoor Firearms Ranges, Roanoke, VA
- Blalock Lakes Clay Pigeon Range Noise Study, Blalock, GA
- Camp Lejeune USMC Firing Ranges, Camp Lejeune, NC
- Caseyville Outdoor Rifle and Pistol Club, Masacoutah, IL
- City of Omaha Outdoor Public Safety Training Center, Omaha, NE
- City of Phoenix Police Indoor and Outdoor Firing Ranges, Phoenix, AZ
- City of Virginia Beach Outdoor Firing Range, Virginia Beach, VA
- Clearwater Police Department Partially Enclosed Firing Range, Clearwater, FL
- Department of Defense Outdoor Firing Ranges, VA
- Dubuque County Sheriff's Outdoor Range, Dubuque, IA
- Duncan Farms Outdoor Firing Range, Beaufort County, SC
- Duval County Sheriff's Office Indoor and Outdoor Firing Ranges Noise Impact Study, Jacksonville, FL
- Everglades Youth Ranch Outdoor Firing Range, Palm Beach, FL
- FBI Indoor and Outdoor Firing Ranges Acoustical Study, Quantico, VA
- FBI Proposed 500 Yard Precision Rifle Deck Environmental Acoustic Assessment, Quantico, VA
- Federal Law Enforcement Indoor and Outdoor Training Center Firing Ranges, GA, MD, SC
- Georgia Department of Natural Resources Union County Outdoor Shooting Ranges, Blairsville, GA
- Island Lake Outdoor Recreational Shooting Range Noise Impact Analysis, Brighton, MI
- Maxwell Air Force Base Partially Enclosed Firing Range, Montgomery, AL
- Maumee Proposed Fire and Police Training Facility, Maumee, OH
- McConnell AFB Combat Arms Training Facility, Wichita, KS
- Michigan Department of Natural Resources Statewide Outdoor Firing Ranges, MI
- Pedlar Mountain Wildlife Management Area Shooting Range, Monongalia, WV
- Rhino Outdoor Open Gun Range, Williston, FL
- Summit County Outdoor Shooting Range, Dillon, CO
- Tampa Police Department Partially Enclosed Firing Range, Tampa, FL
- United States Army Training Complex Outdoor Firing Range, Okinawa, Japan

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ARCHITECTURAL AND ENVIRONMENTAL ACOUSTICS

Intelligently designing architectural, urbane and natural soundscapes for creative and healthy living.

Hyun G. Paek, ASA, INCE

Principal Consultant

AREAS OF EXPERTISE

Architectural Acoustic Design
Mechanical System Noise & Vibration
Environmental Noise

EDUCATION

M.A. (Architecture), 1994
University of Pennsylvania

B.A. (Architectural Studies), 1992
University of Washington

B.S. (Building Construction) 1992
University of Washington

AFFILIATIONS

Member:
Acoustical Society of America
FL Chapter Acoustical Society of America
Institute of Noise Control Engineering
American Society of Heating,
Refrigerating & Air-Conditioning
Engineers

PUBLICATIONS

Mr. Paek has written papers on the subject of architectural acoustics and computer modeling systems and has presented published papers at regional and national acoustics meetings. He has also served as a guest lecturer in architectural acoustics at the University of Florida.

PROFESSIONAL EXPERIENCE

25 Years

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 15
hpaek@siebeinacoustic.com

Hyun has studied and worked in the field of architectural acoustics, architecture, and building construction in various capacities for more than 25 years. He specializes in soundscape planning, architectural acoustical design, acoustical detailing and environmental acoustics. Hyun focuses on visionary acoustics, ensuring the final design blends in as a part of the overall building.

Mr. Paek serves as a mentor to his colleagues, encouraging them to reach beyond the boundaries of the modern acoustical field and to find creative solutions to complex acoustical issues. Hyun has worked on over 1,000 projects worldwide. From this depth and breadth of knowledge comes an acute understanding of a variety of building types. This extensive experience also allows him to organize and supervise acoustical measurements and analyses that are critical to designing the soundscape of buildings. He is proficient at analyzing present and future acoustical conditions in buildings. He has extensive experience in noise assessment, 3-D computer modeling and calibrations, planning and analysis of acoustical measurements, and monitoring of sound levels.

