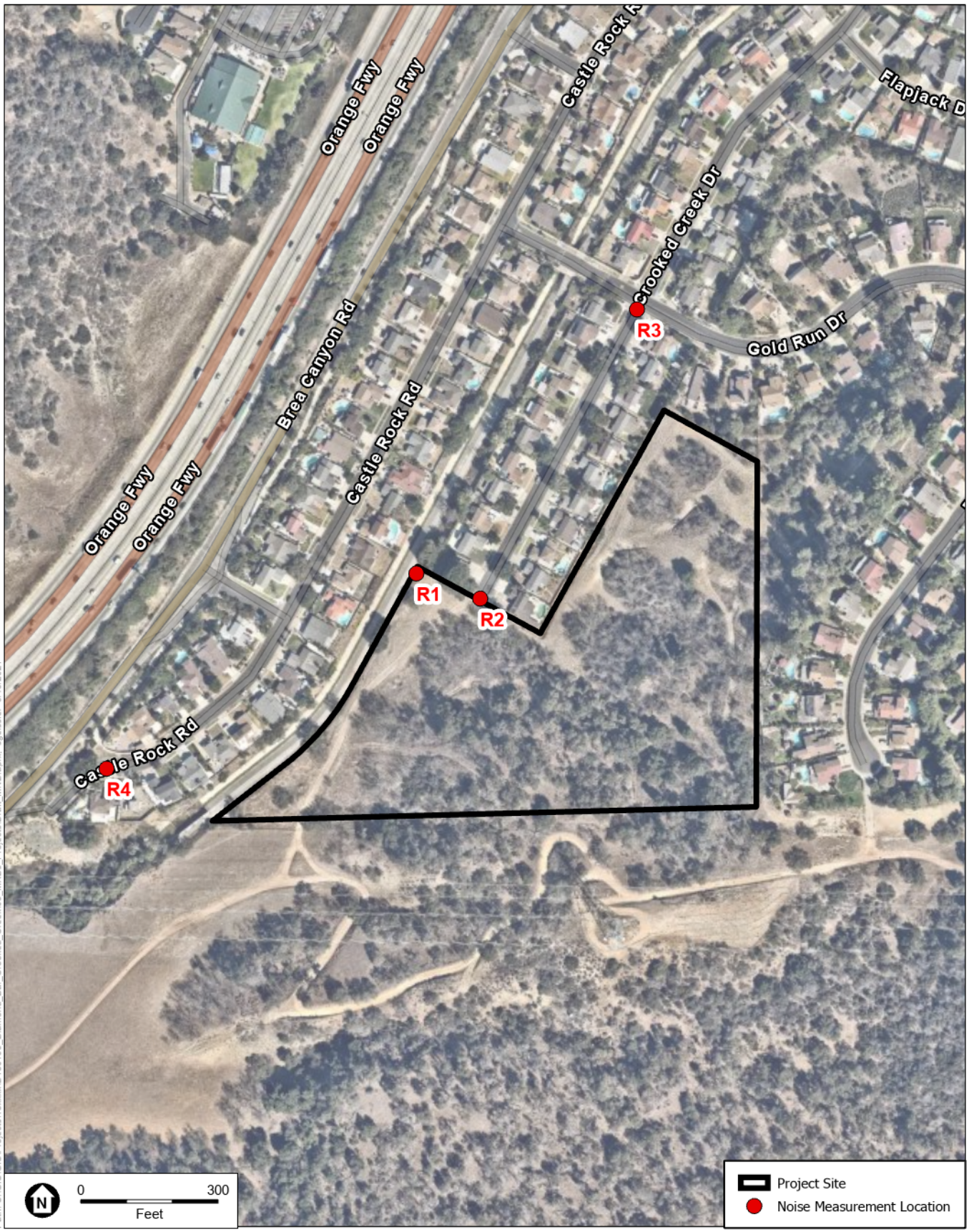
Appendix L
Noise Measurements and Data

ESA

Noise Measurements



SOURCE: Mapbox, 2020.

