Appendix C

Noise Data

Short-Term Noise Measurements Summary

KEY:	
	Orange cells are for input.
	Grey cells are intermediate calculations performed by the model.
	Green cells are data to present in a written analysis (output).

Measurement Date: 5/12/2025
Project Name: Phillip Road Project

Metrics	Coordinates	Start Time	Run Time	Leq	Lmax	L50	L90
ST-1	38°48'9.26"N 121°23'59.66"W	12:18:54 PM	15 Minutes	48.7	66.0	42.4	37.6
ST-2	38°47'36.31"N 121°23'35.62"W	1:52:46 PM	15 Minutes	40.6	58.5	35.6	32.9
ST-3	38°48'11.28"N, 121°23'36.42"W	1:18:26 PM	15 Minutes	43.8	56.9	41.7	38.7

Notes:
Computation of the CNEL based on 1-hour Leq measurements for each hour of a day are based on equation 2-27 on pg. 2-57 of Caltrans 2009.
Computation of the Ldn based on 1-hour Leq measurements for each hour of a day are based on equation 2-26 on pg. 2-56 of Caltrans 2009.
Log factors for the Ldn and CNEL penalties are provided in Table 2-12 on pg. 2-52 of Caltrans 2009.
Source:
California Department of Transportation (Caltrans), Division of Environmental Analysis. 2009 (November). 2009 Technical Noise Supplement. Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed September 24, 2010.

Long-Term Noise Measurement Raw Data

KEY: Orange cells are for input.

Measurement Site: LT-1
Measurement Date: 5/12/2025-5/13/2025
Project Name: Phillip Road Project

Number	Start Date	Start Time	End Time	Meas Mc	Input Ra	Input Ty	SPL Time Weight	LN% Freq Weigl	Overload	UnderRange	Sensitivity	LZeq	LCeq	LAeq
74	5/12/2025	1:00:00 PM	2:00:00 PM	Auto	Low	Mic	Slow	dBA	Yes	No	19.76mV/Pa	90.4	84.5	61.1
75	5/12/2025	2:00:00 PM	3:00:00 PM	Auto	Low	Mic	Slow	dBA	Yes	No	19.76mV/Pa	88.8	82.9	59.6
76	5/12/2025	3:00:00 PM	4:00:00 PM	Auto	Low	Mic	Slow	dBA	Yes	No	19.76mV/Pa	87.7	81.7	57.7
77	5/12/2025	4:00:00 PM	5:00:00 PM	Auto	Low	Mic	Slow	dBA	Yes	No	19.76mV/Pa	84.9	79	56.8
78	5/12/2025	5:00:00 PM	6:00:00 PM	Auto	Low	Mic	Slow	dBA	Yes	No	19.76mV/Pa	86.1	80.2	56.1
79	5/12/2025	6:00:00 PM	7:00:00 PM	Auto	Low	Mic	Slow	dBA	Yes	No	19.76mV/Pa	85.8	79.9	58.9
80	5/12/2025	7:00:00 PM	8:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	82.6	76.6	52.6
81	5/12/2025	8:00:00 PM	9:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	69.1	63.6	49.6
82	5/12/2025	9:00:00 PM	10:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	64.1	58.5	41.2
83	5/12/2025	10:00:00 PM	11:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	60.4	55.6	39.2
84	5/12/2025	11:00:00 PM	12:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	62.4	57.8	42.1
85	5/13/2025	12:00:00 AM	1:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	65.4	59.4	39.8
86	5/13/2025	1:00:00 AM	2:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	66.2	60.1	39.8
87	5/13/2025	2:00:00 AM	3:00:00 AM	Auto	Low	Mic	Slow	dBA	Yes	No	19.76mV/Pa	63.8	59	55.1
88	5/13/2025	3:00:00 AM	4:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	58.1	53.8	45
89	5/13/2025	4:00:00 AM	5:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	54.9	51.2	39.4
90	5/13/2025	5:00:00 AM	6:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	54.6	52.3	46.4
91	5/13/2025	6:00:00 AM	7:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	60.2	57.7	49
92	5/13/2025	7:00:00 AM	8:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	63.3	58.8	48.3
93	5/13/2025	8:00:00 AM	9:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	64.6	63.8	64.8
94	5/13/2025	9:00:00 AM	10:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	67.3	66.3	67.6
95	5/13/2025	10:00:00 AM	11:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	67.2	62	50.3
96	5/13/2025	11:00:00 AM	12:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	70	63.7	46.3
97	5/13/2025	12:00:00 PM	1:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	19.76mV/Pa	72.6	67.2	54.1

Number	LZSmax	LCSmax	LASmax	LZSmin	LCSmin	LASmin	LZE	LCE	LAE	LZpk	LCpk	LApk	LAS1%	LAS2%	LAS5%	LAS8%	LAS10%	LAS25%	LAS50%
74	102.4	96.3	75.7	64.3	57.3	38.8	126	120.1	96.7	115.8	110.2	101.2	69.7	68.3	66.7	65.5	64.8	61.8	58
75	100.1	94.7	76.4	61.3	56.9	39.9	124.4	118.5	95.2	113.7	110.7	106	68.7	67.1	64.9	63.6	63.1	59.9	55.9
76	102.3	96.5	72.8	62.6	56.1	36.1	123.3	117.3	93.3	113.8	108.6	103.4	66	64.9	63.1	62.1	61.5	58.7	54.6
77	98.7	92.8	74.3	58.3	52.5	36.1	120.5	114.6	92.4	114.2	106.4	95.8	68	64.5	61.8	60.4	59.7	56.2	52
78	97.7	92.6	68.1	61.6	54.8	35.4	121.7	115.8	91.7	111.4	108	90.5	64.1	63	61.5	60.4	59.9	57.1	53.6
79	96.7	91.7	75.2	65.5	58.8	38	121.4	115.5	94.5	112.2	105.8	89.6	70.9	69	63.7	62	61.3	58.1	54.3
80	94.7	89.2	64.4	50	46.8	34	118.2	112.2	88.2	108	103.2	82.3	61.6	60.4	58.6	57.5	56.8	53.3	48.9
81	84.7	78.4	72.5	51.5	48.1	33.7	104.7	99.2	85.2	98.7	94.1	91.5	61.3	55.6	49.7	47.8	46.9	43.1	39.9
82	79.9	73.6	62.4	50.9	48	34.3	99.7	94.1	76.8	93.1	86.6	76.9	51.7	47.6	44.2	43	42.4	39.9	38.3
83	73.8	68.7	55.1	50.5	47.6	34.2	96	91.2	74.8	84.6	79.3	73.1	44.5	43.4	42	41.4	41.1	39.7	38.3
84	81.4	78.3	63.5	49.6	46.4	32.9	98	93.4	77.7	91.7	86.3	78.4	51	46.9	43	42	41.5	39.8	38.1
85	79.9	72.8	47.8	49.7	46	33.7	101	95	75.4	92.2	85.1	80	44.8	44.3	43.2	42.5	42.2	40.5	38.9
86	80.5	74.4	48.6	51.4	48.7	34	101.8	95.7	75.4	92.3	88.2	69.8	45.1	44.3	43.2	42.5	42.1	40.4	38.9
87	80.5	72.9	72.9	50	46.9	34.1	99.4	94.6	90.7	110.9	110.3	110.3	65.9	63.9	61.1	59.5	58.7	54.6	49.3
88	72.4	68	68.3	51	48.4	33.8	93.7	89.4	80.6	107.4	106.5	106.2	56.3	53.6	50.1	48	47	42.2	39
89	66.3	59.7	48.3	50	47.2	34.7	90.5	86.8	75	76.7	72	63.9	44.7	44	42.8	42.1	41.8	39.9	38.4
90	68	66.9	68.5	49.7	47.2	34.7	90.2	87.9	82	84.6	83.6	85.3	59.4	57.7	48.5	45.2	44.4	41.9	40.1
91	73.4	73.1	66.5	52	48.4	37.3	95.8	93.3	84.6	85.5	85.5	85.1	61	58.6	53.5	51.3	50.3	47.1	44.6
92	77.7	71.4	72.9	52	49.6	38.3	98.9	94.4	83.9	90.9	90	91.5	57.8	55.5	52.5	51.1	50.3	47.6	45.9
93	88.4	87.8	89.5	50	47.2	32.8	100.2	99.4	100.4	102.6	102	103.7	77.7	67.8	56.4	50.3	48.3	43.1	40.4
94	88.8	88.3	90	48.7	46.2	32.4	102.9	101.9	103.2	102.2	101.5	103.3	83.3	79.5	67.3	58.7	54	42.2	38.2
95	84.1	80.3	75.7	48.4	45.9	31.7	102.8	97.6	85.9	96.6	95.4	92.6	58.9	53.5	48.2	45.1	44.1	40.1	37
96	83.1	76.9	65.5	47.3	44.7	31.8	105.6	99.3	81.9	95.9	89.9	82.6	59	54.7	50.3	48.7	48.1	44	39.9
97	87.9	84.8	79.4	45.7	43.2	31.8	108.2	102.8	89.7	99.6	98.9	96.7	63.5	55.8	51.3	49.5	48.6	43.4	38.3