He helps steer the big-picture thinking about how the acoustical design fits into the larger construct of the project by developing and integrating an acoustical vision for each project. Hyun successfully directs acoustical planning and design efforts with all design team members, facilitating conversation between all participants. This helps to engage all parties and allows dialog to occur between all participants to promote understanding about the acoustical issues. Hyun successfully assists the owner and design team in development concepts in the early phases of projects with a visionary integration of sounds that reflect the dynamics and aesthetics of the architecture.

Hyun is deeply experienced in project management; proactively and successfully leading teams through each project phase, organizing, supervising, and analyzing the design process. He enjoys the collaborative process of developing state of the art sonic environments and brings his professional expertise, technical capabilities, and aesthetic sensitivities to every project.

He has written many papers on the subject of architectural acoustics and computer modeling systems and presented them at regional and national acoustics meetings. He also serves as a guest lecturer in graduate architectural acoustics courses at the University of Florida. He is a member of the Acoustical Society of America, the Institute of Noise Control Engineers, and the Florida Chapter Acoustical Society of America.

EXPERIENCE

- Principal Consultant, Siebein Associates, Inc. 2019- present
- Associate Principal Consultant, Siebein Associates, Inc. 2014 - 2019
- Senior Consultant, Siebein Associates, Inc. 2007-2014
- Consultant, Siebein Associates, Inc. 2000-2007
- Project Architect, Jeong Ik Architects and Engineers 1996-1997
- Project Architect, Ilkun C&C Architects 1994-1996

RELEVANT PROJECT EXPERIENCE (partial list)

- Albemarle Public Safety Training Facility Firearms Ranges, Roanoke, VA
- Camp Lejeune USMC Firing Range, Camp Lejeune, NC
- City of Omaha Outdoor Public Safety Training Center, Omaha, NE
- City of Virginia Beach Outdoor Firing Range, Virginia Beach, VA
- Clearwater Police Department Partially Enclosed Firing Range, Clearwater, FL
- Dubuque County Sheriff's Outdoor Firing Range, Dubuque, IA
- Fort AP Hill Indoor Firing Range, Fort AP Hill, VA
- Fort Lewis Special Forces (SOF) Indoor Firing Range, Fort Lewis, WA
- Fridley Police Department Indoor Firing Range, Fridley MN
- Island Lake Recreational Outdoor Shooting Range Noise Impact Analysis, Brighton, MI
- Loudon County Indoor Firing Range, Ashburn, VA
- Maxwell Air Force Base Outdoor Baffled Firing Range, Montgomery, AL
- McConnell AFB Combat Arms Training Facility, Wichita, KS
- Michigan Department of Natural Resources Statewide Outdoor Firing Ranges, MI
- Patrick Air Force Base Firing Range, Patrick AFB, FL
- Special Operations Forces Headquarters Office and Indoor Firing Range, Fort Lewis, WA
- Tampa Police Department Partially Enclosed Firing Range, Tampa, FL
- US Army Training Outdoor Firing Range Complex, Okinawa, Japan
- US Secret Service Indoor Firing Range, Washington, D.C.
- USAF CATM Firing Range, Homestead, FL
- Zenith Quest Indoor Firing Range, Afton, VA

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Keely Siebein, ASA, INCE, LEED AP BD+C
Senior Consultant

AREAS OF EXPERTISE

Architectural Acoustic Design,
Environmental Noise

EDUCATION

Master of Architectural Acoustics (2012)
University of Florida, cum laude

Bachelor of Arts in Theater (2007) University of Florida, cum laude

AFFILIATIONS

Member:
Acoustical Society of America (ASA);
Florida Chapter ASA (FL-ASA);
Institute of Noise Control Engineers (INCE);
American Society of Safety Professionals (ASSP);
Florida Healthcare Engineering Association (FHEA);
Florida Chapter American Institute of Industrial Hygiene (FL-AIHA);
European Cooperation in Science & Technology (COST)

PUBLICATIONS

Ms. Siebein has coauthored and edited books, papers and scientific journal articles on natural soundscapes and architectural acoustics. She has presented her published papers at ASA conventions and conducts acoustics courses as a guest lecturer at UF. Ms. Siebein develops and presents continuing education courses.