Crooked Creek Residential Subdivision Project

Figure 1
Noise Monitoring Locations

ESA

Summary

File Name on Meter	LxT_Data.085
File Name on PC	SLM_0004983_LxT_Data_085.01.ldbin
Serial Number	0004983
Model	SoundTrack LxT®
Firmware Version	2.302
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2020-10-29 10:52:49
Stop	2020-10-29 11:07:49
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-10-29 10:49:25
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRMLxT1			
Microphone Correction	Off			
Integration Method	Exponential			
Overload	144.6 dB			
	A		**C**	**Z**
Under Range Peak	**100.8**		97.8	102.8 dB
Under Range Limit	**49.8**		47.8	55.8 dB
Noise Floor	36.7		37.3	44.9 dB

Results

LA_{Seq}	52.5 dB		
LASE	82.1 dB		
EAS	17.938 µPa²h		
EAS8	574.013 µPa²h		
EAS40	2.870 mPa²h		
$LA_{peak\ (max)}$	2020-10-29 10:52:53	109.4 dB	
LAS_{max}	2020-10-29 10:52:53	70.1 dB	
LAS_{min}	2020-10-29 10:55:32	48.4 dB	
SEA	-99.9 dB		
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LA_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s	
LC_{Seq}	66.2 dB		
LA_{Seq}	52.5 dB		
LC_{Seq} - LA_{Seq}	13.7 dB		
LAI_{eq}	59.0 dB		
LA_{eq}	52.5 dB		
LAI_{eq} - LA_{eq}	6.5 dB		

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	52.5					
$L_{S(max)}$	70.1	2020/10/29 10:52:53				
$L_{S(min)}$	48.4	2020/10/29 10:55:32				
$L_{Peak(max)}$	109.4	2020/10/29 10:52:53				

# Overloads	0	
Overload Duration	0.0 s	

Dose Settings

Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

Results

Dose	-99.9	-99.9 %
Projected Dose	-99.9	-99.9 %
TWA (Projected)	-99.9	-99.9 dB
TWA (t)	-99.9	-99.9 dB
Lep (t)	37.5	37.5 dB

Statistics

LAS5.00	53.9 dB
LAS10.00	53.5 dB
LAS33.30	52.4 dB
LAS50.00	52.0 dB
LAS66.60	51.6 dB
LAS90.00	50.6 dB

Calibration History

Preamp	Date	dB re. 1V/Pa	6.3	8.0	10.0
PRMLxT1	2020-10-29 10:49:24	-50.8	46.7	53.2	45.3
PRMLxT1	2020-10-14 08:37:22	-50.9	52.4	54.0	58.1
PRMLxT1	2020-10-14 08:37:07	-50.9	54.2	53.2	47.2
PRMLxT1	2020-10-13 09:07:33	-50.9	65.5	67.4	65.5
PRMLxT1	2020-10-13 09:07:19	-50.9	69.7	58.2	62.6
PRMLxT1	2020-10-01 11:08:27	-50.9	69.1	61.0	67.6
PRMLxT1	2020-10-01 11:08:12	-50.9	67.6	65.1	56.1
PRMLxT1	2020-01-30 07:34:47	-51.0	59.4	45.8	53.4
PRMLxT1	2020-01-30 07:34:32	-51.0	53.8	51.8	59.6
PRMLxT1	2020-01-14 09:46:24	-50.9	45.2	43.4	49.6
PRMLxT1	2020-01-14 09:46:10	-50.9	43.1	59.9	64.0
PRMLxT2B	2020-09-28 17:21:56	-50.9	67.0	56.5	58.5
PRMLxT2B	2020-09-28 17:21:41	-50.9	65.6	69.2	73.5
PRMLxT2B	2020-09-10 08:43:42	-50.8	46.9	47.4	65.7
PRMLxT2B	2020-09-10 08:43:27	-50.8	65.3	48.9	50.5
PRMLxT2B	2020-03-11 07:42:14	-50.7	75.1	71.8	76.4
PRMLxT2B	2020-03-11 07:42:00	-50.7	88.1	80.8	79.2
PRMLxT2B	2020-02-13 08:18:03	-50.5	50.8	59.2	43.7
PRMLxT2B	2020-02-13 08:17:08	-50.5	46.9	53.2	54.1

Summary

File Name on Meter	LxT_Data.086
File Name on PC	SLM_0004983_LxT_Data_086.01.ldbin
Serial Number	0004983
Model	SoundTrack LxT®
Firmware Version	2.302
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2020-10-29 11:09:49
Stop	2020-10-29 11:24:49
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-10-29 10:49:24
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting		
Peak Weight	A Weighting		
Detector	Slow		
Preamp	PRMLxT1		
Microphone Correction	Off		
Integration Method	Exponential		
Overload	144.6 dB		
	A	**C**	**Z**
Under Range Peak	**100.8**	97.8	102.8 dB
Under Range Limit	**49.8**	47.8	55.8 dB
Noise Floor	36.7	37.3	44.9 dB