Long-Term Noise Measurement Calculations

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Measurement Site: LT-1
Measurement Date: 5/12/2025-5/13/2025
Project Name: Phillip Road Project

Hour of Day 24-hr Format	L_{dn} Start	L_{dn} End	C_{NEL} Start	C_{NEL} End
Daytime	7	22	7	19
Evening	N/A	N/A	19	22
Nighttime	22	7	22	7

Hour of Day (24-hr Format)	L_{eq}	L_{max}	L_{50}	L_{min}
	Sound Levels Descriptors			
13:00	61	76	58	39
14:00	60	76	56	40
15:00	58	73	55	36
16:00	57	74	52	36
17:00	56	68	54	35
18:00	59	75	54	38
19:00	53	64	49	34
20:00	50	73	40	34
21:00	41	62	38	34
22:00	39	55	38	34
23:00	42	64	38	33
0:00	40	48	39	34
1:00	40	49	39	34
2:00	55	73	49	34
3:00	45	68	39	34
4:00	39	48	38	35
5:00	46	69	40	35
6:00	49	67	45	37
7:00	48	73	46	38
8:00	65	90	40	33
9:00	68	90	38	32
10:00	50	76	37	32
11:00	46	66	40	32
12:00	54	79	38	32

Sound Power[1]
=10*Log($L_{eq,\ 1hr}$/10)

Equivalent Noise Level (L_{eq})				
Day	**Night**	**Day**	**Evening**	**Night**
1288249.552		1288249.552		
912010.8394		912010.8394		
588843.6554		588843.6554		
478630.0923		478630.0923		
407380.2778		407380.2778		
776247.1166		776247.1166		
181970.0859			181970.0859	
91201.08394			91201.08394	
13182.56739			13182.56739	
	8317.637711			8317.637711
	16218.10097			16218.10097
	9549.92586			9549.92586
	9549.92586			9549.92586
	323593.6569			323593.6569
	31622.7766			31622.7766
	8709.6359			8709.6359
	43651.58322			43651.58322
	79432.82347			79432.82347
67608.29754				
3019951.72		3019951.72		
5754399.373		5754399.373		
107151.9305		107151.9305		
42657.95188		42657.95188		
257039.5783		257039.5783		

Day Night Average (L_{dn})[2]		Community Noise Equivalent Level (CNEL)[3]		
Day	**Night**	**Day**	**Evening**	**Night**
Sum of Sound Power during Period w/o Penalty				
13,729,485	530,646	13,375,523	286,354	530,646
Log Factor for CNEL Penalty (i.e., 10*log(x))[4]				
1	10	1	3	10
Sound Power during Period with penalty				
13,729,485	5,306,461	13,375,523	859,061	5,306,461
Number of Hours				
		24		
L_{dn}	59.2	**CNEL**	59.3	

Notes:
[1] Computation of Sound Power are based on equation 7-1 on pg. 7-9 of Caltrans 2013
[2] Computation of the L_{dn} based on 1-hour L_{eq} measurements for each hour of a day are based on equation 2-23 on pg. 2-52 of Caltrans 2013.
[3] Computation of the CNEL based on 1-hour L_{eq} measurements for each hour of a day are based on equation 2-24 on pg. 2-53 of Caltrans 2013.
[4] Log factors for the L_{dn} and CNEL penalties are provided in Table 2-11 on pg. 2-48 of Caltrans 2013.
[5] Average noise level descriptors were logarithmicly averaged over the total number of hours
Source:
California Department of Transportation (Caltrans), Division of Environmental Analysis. 2013 (September). *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. Sacramento, CA. Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf>. Accessed Febuary 26, 2025.

Sound Power[1]
=10*Log($L_{eq,\ 1hr}$/10)

Hour of Day	Maximum Noise Levels (L_{max}) Day	Night	Day	Evening	Night
13:00	37153523		37153522.91		
14:00	43651583		43651583.22		
15:00	19054607		19054607.18		
16:00	26915348		26915348.04		
17:00	6456542		6456542.29		
18:00	33113112		33113112.15		
19:00	2754229			2754228.703	
20:00	17782794			17782794.1	
21:00	1737801			1737800.829	
22:00		323593.6569			323593.6569
23:00		2238721.139			2238721.139
0:00		60255.95861			60255.95861
1:00		72443.59601			72443.59601
2:00		19498446			19498446
3:00		6760829.754			6760829.754
4:00		67608.29754			67608.29754
5:00		7079457.844			7079457.844
6:00		4466835.922			4466835.922
7:00	19498446		19498446		
8:00	891250938		891250938.1		
9:00	1000000000		1000000000		
10:00	37153523		37153522.91		
11:00	3548134		3548133.892		
12:00	87096359		87096359		

Hour of Day	Sound Pressure Level Exceeded 50% of a Specific Time Period (L_{50}) Day	Night	Day	Evening	Night
13:00	630957.3445		630957.3445		
14:00	389045.145		389045.145		
15:00	288403.1503		288403.1503		
16:00	158489.3192		158489.3192		
17:00	229086.7653		229086.7653		
18:00	269153.4804		269153.4804		
19:00	77624.71166			77624.71166	
20:00	9772.37221			9772.37221	
21:00	6760.829754			6760.829754	
22:00		6760.829754			6760.829754
23:00		6456.54229			6456.54229
0:00		7762.471166			7762.471166
1:00		7762.471166			7762.471166
2:00		85113.80382			85113.80382
3:00		7943.282347			7943.282347
4:00		6918.309709			6918.309709
5:00		10232.92992			10232.92992
6:00		28840.31503			28840.31503
7:00	38904.5145		38904.5145		
8:00	10964.78196		10964.78196		
9:00	6606.93448		6606.93448		
10:00	5011.872336		5011.872336		
11:00	9772.37221		9772.37221		
12:00	6760.829754		6760.829754		

Hour of Day	Mininum Noise Levels (L_{min}) Day	Night	Day	Evening	Night
13:00	7585.77575		7585.77575		
14:00	9772.37221		9772.37221		
15:00	4073.802778		4073.802778		
16:00	4073.802778		4073.802778		
17:00	3467.368505		3467.368505		
18:00	6309.573445		6309.573445		
19:00	2511.886432			2511.886432	
20:00	2344.228815			2344.228815	
21:00	2691.534804			2691.534804	
22:00		2630.267992			2630.267992
23:00		1949.8446			1949.8446
0:00		2344.228815			2344.228815
1:00		2511.886432			2511.886432
2:00		2570.395783			2570.395783
3:00		2398.832919			2398.832919
4:00		2951.209227			2951.209227
5:00		2951.209227			2951.209227
6:00		5370.317964			5370.317964
7:00	6760.829754		6760.829754		
8:00	1905.460718		1905.460718		
9:00	1737.800829		1737.800829		
10:00	1479.108388		1479.108388		
11:00	1513.561248		1513.561248		
12:00	1513.561248		1513.561248		