PROFESSIONAL EXPERIENCE

21 Years

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 25
ksiebein@siebeinacoustic.com

Keely has 21 years' experience in acoustical research, technical field data collection and analysis, room acoustic design, sound isolation and environmental acoustics. She has completed work on more than 380 projects for clients on a wide range of projects. She has completed research on natural, historic, and urban soundscapes, classroom acoustics, performance space acoustics, and performed critical analysis of acoustical standards.

Keely has worked on many building types including themed entertainment attractions, worship spaces, performance spaces, educational facilities, condominiums, restaurants and dining facilities performing acoustical measurements, analysis, and design of the spaces. She has also worked on a number of environmental impact projects and traffic noise studies and has proficiency with acoustical modeling software such as CATT-Acoustic, Ecotect, TMN, and CadnaA.

Keely's technical expertise is complimented by her sensitivity to design aesthetics and client needs, and she ensures there is open communication and collaboration among all parties involved with every project.

Keely is a member of the Acoustical Society of America and a member of the Florida chapter of the ASA. She received the Robert Bradford Newman award for excellence in architectural acoustical research in 2012. She was an Alternate Voting Representative for the Accredited Standards Committee on Noise – TAG TC 43/SC1 from 2009-2011.

EXPERIENCE

- Senior Consultant, Siebein Associates, Inc. 2016-present
- Consultant, Siebein Associates, Inc. 2009-2016
- Junior Consultant, Siebein Associates, Inc. 2002-2007
- Research Assistant, Siebein Associates, Inc. 1999-2002

SERVICE TO PROFESSIONAL SOCIETIES

- President: Florida Chapter of the Acoustical Society of America: 2019 - present
- Chair: Council for the Model Aquatic Health Code Acoustical Design Ad Hoc Committee: 2016 -2018
- Secretary: Florida Chapter of the Acoustical Society of America: 2015 - 2019
- ASC Noise – TAG TC 43/SC1: Alternate Voting Representative - 2009 - 2011

AWARDS

- Robert Bradford Newman Award for Excellence in Architectural Acoustics: 2012

RELEVANT PROJECT EXPERIENCE (partial list)

- 82nd Airborne Headquarters Building, Fort Bragg, NC
- Albemarle Public Safety Training Facility Indoor and Outdoor Firing Ranges, Roanoke, VA
- Camp Lejeune USMC Firing Range, Camp Lejeune, NC
- City of Omaha Outdoor Public Safety Training Center, Omaha, NE
- Dubuque County Sheriff's Outdoor Firing Range, Dubuque, IA
- Everglades Youth Camp Outdoor Firing Range, Palm Beach, FL
- FBI Proposed 500 Yard Precision Rifle Deck Environmental Acoustic Assessment, Quantico, VA
- Federal Air Marshals Firing Range Facility, Chicago, IL
- Homestead Air Reserve Base CATM, Homestead, FL
- JPATS Naval Training Operations Facility, Milton, FL
- McConnell AFB Combat Arms Training Facility, Wichita, KS
- Michigan Department of Natural Resources Outdoor Shooting Ranges:
  - ◊ Grand Traverse Shooting Range, Grand Traverse County, MI
  - ◊ Allegan & Barry State, Allegan & Barry Game Areas, MI
  - ◊ Lapeer Range, Grand Traverse County, MI
  - ◊ Marquette Range, Grand Traverse County, MI
- Orlando Police Department Gun Range Noise Study, Orlando, FL
- Patrick Air Force Base Firing Range, Patrick AFB, FL
- Tampa Police Department Partially Enclosed Firing Range, Tampa, FL
- Zenith Quest Indoor Firing Range, Afton, VA

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Gary Siebein Jr., CTS, AVT
Consultant

PROFESSIONAL EXPERIENCE
12 Years

AREAS OF EXPERTISE
Acoustical Measurements
Environmental Noise
Sound System Design

CERTIFICATIONS
Certified Technology Specialist
Infocomm Audio Visual Technologist
Audinate Dante Certification Level 1
Cambridge Qt Pro Certified Masking Expert
Dynasound Pro Certified Masking Expert

AFFILIATIONS
Member, Florida Chapter of the Acoustical Society of America

PUBLICATIONS
Gary has co-authored many papers on the subject of environmental acoustics and has presented published papers at regional and national acoustics meetings.