Results

LA_{Seq}	57.0 dB	
LASE	86.5 dB	
EAS	50.046 µPa²h	
EAS8	1.601 mPa²h	
EAS40	8.007 mPa²h	
$LA_{peak\ (max)}$	2020-10-29 11:12:32	79.1 dB
LAS_{max}	2020-10-29 11:23:11	62.2 dB
LAS_{min}	2020-10-29 11:17:41	53.7 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LA_{peak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LC_{Seq}	66.3 dB	
LA_{Seq}	57.0 dB	
LC_{Seq} - LA_{Seq}	9.4 dB	
LAI_{eq}	57.7 dB	
LA_{eq}	57.0 dB	
LAI_{eq} - LA_{eq}	0.7 dB	

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	57.0					
$L_{S(max)}$	62.2	2020/10/29 11:23:11				
$L_{S(min)}$	53.7	2020/10/29 11:17:41				
$L_{Peak(max)}$	79.1	2020/10/29 11:12:32				

# Overloads	0
Overload Duration	0.0 s

Dose Settings

Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

Results

Dose	-99.9	-99.9 %
Projected Dose	-99.9	-99.9 %
TWA (Projected)	-99.9	-99.9 dB
TWA (t)	-99.9	-99.9 dB
Lep (t)	41.9	41.9 dB

Statistics

LAS5.00	58.9 dB
LAS10.00	58.5 dB
LAS33.30	57.3 dB
LAS50.00	56.8 dB
LAS66.60	56.3 dB
LAS90.00	55.3 dB

Calibration History

Preamp	Date	dB re. 1V/Pa	6.3	8.0	10.0
PRMLxT1	2020-10-29 10:49:24	-50.8	46.7	53.2	45.3
PRMLxT1	2020-10-14 08:37:22	-50.9	52.4	54.0	58.1
PRMLxT1	2020-10-14 08:37:07	-50.9	54.2	53.2	47.2
PRMLxT1	2020-10-13 09:07:33	-50.9	65.5	67.4	65.5
PRMLxT1	2020-10-13 09:07:19	-50.9	69.7	58.2	62.6
PRMLxT1	2020-10-01 11:08:27	-50.9	69.1	61.0	67.6
PRMLxT1	2020-10-01 11:08:12	-50.9	67.6	65.1	56.1
PRMLxT1	2020-01-30 07:34:47	-51.0	59.4	45.8	53.4
PRMLxT1	2020-01-30 07:34:32	-51.0	53.8	51.8	59.6
PRMLxT1	2020-01-14 09:46:24	-50.9	45.2	43.4	49.6
PRMLxT1	2020-01-14 09:46:10	-50.9	43.1	59.9	64.0
PRMLxT2B	2020-09-28 17:21:56	-50.9	67.0	56.5	58.5
PRMLxT2B	2020-09-28 17:21:41	-50.9	65.6	69.2	73.5
PRMLxT2B	2020-09-10 08:43:42	-50.8	46.9	47.4	65.7
PRMLxT2B	2020-09-10 08:43:27	-50.8	65.3	48.9	50.5
PRMLxT2B	2020-03-11 07:42:14	-50.7	75.1	71.8	76.4
PRMLxT2B	2020-03-11 07:42:00	-50.7	88.1	80.8	79.2
PRMLxT2B	2020-02-13 08:18:03	-50.5	50.8	59.2	43.7
PRMLxT2B	2020-02-13 08:17:08	-50.5	46.9	53.2	54.1

Summary

File Name on Meter	LxT_Data.087
File Name on PC	SLM_0004983_LxT_Data_087.01.ldbin
Serial Number	0004983
Model	SoundTrack LxT®
Firmware Version	2.302
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2020-10-29 11:28:14
Stop	2020-10-29 11:43:14
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-10-29 10:49:24
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting		
Peak Weight	A Weighting		
Detector	Slow		
Preamp	PRMLxT1		
Microphone Correction	Off		
Integration Method	Exponential		
Overload	144.6 dB		
	A	**C**	**Z**
Under Range Peak	**100.8**	97.8	102.8 dB
Under Range Limit	**49.8**	47.8	55.8 dB
Noise Floor	36.7	37.3	44.9 dB