Average Sound Level Descriptors[5]

L_{eq} Day	Night	Day	Evening	Night	L_{50} Day	Night	Day	Evening	Night
60	48	61	50	48	52	43	53	45	43

L_{max} Day	Night	Day	Evening	Night	L_{min} Day	Night	Day	Evening	Night
82	67	83	69	67	36	35	36	34	35

Long-Term Noise Measurement Summary

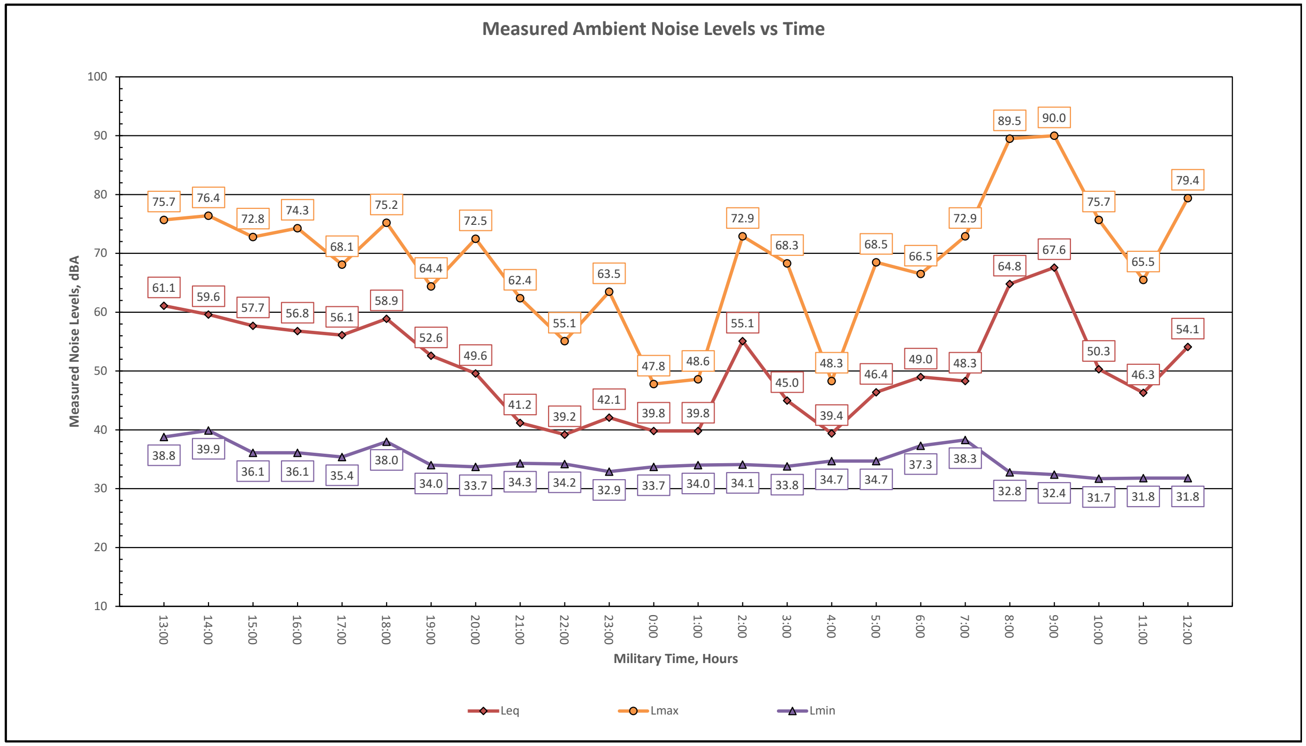
KEY: Orange cells are for input.

Green cells are data to present in a written analysis (output).

Measurement Site:	LT-1
Measurement Date:	5/12/2025-5/13/2025
Project Name:	Phillip Road Project
Coordinates	38°47'48.02"N 121°23'35.91"W

Hour of Day (military time)	Measured Level, dBA L_{eq}	L_{max}	L_{50}	L_{min}
13:00	61.1	75.7	58.0	38.8
14:00	59.6	76.4	55.9	39.9
15:00	57.7	72.8	54.6	36.1
16:00	56.8	74.3	52.0	36.1
17:00	56.1	68.1	53.6	35.4
18:00	58.9	75.2	54.3	38.0
19:00	52.6	64.4	48.9	34.0
20:00	49.6	72.5	39.9	33.7
21:00	41.2	62.4	38.3	34.3
22:00	39.2	55.1	38.3	34.2
23:00	42.1	63.5	38.1	32.9
0:00	39.8	47.8	38.9	33.7
1:00	39.8	48.6	38.9	34.0
2:00	55.1	72.9	49.3	34.1
3:00	45.0	68.3	39.0	33.8
4:00	39.4	48.3	38.4	34.7
5:00	46.4	68.5	40.1	34.7
6:00	49.0	66.5	44.6	37.3
7:00	48.3	72.9	45.9	38.3
8:00	64.8	89.5	40.4	32.8
9:00	67.6	90.0	38.2	32.4
10:00	50.3	75.7	37.0	31.7
11:00	46.3	65.5	39.9	31.8
12:00	54.1	79.4	38.3	31.8

Metrics	L_{eq}	L_{max}	L_{50}	L_{min}
Day Average	59.9	81.8	51.8	36.0
Night Average	47.7	66.5	42.7	34.6



Ldn	59.2
Day %	96.3%
Night %	3.7%

Notes: Primary noises includes traffic noise originating from Phillip Road

Long-Term Noise Measurement Raw Data

KEY: Orange cells are for input.

Measurement Site: LT-2
Measurement Date: 5/12/2025-5/13/2025
Project Name: Phillip Road Project

Number	Start Date	Start Time	End Time	Meas Mc	Input Ra	Input Ty	SPL Time Weight	LN% Freq Weigl	Overload	UnderRange	Sensitivity
7	5/12/2025	1:00:00 PM	2:00:00 PM	Auto	Low	Mic	Slow	dBA	Yes	No	17.41mV/Pa
8	5/12/2025	2:00:00 PM	3:00:00 PM	Auto	Low	Mic	Slow	dBA	Yes	No	17.41mV/Pa
9	5/12/2025	3:00:00 PM	4:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
10	5/12/2025	4:00:00 PM	5:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
11	5/12/2025	5:00:00 PM	6:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
12	5/12/2025	6:00:00 PM	7:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
13	5/12/2025	7:00:00 PM	8:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
14	5/12/2025	8:00:00 PM	9:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
15	5/12/2025	9:00:00 PM	10:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
16	5/12/2025	10:00:00 PM	11:00:00 PM	Auto	Low	Mic	Slow	dBA	No	Yes	17.41mV/Pa
17	5/12/2025	11:00:00 PM	12:00:00 AM	Auto	Low	Mic	Slow	dBA	No	Yes	17.41mV/Pa
18	5/13/2025	12:00:00 AM	1:00:00 AM	Auto	Low	Mic	Slow	dBA	No	Yes	17.41mV/Pa
19	5/13/2025	1:00:00 AM	2:00:00 AM	Auto	Low	Mic	Slow	dBA	No	Yes	17.41mV/Pa
20	5/13/2025	2:00:00 AM	3:00:00 AM	Auto	Low	Mic	Slow	dBA	No	Yes	17.41mV/Pa
21	5/13/2025	3:00:00 AM	4:00:00 AM	Auto	Low	Mic	Slow	dBA	No	Yes	17.41mV/Pa
22	5/13/2025	4:00:00 AM	5:00:00 AM	Auto	Low	Mic	Slow	dBA	No	Yes	17.41mV/Pa
23	5/13/2025	5:00:00 AM	6:00:00 AM	Auto	Low	Mic	Slow	dBA	No	Yes	17.41mV/Pa
24	5/13/2025	6:00:00 AM	7:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
25	5/13/2025	7:00:00 AM	8:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
26	5/13/2025	8:00:00 AM	9:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
27	5/13/2025	9:00:00 AM	10:00:00 AM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
28	5/13/2025	10:00:00 AM	11:00:00 AM	Auto	Low	Mic	Slow	dBA	No	Yes	17.41mV/Pa
29	5/13/2025	11:00:00 AM	12:00:00 PM	Auto	Low	Mic	Slow	dBA	No	No	17.41mV/Pa
30	5/13/2025	12:00:00 PM	1:00:00 PM	Auto	Low	Mic	Slow	dBA	Yes	No	17.41mV/Pa