PROFESSIONAL EXPERIENCE
12 Years

CONTACT INFORMATION
625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 19
gary@siebeinacoustic.com

Gary has 12 years' experience consulting with Siebein Associates and has worked on more than 300 projects. He is a member of Siebein Associates' A/V Design Team where his expertise and certifications in sound system and A/V design allows him to design functional and practical sound, audio and video systems in performing arts centers, religious facilities, educational facilities, theme parks and many other building types.

Gary is also a key member of our environmental noise team, leading many environmental noise impact studies in the field. His technical dexterity and extensive experience allow him to operate specialized equipment and advanced digital software under any conditions to gain insight into custom sound mitigation techniques and design solutions.

He is fluent on many sound level meters including meters by Larson Davis, B+K, Cesva, Rion and Ivie. He is proficient in architectural/acoustic software programs including AutoCAD, TNM, SARNAM, WinMLS, and EASE.

He has worked on various building types including worship spaces, performance halls, firing ranges, educational facilities, amusement park attractions, condominiums, and hospitals, as well as been involved on environmental impact projects and traffic noise studies.

EXPERIENCE

- Siebein Associates, Inc. - Consultant (2016 - present)
- Siebein Associates, Inc. - Technical Acoustic Specialist (2010 - 2016)
- Siebein Associates, Inc. – Junior Consultant (2008 - 2010)

RELEVANT PROJECT EXPERIENCE (partial list)

- Albemarle Public Safety Training Facility Indoor and Outdoor Firing Ranges, Roanoke, VA
- Camp Lejeune USMC Firing Ranges, Camp Lejeune, NC
- City of Omaha Outdoor Public Safety Training Center, Omaha, NE
- Clearwater Police Department Partially Enclosed Firing Range, Clearwater, FL
- Dubuque County Sheriff's Outdoor Firing Range, Dubuque, IA
- Duncan Farms Outdoor Firing Range, Tampa, FL
- Eglin Air Force Base Security Renovation Building, Eglin Air Force Base, FL
- Everglades Youth Camp Outdoor Firing Range, Palm Beach, FL
- Fort AP Hill Indoor Firing Range, Fort AP Hill, VA
- Georgia Department of Natural Resources Union County Outdoor Shooting Ranges, Blairsville, GA
- JPATS Naval Training Operations Facility, Milton, FL
- Little Creek Navy Seal Firing Range, Norfolk, VA
- Loudon County Indoor Firing Range, Ashburn, VA
- Michigan Department of Natural Resources Outdoor Firing Ranges:
  - ◊ Grand Traverse Shooting Range, Grand Traverse County, MI
  - ◊ Allegan & Barry State, Allegan & Barry Game Areas, MI
  - ◊ Lapeer Range, Grand Traverse County, MI
  - ◊ Marquette Range, Grand Traverse County, MI
- Norfolk Naval Station Veterinary Replacement Facility, Norfolk, VA
- Palmetto Bluff Outdoor Shooting Range, Bluffton, SC
- Patrick Air Force Base Firing Range, Patrick AFB, FL
- Summit County Outdoor Shooting Range, Dillon, CO
- Troy Acoustics General Instrumentation, Gainesville, FL
- US Army Rowe Training Facility, Fort Bragg, NC
- Zenith Quest Indoor Firing Range, Afton, VA

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Marylin Roa, AIA, ASA, INCE

Senior Consultant

AREAS OF EXPERTISE

Architectural Acoustic Design
Mechanical System Design
Environmental Noise

EDUCATION

Master of Architecture (2014) University of Florida

Bachelor of Architecture (2012) Florida International University

REGISTRATION

Registered Architect Florida # AR100453

AFFILIATIONS

Member, American Institute of Architects
Member, Acoustical Society of America
Member, Institute of Noise Control Engineering

PUBLICATIONS

Marylin has co-authored papers on the subject of architectural acoustics and computer modeling systems and has presented published papers at regional and national acoustics meetings.