Results

L_{ASeq}	58.8 dB	
LASE	88.3 dB	
EAS	75.415 µPa²h	
EAS8	2.413 mPa²h	
EAS40	12.066 mPa²h	
$L_{Apeak\ (max)}$	2020-10-29 11:34:29	86.0 dB
L_{ASmax}	2020-10-29 11:30:46	70.6 dB
L_{ASmin}	2020-10-29 11:37:36	53.2 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{Apeak} > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
L_{CSeq}	68.0 dB	
L_{ASeq}	58.8 dB	
L_{CSeq} - L_{ASeq}	9.2 dB	
L_{AIeq}	60.2 dB	
L_{Aeq}	58.8 dB	
L_{AIeq} - L_{Aeq}	1.5 dB	

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
L_{eq}	58.8					
$L_{S(max)}$	70.6	2020/10/29 11:30:46				
$L_{S(min)}$	53.2	2020/10/29 11:37:36				
$L_{Peak(max)}$	86.0	2020/10/29 11:34:29				

# Overloads	0
Overload Duration	0.0 s

Dose Settings

Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

Results

Dose	-99.9	-99.9 %
Projected Dose	-99.9	-99.9 %
TWA (Projected)	-99.9	-99.9 dB
TWA (t)	-99.9	-99.9 dB
Lep (t)	43.7	43.7 dB

Statistics

LAS5.00	63.7 dB
LAS10.00	60.4 dB
LAS33.30	57.6 dB
LAS50.00	57.0 dB
LAS66.60	56.3 dB
LAS90.00	55.2 dB

Calibration History

Preamp	Date	dB re. 1V/Pa	6.3	8.0	10.0
PRMLxT1	2020-10-29 10:49:24	-50.8	46.7	53.2	45.3
PRMLxT1	2020-10-14 08:37:22	-50.9	52.4	54.0	58.1
PRMLxT1	2020-10-14 08:37:07	-50.9	54.2	53.2	47.2
PRMLxT1	2020-10-13 09:07:33	-50.9	65.5	67.4	65.5
PRMLxT1	2020-10-13 09:07:19	-50.9	69.7	58.2	62.6
PRMLxT1	2020-10-01 11:08:27	-50.9	69.1	61.0	67.6
PRMLxT1	2020-10-01 11:08:12	-50.9	67.6	65.1	56.1
PRMLxT1	2020-01-30 07:34:47	-51.0	59.4	45.8	53.4
PRMLxT1	2020-01-30 07:34:32	-51.0	53.8	51.8	59.6
PRMLxT1	2020-01-14 09:46:24	-50.9	45.2	43.4	49.6
PRMLxT1	2020-01-14 09:46:10	-50.9	43.1	59.9	64.0
PRMLxT2B	2020-09-28 17:21:56	-50.9	67.0	56.5	58.5
PRMLxT2B	2020-09-28 17:21:41	-50.9	65.6	69.2	73.5
PRMLxT2B	2020-09-10 08:43:42	-50.8	46.9	47.4	65.7
PRMLxT2B	2020-09-10 08:43:27	-50.8	65.3	48.9	50.5
PRMLxT2B	2020-03-11 07:42:14	-50.7	75.1	71.8	76.4
PRMLxT2B	2020-03-11 07:42:00	-50.7	88.1	80.8	79.2
PRMLxT2B	2020-02-13 08:18:03	-50.5	50.8	59.2	43.7
PRMLxT2B	2020-02-13 08:17:08	-50.5	46.9	53.2	54.1

Summary

File Name on Meter	LxT_Data.088
File Name on PC	SLM_0004983_LxT_Data_088.02.ldbin
Serial Number	0004983
Model	SoundTrack LxT®
Firmware Version	2.302
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2020-10-29 11:47:24
Stop	2020-10-29 12:02:24
Duration	00:15:00.0
Run Time	00:00:00.2
Pause	00:14:59.8
Pre Calibration	2020-10-29 10:49:24
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting		
Peak Weight	A Weighting		
Detector	Slow		
Preamp	PRMLxT1		
Microphone Correction	Off		
Integration Method	Exponential		
Overload	144.6 dB		
	A	**C**	**Z**
Under Range Peak	**100.8**	97.8	102.8 dB
Under Range Limit	**49.8**	47.8	55.8 dB
Noise Floor	36.7	37.3	44.9 dB