Number	LZeq	LCeq	LAeq	LZSmax	LCSmax	LASmax	LZSmin	LCSmin	LASmin	LZE	LCE	LAE	LZpk	LCpk	LApk	LAS1%	LAS2%	LAS5%	LAS8%	LAS10%	LAS25%	LAS50%
7	83.6	78	57.3	98.9	92.4	72.1	60.4	54.4	38.4	119.2	113.6	92.9	114.9	107.8	91	66.4	64.7	62.8	61.7	61.1	57.7	54
8	81.4	75.9	55.2	97.3	90.6	71.4	59.3	54.5	39.3	117	111.5	90.8	110.6	104.5	86.7	64.5	63	61.1	59.6	58.9	55.4	51.5
9	79.7	74.2	53.6	94.4	88.4	71	54	49.3	34.3	115.3	109.8	89.2	107.7	103.5	86.2	62.3	61	59	57.9	57.3	54	50.2
10	78.9	73.4	54.2	95.2	89.9	73	52.4	47.9	36.8	114.5	109	89.8	109	103.9	86.1	65.4	62.8	59.5	57.8	56.7	52.6	48.5
11	77.7	72.1	51.7	94.7	88.8	65.3	51	47.8	34	113.3	107.7	87.3	109.5	104.5	85.3	60.8	59.6	57.3	56	55.3	52.2	48.8
12	77.9	72.5	51.8	91.2	85.5	65.7	53.4	47.5	37.4	113.5	108.1	87.4	108.5	103.8	93.7	61.3	60.2	58.1	56.4	55.6	51.9	48.1
13	75.1	69.9	49.6	91.4	86.4	63.4	49.3	45.6	33	110.7	105.5	85.2	106.3	103.2	81	59.2	57.8	55.4	54.1	53.4	49.8	45.8
14	68.4	63.8	48.1	85.2	82.5	71.9	47.1	44.6	31	104	99.4	83.7	97.5	98.2	94	62.9	54	49.4	47.6	46.7	42.3	38.4
15	64.3	58.2	38.1	80.1	73	53.5	50	46.9	31	99.9	93.8	73.7	95.9	89.1	73.9	48.8	46.4	43.3	41.4	40.5	36.5	34.4
16	62.1	56	36.7	79.9	72.3	58.8	46.2	43.6	29.9	97.7	91.6	72.3	93.9	86.6	77.2	42.6	40.3	39	38.3	37.8	35.4	33.4
17	63.4	57.5	37.4	79.5	76.5	56.7	42.6	40.1	29.2	99	93.1	73	91.9	85.3	72.9	50.3	46.6	38.9	36.9	36.2	33.6	32
18	63	55.5	36.3	80.3	73.1	53.1	40.8	38.3	29.7	98.6	91.1	71.9	94.1	86	74.2	43.5	41.6	39.8	39	38.5	36.5	34.7
19	63.5	56	36.7	81.7	75.5	53.8	42.5	40.2	29.3	99.1	91.6	72.3	96.3	90.1	79.6	43.2	41.9	40.3	39.5	39.1	37.3	35.4
20	58.7	51.6	41.5	76.2	68.3	55.1	43	39.9	29.2	94.3	87.2	77.1	89.6	87.2	86.9	46.8	45.8	44.8	44.4	44.2	43.2	41.2
21	58.7	52.1	34.1	75.5	67.6	53.4	44.7	42	29.5	94.3	87.7	69.7	88.4	87.1	88.3	41.3	39.8	38.3	37.5	37.1	34.4	31.9
22	50.5	48.1	38.2	67.3	58.3	49.1	42.9	40.1	29.4	86.1	83.7	73.8	78.9	71.2	67.5	47.1	46.4	44.2	42.4	41.5	38.5	35.3
23	51.1	49.3	44.3	71	69.1	67	44.5	41.4	31.4	86.7	84.9	79.9	86.3	85.8	83.6	53	51.2	48.1	46.9	46.3	43.8	40.8
24	64	63.3	50.1	88.7	88.5	74.2	46.3	41.8	34	99.6	98.9	85.7	97.7	97.7	85.2	61.5	58.7	53.1	50.8	49.6	45.2	41.2
25	59	56.8	48.7	73.3	73.2	73	47.3	44.2	34.1	94.6	92.4	84.3	91.6	91.4	92.5	61	57.8	53.7	50.9	49.6	45.3	42
26	56.6	55.2	47	74.3	74.2	73.6	45.8	42.8	32.1	92.2	90.8	82.6	86.7	86.1	85.9	60.5	56.4	49.6	46.9	45.7	42.1	39.5
27	55	52	40.4	73.7	67.5	55.6	45.8	42.9	31.2	90.6	87.6	76	89.2	80.3	73.3	49.4	48.2	45.8	44.4	43.7	40.4	37.3
28	64.9	62.3	49.6	85	84	72.2	46.2	42.8	30.3	100.5	97.9	85.2	95	93.8	89.8	62.4	58.8	49	45.4	44.2	40.2	37.7
29	60.9	57	48	79.1	77	71.6	45.8	43.3	32.1	96.5	92.6	83.6	91.7	89.6	85.6	56.9	54.8	50.1	48.2	47.3	43.4	40.2
30	67.2	64.4	57.9	87.7	87	85.9	43.7	40.8	31.4	102.8	100	93.5	112.6	112.5	113.9	70.7	64.9	55.2	50.3	48.6	41.9	38.6

Long-Term Noise Measurement Calculations

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Measurement Site: LT-2
Measurement Date: 5/12/2025-5/13/2025
Project Name: Phillip Road Project

Hour of Day 24-hr Format	L_{dn} Start	L_{dn} End	C_{NEL} Start	C_{NEL} End
Daytime	7	22	7	19
Evening	N/A	N/A	19	22
Nighttime	22	7	22	7

Sound Power[1]
=10*Log($L_{eq,\ 1hr}$/10)

Hour of Day (24-hr Format)	Sound Levels Descriptors L_{eq}	L_{max}	L_{50}	L_{min}	Equivalent Noise Level (L_{eq}) Day	Night	Day	Evening	Night
13:00	57	72	54	38	537031.7964		537031.7964		
14:00	55	71	52	39	331131.1215		331131.1215		
15:00	54	71	50	34	229086.7653		229086.7653		
16:00	54	73	49	37	263026.7992		263026.7992		
17:00	52	65	49	34	147910.8388		147910.8388		
18:00	52	66	48	37	151356.1248		151356.1248		
19:00	50	63	46	33	91201.08394			91201.08394	
20:00	48	72	38	31	64565.4229			64565.4229	
21:00	38	54	34	31	6456.54229			6456.54229	
22:00	37	59	33	30		4677.351413			4677.351413
23:00	37	57	32	29		5495.408739			5495.408739
0:00	36	53	35	30		4265.795188			4265.795188
1:00	37	54	35	29		4677.351413			4677.351413
2:00	42	55	41	29		14125.37545			14125.37545
3:00	34	53	32	30		2570.395783			2570.395783
4:00	38	49	35	29		6606.93448			6606.93448
5:00	44	67	41	31		26915.34804			26915.34804
6:00	50	74	41	34		102329.2992			102329.2992
7:00	49	73	42	34	74131.02413				
8:00	47	74	40	32	50118.72336		50118.72336		
9:00	40	56	37	31	10964.78196		10964.78196		
10:00	50	72	38	30	91201.08394		91201.08394		
11:00	48	72	40	32	63095.73445		63095.73445		
12:00	58	86	39	31	616595.0019		616595.0019		