PROFESSIONAL EXPERIENCE

7 Years

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 14
mroa@siebeinacoustic.com

Marylin designs creative solutions to acoustical challenges faced in more than 30 building types. The acoustical assessment of multiple project types allows her to be involved in the acoustical design of sensitive performance venues for music and theater, quiet background noise levels for recording studios, and creating graphic acoustical 3-D modeling of loud noise generating sources to determine their noise impact on buildings and the environment. By being able to determine applicable regulations and ordinances for each project type, Marylin can interpret the acoustical measurements made on site as well as virtually in computer models and provide recommendations that meet design criteria and provide comfortable acoustic environments.

Marylin's ability to visualize space and sound three-dimensionally helps her have clear conversations with owners, architects, engineers, and contractors. Marylin has been immersed in more than 355 projects during her time with Siebein Associates and is experienced in all phases of project management, from schematic design through construction. She actively participates in project meetings, clearly communicating acoustical design goals and acoustical recommendations to designers, owners, user groups and project stakeholders. Marylin consistently applies her skills and experience to find creative acoustic solutions for her projects and excels in providing acoustic design and analysis for critical acoustic spaces.

She is proficient in many architectural/acoustic software programs including EASE, INSUL, AutoCAD, Revit, Trane, VA Select, Ibana Calc, Cope Calc, TNM, CadnaA, CATT Acoustic, and Photoshop.

EXPERIENCE

- Consultant, Siebein Associates Inc. (2014 – present)
- Intern Consultant, Siebein Associates Inc. (2014)
- Graduate Teacher Assistant, University of Florida (2013 – 2014)
- Freelance Designer, NV Capital Partners LLC (2012 – 2014)
- Photographer and Web Designer, Frost Art Museum, Florida Atlantic University (2011)
- Digital Lab Supervisor, School of Architecture, Florida International University (2009-2011)
- Professional Photography, Darimar Inc. (2006 – 2007)

SPECIAL ACHIEVEMENTS

- Robert Bradford Newman Award for Excellence in Architectural Acoustics (2014)
- Architecture MRP Design Honor Award, University of Florida(2014)
- Architecture Academic Excellence Award, University of Florida (2014)
- Architecture Academic Achievement, University of Florida (2013)

RELEVANT PROJECT EXPERIENCE (partial list)

- Albemarle Public Safety Training Facility Firearms Ranges, Roanoke, VA
- Allegan Echo Point Shooting Range, Allegan Game Area, MI
- City of Omaha Outdoor Public Safety Training Center, Omaha, NE
- Clearwater Police Partially Enclosed Firing Range, Clearwater, FL
- Dubuque County Sheriff's Outdoor Firing Range, Dubuque, IA
- Everglades Youth Camp Outdoor Firing Range, Palm Beach, FL
- Fort AP Hill Indoor Firing Range, Fort AP Hill, VA
- Georgia Department of Natural Resources Union County Outdoor Shooting Ranges, Blairsville, GA
- JPATS Naval Training Operations Facility, Milton, FL
- Loudon County Indoor Firing Range, Ashburn, VA
- McConnell AFB Combat Arms Training Facility, Wichita, KS
- Michigan Department of Natural Resources:
  - ◊ Grand Traverse Shooting Range, Grand Traverse County, MI
  - ◊ Allegan & Barry State, Allegan & Barry Game Areas, MI
  - ◊ Lapeer Range, Grand Traverse County, MI
  - ◊ Marquette Range, Grand Traverse County, MI
- Palmetto Bluff Shooting Range, Bluffton, SC
- Patrick Air Force Base Firing Range, Patrick AFB, FL
- Pedlar Mountain Wildlife Management Area Shooting Range, Monongalia, WV
- Summit County Outdoor Shooting Range, Dillon, CO
- Tampa Police Department Partially Enclosed Firing Range, Tampa, FL
- USAF CATM Firing Range, Homestead, FL
- Zenith Quest Firing Range, Afton, VA