Results

LASeq	63.4 dB	
LASE	56.4 dB	
EAS	0.048 µPa²h	
EAS8	6.928 mPa²h	
EAS40	34.640 mPa²h	
LApeak (max)	2020-10-29 11:47:24	-99.9 dB
LASmax	2020-10-29 11:47:24	63.4 dB
LASmin	2020-10-29 11:47:24	63.3 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LApeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LApeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LApeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LCSeq	77.6 dB	
LASeq	63.4 dB	
LCSeq - LASeq	14.2 dB	
LAleq	63.2 dB	
LAeq	62.4 dB	
LAleq - LAeq	0.8 dB	

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
Leq	62.4					
LS(max)	63.4	2020/10/29 11:47:24				
LS(min)	63.3	2020/10/29 11:47:24				

# Overloads	0
Overload Duration	0.0 s

Dose Settings

Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

Results

Dose	-99.9	-99.9 %
Projected Dose	-99.9	-99.9 %
TWA (Projected)	-99.9	-99.9 dB
TWA (t)	-99.9	-99.9 dB
Lep (t)	11.8	11.8 dB

Statistics

LAS5.00	63.4 dB

LAS10.00	63.4 dB
LAS33.30	63.4 dB
LAS50.00	63.4 dB
LAS66.60	63.3 dB
LAS90.00	63.3 dB

Calibration History

Preamp	Date	dB re. 1V/Pa	6.3	8.0	10.0
PRMLxT1	2020-10-29 10:49:24	-50.8	46.7	53.2	45.3
PRMLxT1	2020-10-14 08:37:22	-50.9	52.4	54.0	58.1
PRMLxT1	2020-10-14 08:37:07	-50.9	54.2	53.2	47.2
PRMLxT1	2020-10-13 09:07:33	-50.9	65.5	67.4	65.5
PRMLxT1	2020-10-13 09:07:19	-50.9	69.7	58.2	62.6
PRMLxT1	2020-10-01 11:08:27	-50.9	69.1	61.0	67.6
PRMLxT1	2020-10-01 11:08:12	-50.9	67.6	65.1	56.1
PRMLxT1	2020-01-30 07:34:47	-51.0	59.4	45.8	53.4
PRMLxT1	2020-01-30 07:34:32	-51.0	53.8	51.8	59.6
PRMLxT1	2020-01-14 09:46:24	-50.9	45.2	43.4	49.6
PRMLxT1	2020-01-14 09:46:10	-50.9	43.1	59.9	64.0
PRMLxT2B	2020-09-28 17:21:56	-50.9	67.0	56.5	58.5
PRMLxT2B	2020-09-28 17:21:41	-50.9	65.6	69.2	73.5
PRMLxT2B	2020-09-10 08:43:42	-50.8	46.9	47.4	65.7
PRMLxT2B	2020-09-10 08:43:27	-50.8	65.3	48.9	50.5
PRMLxT2B	2020-03-11 07:42:14	-50.7	75.1	71.8	76.4
PRMLxT2B	2020-03-11 07:42:00	-50.7	88.1	80.8	79.2
PRMLxT2B	2020-02-13 08:18:03	-50.5	50.8	59.2	43.7
PRMLxT2B	2020-02-13 08:17:08	-50.5	46.9	53.2	54.1

Construction Noise

Project: Crooked Creek

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	8	Daytime hours (7 am to 7 pm)
	0	Evening hours (7 pm to 10 pm)
	0	Nighttime hours (10 pm to 7 am)
Leq to L10 factor	3	