Day Night Average (L_{dn})[2] Day	Night	Community Noise Equivalent Level (CNEL)[3] Day	Evening	Night
Sum of Sound Power during Period w/o Penalty				
2,727,873	171,663	2,491,519	162,223	171,663
Log Factor for CNEL Penalty (i.e., 10*log(x))[4]				
1	10	1	3	10
Sound Power during Period with penalty				
2,727,873	1,716,633	2,491,519	486,669	1,716,633
Number of Hours				
		24		
L_{dn}	52.7	CNEL	52.9	

Notes:
[1] Computation of Sound Power are based on equation 7-1 on pg. 7-9 of Caltrans 2013
[2] Computation of the L_{dn} based on 1-hour L_{eq} measurements for each hour of a day are based on equation 2-23 on pg. 2-52 of Caltrans 2013.
[3] Computation of the CNEL based on 1-hour L_{eq} measurements for each hour of a day are based on equation 2-24 on pg. 2-53 of Caltrans 2013.
[4] Log factors for the L_{dn} and CNEL penalties are provided in Table 2-11 on pg. 2-48 of Caltrans 2013.
[5] Average noise level descriptors were logarithmicly averaged over the total number of hours

Source:
California Department of Transportation (Caltrans), Division of Environmental Analysis. 2013 (September). *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. Sacramento, CA. Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf>. Accessed Febuary 26, 2025.

Sound Power[1]
=10*Log($L_{eq,\ 1hr}$/10)

Hour of Day	Maximum Noise Levels (L_{max}) Day	Night	Day	Evening	Night
13:00	16218101		16218100.97		
14:00	13803843		13803842.65		
15:00	12589254		12589254.12		
16:00	19952623		19952623.15		
17:00	3388442		3388441.561		
18:00	3715352		3715352.291		
19:00	2187762			2187761.624	
20:00	15488166			15488166.19	
21:00	223872			223872.1139	
22:00		758577.575			758577.575
23:00		467735.1413			467735.1413
0:00		204173.7945			204173.7945
1:00		239883.2919			239883.2919
2:00		323593.6569			323593.6569
3:00		218776.1624			218776.1624
4:00		81283.05162			81283.05162
5:00		5011872.336			5011872.336
6:00		26302679.92			26302679.92
7:00	19952623		19952623.15		
8:00	22908677		22908676.53		
9:00	363078		363078.0548		
10:00	16595869		16595869.07		
11:00	14454398		14454397.71		
12:00	389045145		389045145		

Hour of Day	Sound Pressure Level Exceeded 50% of a Specific Time Period (L_{50}) Day	Night	Day	Evening	Night
13:00	251188.6432		251188.6432		
14:00	141253.7545		141253.7545		
15:00	104712.8548		104712.8548		
16:00	70794.57844		70794.57844		
17:00	75857.7575		75857.7575		
18:00	64565.4229		64565.4229		
19:00	38018.93963			38018.93963	
20:00	6918.309709			6918.309709	
21:00	2754.228703			2754.228703	
22:00		2187.761624			2187.761624
23:00		1584.893192			1584.893192
0:00		2951.209227			2951.209227
1:00		3467.368505			3467.368505
2:00		13182.56739			13182.56739
3:00		1548.816619			1548.816619
4:00		3388.441561			3388.441561
5:00		12022.64435			12022.64435
6:00		13182.56739			13182.56739
7:00	15848.93192		15848.93192		
8:00	8912.509381		8912.509381		
9:00	5370.317964		5370.317964		
10:00	5888.436554		5888.436554		
11:00	10471.28548		10471.28548		
12:00	7244.359601		7244.359601		

Hour of Day	Mininum Noise Levels (L_{min}) Day	Night	Day	Evening	Night
13:00	6918.309709		6918.309709		
14:00	8511.380382		8511.380382		
15:00	2691.534804		2691.534804		
16:00	4786.300923		4786.300923		
17:00	2511.886432		2511.886432		
18:00	5495.408739		5495.408739		
19:00	1995.262315			1995.262315	
20:00	1258.925412			1258.925412	
21:00	1258.925412			1258.925412	
22:00		977.237221			977.237221
23:00		831.7637711			831.7637711
0:00		933.2543008			933.2543008
1:00		851.1380382			851.1380382
2:00		831.7637711			831.7637711
3:00		891.2509381			891.2509381
4:00		870.96359			870.96359
5:00		1380.384265			1380.384265
6:00		2511.886432			2511.886432
7:00	2570.395783		2570.395783		
8:00	1621.810097		1621.810097		
9:00	1318.256739		1318.256739		
10:00	1071.519305		1071.519305		
11:00	1621.810097		1621.810097		
12:00	1380.384265		1380.384265		

Average Sound Level Descriptors[5]

	L_{eq} Day	Night	Day	Evening	Night	L_{50} Day	Night	Day	Evening	Night
	53	43	54	47	43	47	38	48	42	38

	L_{max} Day	Night	Day	Evening	Night	L_{min} Day	Night	Day	Evening	Night
	76	66	76	68	66	35	30	35	32	30

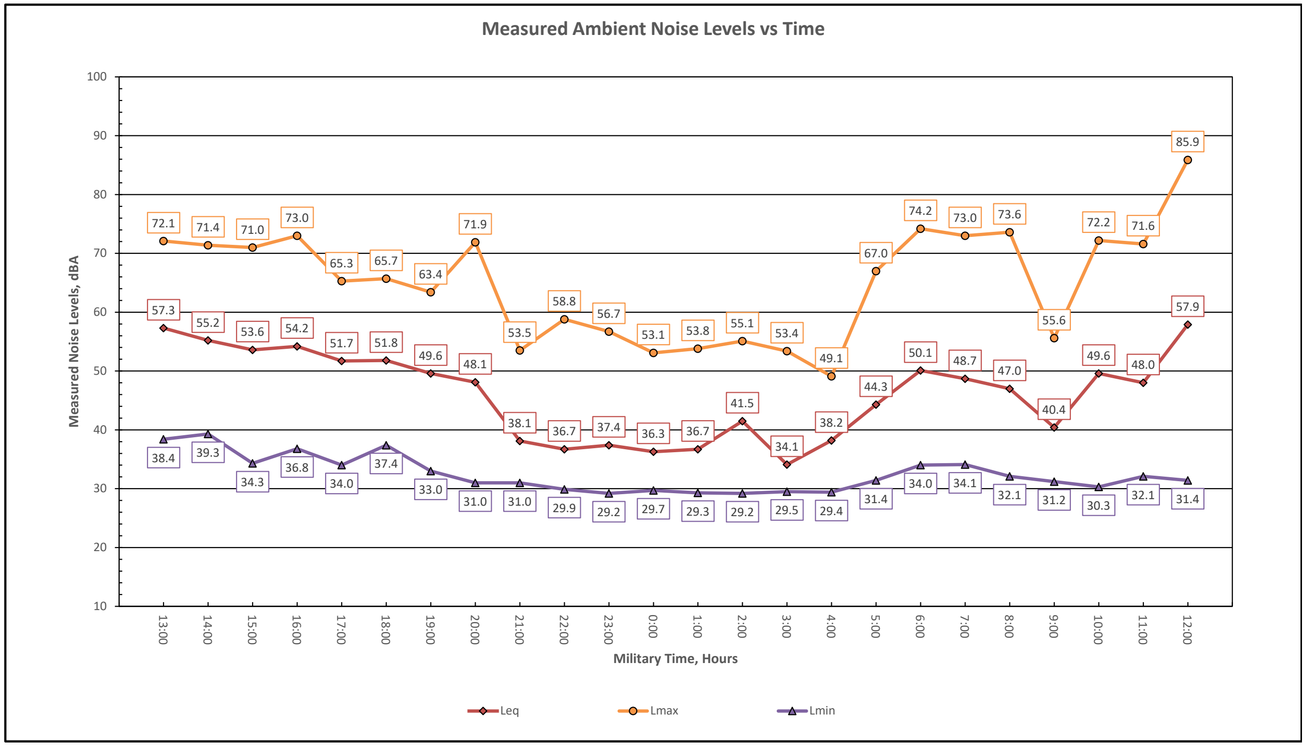
Long-Term Noise Measurement Summary

KEY:	Orange cells are for input.
	Green cells are data to present in a written analysis (output).