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Jennifer Miller, Assoc. AIA, ASA
Consultant

AREAS OF EXPERTISE
Acoustical Measurements
Architectural Acoustic Design
HVAC Design

EDUCATION
Master of Architecture (2015)
University of Florida

Bachelor of Design in Architecture
cum laude (2013), University of Florida

AFFILIATIONS
Associate, American Institute of Architects
Member, Acoustical Society of America

PUBLICATIONS
Jennifer has co-authored papers on the subject of architectural acoustics and natural soundscapes and has presented published papers at regional and national acoustics meetings.

PROFESSIONAL EXPERIENCE
6 Years

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 12
jmiller@siebeinacoustic.com

Jennifer excels in architectural acoustic design and analysis. Having worked on more than 335 projects with Siebein Associates, Jennifer is proficient in full-cycle project management from schematic design through construction and has considerable experience in taking field measurements, analyzing data, and performing specialized acoustical analysis in many types of buildings.

Jennifer is fluent in many architectural/acoustic software programs including TAP, INSUL, Adobe Suite Programs, AutoCAD, Rhinoceros, VRay Rendering Software, Brazil Rendering Software, Grasshopper Software, Microsoft Office Programs, Ecotect, and V-A Select and is proficient in taking acoustic measurements using sound level meters by Rion, Cesva, B+K and Larson Davis.

She collaborates very well with architects, design teams and project stakeholders, carefully analyzing design criteria, and consistently creating functional and aesthetically pleasing acoustical systems in a wide variety of building acoustic and environmental noise projects.

EXPERIENCE
- Consultant, Siebein Associates, Inc. (2015-present)
- Intern Consultant, Siebein Associates, Inc. (2014-2015)
- Lunz Prebor Fowler Architects, Intern (May-August 2011, May-August 2012)
- SCMH Architects, Intern (May-August 2010)

SPECIAL ACHIEVEMENTS
- Selected as participant in the Acoustical Society of America School in Salt Lake City (2016)
- Robert Bradford Newman Award for Excellence in Architectural Acoustics (2015)

RELEVANT PROJECT EXPERIENCE (partial list)
- Aberdeen Indoor Firing Range, Aberdeen, MD
- Camp Lejeune USMC Firing Ranges, Camp Lejeune, NC
- City of Omaha Outdoor Firing Range, Omaha, NE
- Clearwater Police Department Partially Enclosed Firing Range, Clearwater, FL
- Dubuque County Sheriff's Outdoor Firing Range, Dubuque, IA
- Eglin Air Force Base Security Renovation Building, Eglin Air Force Base, FL
- Fridley Police Department Indoor Firing Range, Fridley, MN
- Georgia Department of Natural Resources Union County Outdoor Shooting Ranges, Blairsville, GA
- Grand Traverse Outdoor Firing Range, Traverse City, Michigan
- Homestead Air Reserve Base CATM, Homestead, FL
- JIATFS Command Center, Key West, FL
- JPATS Naval Training Operations Facility, Milton, FL
- McConnell Air Force Base Indoor Firing Range, Wichita, KS
- Michigan Department of Natural Resources Outdoor Shooting Ranges:
  - ◊ Grand Traverse Shooting Range, Grand Traverse County, MI
  - ◊ Allegan & Barry State, Allegan & Barry Game Areas, MI
  - ◊ Lapeer Range, Grand Traverse County, MI
  - ◊ Marquette Range, Grand Traverse County, MI
- Norfolk Naval Station Veterinary Replacement Facility, Norfolk, VA
- Palmetto Bluff Outdoor Firing Range, Bluffton, SC
- Patrick Air Force Base Firing Range, Patrick AFB, FL
- Pedlar Mountain Wildlife Management Area Outdoor Shooting Range, Monongalia County, WV
- Summit County Outdoor Shooting Range, Dillon, CO
- Tampa Police Department Partially Enclosed Firing Range, Tampa, FL
- Zenith Quest Indoor Firing Range, Afton, VA

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Matthew Vetterick, AIA, NCARB