				R1				R2					R3					R4				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Site Preparation					***92***	***88***			***92***	***88***				***56***	***51***				***87***	***83***		
Graders	1	85	40%	25	91	87	0	25	91	87	90	0	720	52	48	51	10	50	85	81	84	0
Tractor/Loader/Backhoe	1	85	20%	50	85	78	0	50	85	78	81	0	720	52	45	48	10	75	81	74	77	0
Scrapers	1	84	40%	300	68	64	0	300	68	64	67	0	1020	48	44	47	10	100	78	74	77	0
Grading/Retaining Wall Construction					***92***	***88***			***92***	***88***				***58***	***53***	56			***89***	***84***		
Graders	1	85	40%	25	91	87	0	25	91	87	90	0	720	52	48	51	10	50	85	81	84	0
Rubber Tired Dozers	1	85	40%	50	85	81	0	50	85	81	84	0	720	52	48	51	10	75	81	77	80	0
Graders	2	85	40%	300	72	68	0	300	72	68	71	0	1020	52	48	51	10	100	82	78	81	0
Tractor/Loader/Backhoe	2	85	20%	300	72	65	0	300	72	65	68	0	1020	52	45	48	10	100	82	75	78	0
Water Trucks	1	80	10%	300	64	54	0	300	64	54	57	0	1020	44	34	37	10	100	74	64	67	0
Underground Utility Installation					***92***	***88***			***92***	***88***				***56***	***50***				***87***	***82***		
Excavator	1	85	40%	25	91	87	0	25	91	87	90	0	720	52	48	51	10	50	85	81	84	0
Tractor/Loader/Backhoe	1	85	20%	50	85	78	0	50	85	78	81	0	720	52	45	48	10	75	81	74	77	0
Tractor/Loader/Backhoe	1	85	20%	300	69	62	0	300	69	62	65	0	1020	49	42	45	10	100	79	72	75	0
Water Trucks	1	80	10%	300	64	54	0	300	64	54	57	0	1020	44	34	37	10	100	74	64	67	0
Paving					***92***	***89***			***92***	***89***				***57***	***53***				***89***	***85***		
Paver	1	85	50%	25	91	88	0	25	91	88	91	0	720	52	49	52	10	50	85	82	85	0
Paving Equipment	1	85	50%	50	85	82	0	50	85	82	85	0	720	52	49	52	10	75	81	78	81	0
Roller	2	85	20%	300	72	65	0	300	72	65	68	0	1020	52	45	48	10	100	82	75	78	0
Tractor/Loader/Backhoe	1	85	20%	300	69	62	0	300	69	62	65	0	1020	49	42	45	10	100	79	72	75	0
Cement and Mortar Mixers	1	79	40%	300	63	59	0	300	63	59	62	0	1020	43	39	42	10	100	73	69	72	0
Home Construction					***92***	***84***			***92***	***84***				***57***	***49***				***88***	***80***		
Cranes	1	85	16%	25	91	83	0	25	91	83	86	0	720	52	44	47	10	50	85	77	80	0
Forklift	1	85	20%	50	85	78	0	50	85	78	81	0	720	52	45	48	10	75	81	74	77	0
Forklift	1	85	20%	300	69	62	0	300	69	62	65	0	1020	49	42	45	10	100	79	72	75	0
Tractor/Loader/Backhoe	1	85	20%	300	69	62	0	300	69	62	65	0	1020	49	42	45	10	100	79	72	75	0
Generator Sets	3	82	50%	300	71	68	0	300	71	68	71	0	1020	51	48	51	10	100	81	78	81	0
Air Compressor	1	78	50%	300	62	59	0	300	62	59	62	0	1020	42	39	42	10	100	72	69	72	0
Welders	3	73	40%	300	62	58	0	300	62	58	61	0	1020	42	38	41	10	100	72	68	71	0
Maximum Noise Level						***89.0***				***89.0***					***53.3***					***84.5***		

Source for Ref. Noise Levels: FHWA RCNM, 2005

TRAFFIC NOISE ANALYSIS TOOL

Project Name: Crooked Creek
Analysis Scenario: Construction

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Off-site Construction Noise	Hard	50	25	25	25	10	0	2	49.0	49.3

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

Construction Vibration

Crooked Creek

Vibration Level Calculations

Based on Federal Transit Administration, Office of Planning and Environment

N =	1.5

Construction Equipment	Project Equipment	Equipment Peak Particle Velocity @ 25 Feet* (inches/second)	Distance to Receptor for < 0.5 PPV (Feet)	Estimated Velocity Decibels @ Distance** (VdB)	Estimated Peak Particle Velocity @ Distance*** (inches/second)
Unmitigated Vibration Levels					
R1 / R2					
Large Bulldozer or Bore/Drill Rig	Yes	0.089	25	86.9	0.089
Loaded Trucks	Yes	0.076	25	85.6	0.076
Small Bulldozer	Yes	0.003	25	57.5	0.003
R4					
Large Bulldozer or Bore/Drill Rig	Yes	0.089	50	77.9	0.031
Loaded Trucks	Yes	0.076	50	76.5	0.027
Small Bulldozer	Yes	0.003	50	48.5	0.001

Source:

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* 2018.

Notes:

* Values taken from Table 7-4.

** Based on the formula VdB = 20 x LOG10 (v/v_{ref}), where v_{ref} is equal to 1×10^{-6} in/sec (see page 111).

The approximate rms vibration velocity level (v) is calculated from PPV using a crest factor of 4 (see page 184).

*** Based on the formula $PPV(D) = PPV(25\text{ ft}) \times (25/D)^{N}$, where D is equal to the distance (see page 185).

N = soil type classification factor (typically ranges from 1 to 1.5)