Measurement Site:	LT-2
Measurement Date:	5/12/2025-5/13/2025
Project Name:	Phillip Road Project
Coordinates	38°48'7.76"N 121°23'58.88"W

Hour of Day (military time)	Measured Level, dBA L_{eq}	L_{max}	L_{50}	L_{min}
13:00	57.3	72.1	54.0	38.4
14:00	55.2	71.4	51.5	39.3
15:00	53.6	71.0	50.2	34.3
16:00	54.2	73.0	48.5	36.8
17:00	51.7	65.3	48.8	34.0
18:00	51.8	65.7	48.1	37.4
19:00	49.6	63.4	45.8	33.0
20:00	48.1	71.9	38.4	31.0
21:00	38.1	53.5	34.4	31.0
22:00	36.7	58.8	33.4	29.9
23:00	37.4	56.7	32.0	29.2
0:00	36.3	53.1	34.7	29.7
1:00	36.7	53.8	35.4	29.3
2:00	41.5	55.1	41.2	29.2
3:00	34.1	53.4	31.9	29.5
4:00	38.2	49.1	35.3	29.4
5:00	44.3	67.0	40.8	31.4
6:00	50.1	74.2	41.2	34.0
7:00	48.7	73.0	42.0	34.1
8:00	47.0	73.6	39.5	32.1
9:00	40.4	55.6	37.3	31.2
10:00	49.6	72.2	37.7	30.3
11:00	48.0	71.6	40.2	32.1
12:00	57.9	85.9	38.6	31.4

Metrics	L_{eq}	L_{max}	L_{50}	L_{min}
Day Average	52.6	75.6	47.3	34.8
Night Average	42.8	65.7	37.7	30.5



Ldn	52.7
Day %	94.1%
Night %	5.9%

Notes: Primary noises include traffic noise originating from Phillip Road. Secondary noise sources include natural noises and the noise from an aircraft flying that was observed during measurement

Construction Equipment Average Noise Levels

Project Name: Phillip Road Project

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (dBA L_{eq})
Thresholds		
Daytime Standard		
Evening Standard		
Nighttime Standard		
Sensitive Receptors		
Residence 1 from Project Site	500	62.1
Residence 2 from Project Site	2200	49.3
Residence 1 from Off-Site Work	100	76.1
Residence 2 from Off-Site Work	590	60.7

Equipment[1]	Reference Emission Noise Levels (dBA L_{max}) at 50 feet[2]	Usage Factor[2]
Scraper	84	0.4
Dozer	82	0.4

Ground Type	Hard
Source Height	8
Receiver Height	5
Ground Factor[3]	0.00

Predicted Noise Level[4]	dBA L_{eq} at 50 feet[4]
Scraper	80.0
Dozer	78.0

Combined Predicted Noise Level (dBA L_{eq} at 50 feet)
82.1

Sources:

[1]Where measured values are not available, noise levels based on the Construction Noise Control Specification 721.560 were used.

[2] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[3] Based on Figure 4-26 from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 86).

[4] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 177).

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2018: pg 86); and

D = Distance from source to receiver.

Construction Equipment Maximum Noise Levels

Project Name: Phillip Road Project

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (dBA L_{max})
Thresholds		
Daytime Standard		
Nighttime Standard		
Sensitive Receptors		
Residence 1 from Project Site	500	66.1
Residence 2 from Project Site	2200	53.3
Residence 1 from Off-Site Work	100	80.1
Residence 2 from Off-Site Work	590	64.7

Equipment[1]	Reference Emission Noise Levels (dBA L_{max}) at 50 feet[2]
Scraper	84
Dozer	82

Ground Type	Hard
Source Height	8
Receiver Height	5
Ground Factor[3]	0.00

Predicted Noise Level [3]	dBA L_{max} at 50 feet[3]
Scraper	84.0
Dozer	82.0

Combined Predicted Noise Level (dBA L_{max} at 50 feet)
86.1

Sources:

[1]Where measured values are not available, noise levels based on the Construction Noise Control Specification 721.560 were used.

[2] Based on Figure 4-26 from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 86).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 177).

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor, assumed to be 1 for the purposes of the calculation of maximum noise levels;

G = Constant that accounts for topography and ground effects (FTA 2018: pg 86); and

D = Distance from source to receiver.

Equipment Description	Acoustical Usage Factor (%)	Spec 721.560 Lmax @ 50ft (dBA slow)	Actual Measured Lmax @ 50ft (dBA slow)	No. of Actual Data Samples (count)	Spec 721.560 LmaxCalc	Spec 721.560 Leq	Distance	Actual Measured LmaxCalc	Actual Measured Leq
Auger Drill Rig	20	85	84	36	79.0	72.0	100	78.0	71.0
Backhoe	40	80	78	372	74.0	70.0	100	72.0	68.0
Bar Bender	20	80	80	0	74.0	67.0	100		
Blasting	100	94	94	0	88.0		100		
Boring Jack Power Unit	50	80	83	1	74.0	71.0	100	77.0	74.0
Chain Saw	20	85	84	46	79.0	72.0	100	78.0	71.0
Clam Shovel (dropping)	20	93	87	4	87.0	80.0	100	81.0	74.0
Compactor (ground)	20	80	83	57	74.0	67.0	100	77.0	70.0
Compressor (air)	40	80	78	18	74.0	70.0	100	72.0	68.0
Concrete Batch Plant	15	83	83	0	77.0	68.7	100		
Concrete Mixer Truck	40	85	79	40	79.0	75.0	100	73.0	69.0
Concrete Pump Truck	20	82	81	30	76.0	69.0	100	75.0	68.0
Concrete Saw	20	90	90	55	84.0	77.0	100	84.0	77.0
Crane	16	85	81	405	79.0	71.0	100	75.0	67.0
Dozer	40	85	82	55	79.0	75.0	100	76.0	72.0
Drill Rig Truck	20	84	79	22	78.0	71.0	100	73.0	66.0
Drum Mixer	50	80	80	1	74.0	71.0	100	74.0	71.0
Dump Truck	40	84	76	31	78.0	74.0	100	70.0	66.0
Excavator	40	85	81	170	79.0	75.0	100	75.0	71.0
Flat Bed Truck	40	84	74	4	78.0	74.0	100	68.0	64.0
Front End Loader	40	80	79	96	74.0	70.0	100	73.0	69.0
Generator	50	82	81	19	76.0	73.0	100	75.0	72.0
Generator (<25KVA, VMS signs)	50	70	73	74	64.0	61.0	100	67.0	64.0
Gradall	40	85	83	70	79.0	75.0	100	77.0	73.0
Grader	40	85	85	0	79.0	75.0	100		
Grapple (on Backhoe)	40	85	87	1	79.0	75.0	100	81.0	77.0
Horizontal Boring Hydr. Jack	25	80	82	6	74.0	68.0	100	76.0	70.0
Hydra Break Ram	10	90	90	0	84.0	74.0	100		
Impact Pile Driver	20	95	101	11	89.0	82.0	100	95.0	88.0
Jackhammer	20	85	89	133	79.0	72.0	100	83.0	76.0
Man Lift	20	85	75	23	79.0	72.0	100	69.0	62.0
Mounted Impact Hammer (hoe ram)	20	90	90	212	84.0	77.0	100	84.0	77.0
Pavement Scarafier	20	85	90	2	79.0	72.0	100	84.0	77.0
Paver	50	85	77	9	79.0	76.0	100	71.0	68.0
Pickup Truck	40	55	75	1	49.0	45.0	100	69.0	65.0
Pneumatic Tools	50	85	85	90	79.0	76.0	100	79.0	76.0
Pumps	50	77	81	17	71.0	68.0	100	75.0	72.0
Refrigerator Unit	100	82	73	3	76.0	76.0	100	67.0	67.0
Rivit Buster/chipping gun	20	85	79	19	79.0	72.0	100	73.0	66.0
Rock Drill	20	85	81	3	79.0	72.0	100	75.0	68.0
Roller	20	85	80	16	79.0	72.0	100	74.0	67.0
Sand Blasting (Single Nozzle)	20	85	96	9	79.0	72.0	100	90.0	83.0
Scraper	40	85	84	12	79.0	75.0	100	78.0	74.0
Shears (on backhoe)	40	85	96	5	79.0	75.0	100	90.0	86.0
Slurry Plant	100	78	78	1	72.0	72.0	100	72.0	72.0
Slurry Trenching Machine	50	82	80	75	76.0	73.0	100	74.0	71.0
Soil Mix Drill Rig	50	80	80	0	74.0	71.0	100		
Tractor	40	84	84	0	78.0	74.0	100		
Vacuum Excavator (Vac-truck)	40	85	85	149	79.0	75.0	100	79.0	75.0
Vacuum Street Sweeper	10	80	82	19	74.0	64.0	100	76.0	66.0
Ventilation Fan	100	85	79	13	79.0	79.0	100	73.0	73.0
Vibrating Hopper	50	85	87	1	79.0	76.0	100	81.0	78.0
Vibratory Concrete Mixer	20	80	80	1	74.0	67.0	100	74.0	67.0
Vibratory Pile Driver	20	95	101	44	89.0	82.0	100	95.0	88.0
Warning Horn	5	85	83	12	79.0	66.0	100	77.0	64.0
Welder / Torch	40	73	74	5	67.0	63.0	100	68.0	64.0