Senior Consultant

AREAS OF EXPERTISE

Acoustical Measurements
Architectural Acoustic Design
Mechanical System Noise and Vibration

EDUCATION

Master of Architecture (2016), University of Florida

Bachelor of Design in Architecture summa cum laude (2014), University of Florida

Associate in Arts in Architecture (2012), Valencia College

REGISTRATION

Registered Architect Florida # AR101159
NCARB # 100758

AFFILIATIONS

Member, American Institute of Architects
Member, Acoustical Society of America - Florida Chapter

PUBLICATIONS

Matthew has co-authored papers on the subject of architectural acoustics has presented published papers at regional and national acoustics meetings.

PROFESSIONAL EXPERIENCE

5 Years

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 10
mvetterick@siebeinacoustic.com

During his time with Siebein Associates, Matthew has worked on more than 325 projects and excels in developing acoustical solutions for clients that are both efficient and aesthetically pleasing. He is experienced in all phases of project management, from schematic design through construction and collaborates perceptively with design team members and project stakeholders, consistently providing thoughtful acoustical design goals and recommendations.

He is adept in many architectural/acoustic software programs including EASE, AutoCAD, Revit, INSUL, Rhinoceros, VRay Rendering Software, Grasshopper Software, Ecotect, V-A Select, TAP (Trane Acoustic Program), Adobe Suite Programs and Microsoft Office. Matthew is also experienced in taking acoustic measurements using sound level meters by Larson Davis and Win MLS software.

Matthew is highly accomplished in performing mechanical system noise and vibration analysis and room acoustic analysis. He is experienced in taking field measurements, analyzing data, performing acoustical calculations, providing recommendations and developing thoughtful and effective acoustical details for many situations. Matthew is equally proficient onsite and in the acoustical laboratory.

EXPERIENCE

- Senior Consultant, Siebein Associates, Inc. (2021-present)
- Consultant, Siebein Associates, Inc. (2016-2021)
- Intern Consultant, Siebein Associates, Inc. (2015-2016)
- Graduate Teaching Assistant, University of Florida School of Architecture (2014-2015)
- Technology Consultant University of Florida Academic Technology (2013-2015)

SERVICE TO PROFESSIONAL SOCIETIES

- AIA Gainesville Chapter, Vice President (2021-present)
- AIA Gainesville Chapter, Secretary (2020)
- AIA Gainesville Chapter, Interim Associate Chapter Director (2019)

SPECIAL ACHIEVEMENTS

- AIA Florida Bronze Medal for outstanding academic distinction in the study of architecture (2016)
- Featured Student Work Chicago Architecture Foundation (2010)
- The Architecture Handbook - Student Design Experience
- Eagle Scout, Boy Scouts of America (2007)

RELEVANT PROJECT EXPERIENCE (partial list)

- Bunnell Outdoor Firing Range, Bunnell, FL
- Camp Lejeune USMC Firing Ranges, Camp Lejeune, NC
- City of Omaha Outdoor Public Safety Training Center, Omaha, NE
- Dubuque County Sheriff's Outdoor Firing Range, Dubuque, IA
- Georgia Department of Natural Resources Union County Outdoor Shooting Ranges, Blairsville, GA
- Homestead Air Reserve Base CATM, Homestead, FL
- JPATS Naval Training Operations Facility, Milton, FL
- Michigan Department of Natural Resources Outdoor Firing Ranges:
  - ◊ Grand Traverse Shooting Range, Grand Traverse County, MI
  - ◊ Allegan & Barry State, Allegan & Barry Game Areas, MI
  - ◊ Lapeer Range, Grand Traverse County, MI
  - ◊ Marquette Range, Grand Traverse County, MI
- McConnell Air Force Base Indoor Firing Range, Wichita, KS
- Palmetto Bluff Outdoor Firing Range, Bluffton, SC
- Patrick Air Force Base Firing Range, Brevard County, FL
- Summit County Outdoor Shooting Range, Dillon, CO
- Tampa Police Department Partially Enclosed Firing Range, Tampa, FL
- Zenith Quest Indoor Firing Range, Afton, VA