Ground Vibration Distance Propagation Calculations for Stationary Sources

ASCENT

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Project Name: Phillip Road Project

STEP 1: Determine units in which to perform calculation.

— If vibration decibels (VdB), then use Table A and proceed to Steps 2A and 3A.
— If peak particle velocity (PPV), then use Table B and proceed to Steps 2B and 3B.

STEP 2A: Identify the vibration source and enter the reference vibration level (VdB) and distance.

STEP 3A: Select the distance to the receiver.

Table A. Propagation of vibration decibels (VdB) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (VdB)	@	distance (ft)	vibration level (VdB)	@	distance (ft)
Vibratory Roller	94	@	25	85	@	50

The Lv metric (VdB) is used to assess the likelihood for vibration to result in human annoyance.

Human Annoyance Criteria

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch/sec)		
	Frequent Events	Occacional Events	Infrequent Events
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB	65 VdB	65 VdB
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Source: Federal Transit Administration, pg 126

STEP 2B: Identify the vibration source and enter the reference peak particle velocity (PPV) and distance.

STEP 3B: Select the distance to the receiver.

Table B. Propagation of peak particle velocity (PPV) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (PPV)	@	distance (ft)	vibration level (PPV)	@	distance (ft)
Vibratory Roller	0.210	@	25	0.074	@	50

The PPV metric (in/sec) is used for assessing the likelihood for the potential of structural damage.

Construction Vibration Damage Criteria

Building/Structural Category	PPV, in/sec	Approximate Lv
I. Reinforced-concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildng	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Source: Federal Transit Administration, pg 186

Notes:
- Computation of propagated vibration levels is based on the equations presented on pg. 185 of FTA 2018.
- Estimates of attenuated vibration levels do not account for reductions from intervening underground barriers or other underground structures of any type, or changes in soil type.
- Frequenct Events are defined as more than 70 events per day; occasional events as 30--70 events per day; and infrequent events as fewer than 30 events per day

Reference:

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Washington, D.C. Accessed: December 20, 2020. Page Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Equipment	PPV at 25 ft, in/sec	Approximate LV at 25 ft	Reference
Pile Driver (impact - upper range)	1.518	112	FTA Noise and Vibration Manual Page 184
Pile Driver (impact - typical)	0.644	104	FTA Noise and Vibration Manual Page 184
Pile Driver (Sonic - upper range)	0.734	105	FTA Noise and Vibration Manual Page 184
Pile Driver (Sonic - typical)	0.17	93	FTA Noise and Vibration Manual Page 184
Clam Shovel	0.202	94	FTA Noise and Vibration Manual Page 184
Hydromill (Slurry Wall)	0.008	66	FTA Noise and Vibration Manual Page 184
Vibratory Roller	0.21	94	FTA Noise and Vibration Manual Page 184
Hoe Ram	0.089	87	FTA Noise and Vibration Manual Page 184
Large Bulldozer	0.089	87	FTA Noise and Vibration Manual Page 184
Caisson Drilling	0.089	87	FTA Noise and Vibration Manual Page 184
Loaded Trucks	0.076	86	FTA Noise and Vibration Manual Page 184
Jackhammer	0.035	79	FTA Noise and Vibration Manual Page 184
Small Bulldozer	0.003	58	FTA Noise and Vibration Manual Page 184
Clam Shovel	0.202	94	FTA Noise and Vibration Manual Page 184

Notes:
Computation of propagated vibration levels is based on the equations presented on pg. 185

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Washington, D.C. Accessed: December 20, 2020. Page Available:

https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Traffic Noise Spreadsheet Calculator

Project: **Phillip Road Project**

Number	Segment Description and Location Name	From	Existing Conditions	Existing + Project Conditions	Δ Existing – Existing + Project	Cumulative Conditions	Cumulative +Project Conditions	Δ Cumulative – Cumulative + Project
Summary of Net Changes								
1	Blue Oaks Boulevard	Project Site	53.7	64.5	10.7	62.2	65.0	2.7
2	Blue Oaks Boulevard	Westbrook Boulevard	62.6	64.9	2.3	67.5	67.8	0.3
3	Blue Oaks Boulevard	North Hayden Parkway	65.1	66.5	1.4	69.1	69.3	0.2
4	Blue Oaks Boulevard	Fiddyment Road	68.6	69.1	0.4	69.9	70.0	0.1
5	Pleasant Grove	Market Street	68.4	68.6	0.2	68.1	68.2	0.1
6	Westbrook Boulevard	Blue Oaks Boulevard	59.4	61.8	2.4	67.3	67.5	0.1
7	Hayden Parkway	Fiddyment Road	61.7	61.7	0.0	61.4	61.4	0.0
8	Hayden Parkway	Blue Oaks Boulevard	62.0	61.8	-0.2	63.0	63.0	0.1
9	Fiddyment Road	Del Webb Boulevard	68.1	68.1	-0.1	69.6	69.6	0.0
10	Fiddyment Road	Blue Oaks Boulevard	68.1	68.2	0.1	70.2	70.2	0.0
11	Placer Parkway	Blue Oaks Boulevard				66.4	66.5	0.1
12	Santuccie Boulevard	Blue Oaks Boulevard				67.9	68.3	0.4
13	Blue Oaks Boulevard	Phillip Road				62.7	64.8	2.1
14	Pleasant Grove	Westbrook Boulevard				65.2	65.2	0.1
15	Pleasant Grove	Fiddyment Road				70.7	70.7	0.0
16	Westbrook blvd	Holt Parkway				67.7	67.9	0.2
17	Benchmark Drive	Westbrook Boulevard				54.8	56.2	1.4

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator

Project: **Phillip Road Project**

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

Number	Name	From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet)$_4$ Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	*Measured from Segment Centerline Ldn, (dBA)$_{5,6,7}$	Distance to Contour, (feet)$_3$ 75 dBA	70 dBA	65 dBA	60 dBA
Existing Conditions																		
1	Blue Oaks Boulevard	Project Site	Westbrook Boulevard	1,200	45	105	150	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	53.7	1	3	9	30
2	Blue Oaks Boulevard	Westbrook Boulevard	North Hayden Parkway	8,900	45	100	145	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.6	7	22	70	220
3	Blue Oaks Boulevard	North Hayden Parkway	Fiddyment Road	12,000	45	85	100	96.4%	2.6%	1.0%	80.0%	15.0%	5.0%	65.1	9	30	95	299
4	Blue Oaks Boulevard	Fiddyment Road	Del Webb Boulevard	30,200	45	80	135	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.6	24	76	240	760
5	Pleasant Grove	Market Street	Fiddyment Road	23,400	45	65	110	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.4	19	59	186	589
6	Westbrook Boulevard	Blue Oaks Boulevard	Pleasant Grove Boulevard	5,200	40	80	145	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.4	3	9	30	94
7	Hayden Parkway	Fiddyment Road	Blue Oaks Boulevard	6,000	35	40	65	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.7	2	7	24	75
8	Hayden Parkway	Blue Oaks Boulevard	Crawford Parkway	6,700	35	40	70	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.0	3	8	27	84
9	Fiddyment Road	Del Webb Boulevard	Blue Oaks Boulevard	25,200	45	80	115	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.1	20	62	197	623
10	Fiddyment Road	Blue Oaks Boulevard	Crawford Parkway	21,500	45	65	105	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.1	17	54	170	538
11	Placer Parkway	Blue Oaks Boulevard	North of the Project Site															
12	Santuccie Boulevard	Blue Oaks Boulevard	Pleasant Grove Boulevard															
13	Blue Oaks Boulevard	Phillip Road	Placer Parkway															
14	Pleasant Grove	Westbrook Boulevard	Santucci Boulevard															
15	Pleasant Grove	Fiddyment Road	East of Fiddyment Road															
16	Westbrook blvd	Holt Parkway	North of Holt Parkway															
17	Benchmark Drive	Westbrook Boulevard	Project Site															

Input columns: ADT through % Night. Output columns: Measured Ldn and Distance to Contour.

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator

Project: Phillip Road Project

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

Number	Name	From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet)4 Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	*Measured from Segment Centerline Ldn, (dBA)5,6,7	Distance to Contour, (feet)3 75 dBA	70 dBA	65 dBA	60 dBA
	Segment Description and Location			Input				Traffic Distribution Characteristics						Output				
Existing + Project Conditions																		
1	Blue Oaks Boulevard	Project Site	Westbrook Boulevard	14,200	45	105	150	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.5	11	35	111	351
2	Blue Oaks Boulevard	Westbrook Boulevard	North Hayden Parkway	15,000	45	100	145	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.9	12	37	117	371
3	Blue Oaks Boulevard	North Hayden Parkway	Fiddyment Road	16,700	45	85	100	96.4%	2.6%	1.0%	80.0%	15.0%	5.0%	66.5	13	42	132	416
4	Blue Oaks Boulevard	Fiddyment Road	Del Webb Boulevard	33,400	45	80	135	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	69.1	27	84	266	841
5	Pleasant Grove	Market Street	Fiddyment Road	24,600	45	65	110	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.6	20	62	196	619
6	Westbrook Boulevard	Blue Oaks Boulevard	Pleasant Grove Boulevard	9,000	40	80	145	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.8	5	16	52	163
7	Hayden Parkway	Fiddyment Road	Blue Oaks Boulevard	6,000	35	40	65	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.7	2	7	24	75
8	Hayden Parkway	Blue Oaks Boulevard	Crawford Parkway	6,400	35	40	70	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.8	3	8	25	80
9	Fiddyment Road	Del Webb Boulevard	Blue Oaks Boulevard	24,900	45	80	115	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.1	19	62	195	616
10	Fiddyment Road	Blue Oaks Boulevard	Crawford Parkway	21,800	45	65	105	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.2	17	55	173	546
11	Placer Parkway	Blue Oaks Boulevard	North of the Project Site															
12	Santuccie Boulevard	Blue Oaks Boulevard	Pleasant Grove Boulevard															
13	Blue Oaks Boulevard	Phillip Road	Placer Parkway															
14	Pleasant Grove	Westbrook Boulevard	Santucci Boulevard															
15	Pleasant Grove	Fiddyment Road	East of Fiddyment Road															
16	Westbrook blvd	Holt Parkway	North of Holt Parkway															
17	Benchmark Drive	Westbrook Boulevard	Project Site															

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator

Project: **Phillip Road Project**

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

Segment Description and Location				Input										Output				
						Distance to Directional Centerline, (feet)$_4$		Traffic Distribution Characteristics						*Measured from Segment Centerline Ldn, (dBA)$_{5,6,7}$	Distance to Contour, (feet)$_3$			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night		75 dBA	70 dBA	65 dBA	60 dBA
Cumulative Conditions																		
1	Blue Oaks Boulevard	Project Site	Westbrook Boulevard	8,500	45	105	150	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.2	7	21	66	210
2	Blue Oaks Boulevard	Westbrook Boulevard	North Hayden Parkway	27,100	45	100	145	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	67.5	21	67	212	671
3	Blue Oaks Boulevard	North Hayden Parkway	Fiddyment Road	30,000	45	85	100	96.4%	2.6%	1.0%	80.0%	15.0%	5.0%	69.1	24	75	236	747
4	Blue Oaks Boulevard	Fiddyment Road	Del Webb Boulevard	40,500	45	80	135	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	69.9	32	102	322	1019
5	Pleasant Grove	Market Street	Fiddyment Road	21,500	45	65	110	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.1	17	54	171	541
6	Westbrook Boulevard	Blue Oaks Boulevard	Pleasant Grove Boulevard	32,000	40	80	145	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	67.3	18	58	184	581
7	Hayden Parkway	Fiddyment Road	Blue Oaks Boulevard	5,600	35	40	65	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.4	2	7	22	70
8	Hayden Parkway	Blue Oaks Boulevard	Crawford Parkway	8,400	35	40	70	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.0	3	11	33	106
9	Fiddyment Road	Del Webb Boulevard	Blue Oaks Boulevard	35,600	45	80	115	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	69.6	28	88	278	880
10	Fiddyment Road	Blue Oaks Boulevard	Crawford Parkway	34,600	45	65	105	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	70.2	27	87	274	866
11	Placer Parkway	Blue Oaks Boulevard	North of the Project Site	20,100	45	100	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	66.4	16	49	156	492
12	Santuccie Boulevard	Blue Oaks Boulevard	Pleasant Grove Boulevard	28,300	45	100	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	67.9	22	69	219	693
13	Blue Oaks Boulevard	Phillip Road	Placer Parkway	8,500	45	100	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.7	7	21	66	208
14	Pleasant Grove	Westbrook Boulevard	Santucci Boulevard	13,400	45	90	110	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.2	10	33	104	328
15	Pleasant Grove	Fiddyment Road	East of Fiddyment Road	39,500	45	70	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	70.7	31	98	309	976
16	Westbrook blvd	Holt Parkway	North of Holt Parkway	27,100	45	100	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	67.7	21	66	210	663
17	Benchmark Drive	Westbrook Boulevard	Project Site	2,900	30	70	90	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	54.8	1	2	8	24

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator

Project: **Phillip Road Project**

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

	Segment Description and Location			Input											Output				
						Distance to Directional Centerline, (feet)$_4$		Traffic Distribution Characteristics							*Measured from Segment Centerline Ldn,	Distance to Contour, (feet)$_3$			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night		(dBA)$_{5,6,7}$	75 dBA	70 dBA	65 dBA	60 dBA
Cumulative +Project Conditions																			
1	Blue Oaks Boulevard	Project Site	Westbrook Boulevard	15,900	45	105	150	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		65.0	12	39	124	393
2	Blue Oaks Boulevard	Westbrook Boulevard	North Hayden Parkway	29,000	45	100	145	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		67.8	23	72	227	718
3	Blue Oaks Boulevard	North Hayden Parkway	Fiddyment Road	31,400	45	85	100	96.4%	2.6%	1.0%	80.0%	15.0%	5.0%		69.3	25	78	247	782
4	Blue Oaks Boulevard	Fiddyment Road	Del Webb Boulevard	41,500	45	80	135	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		70.0	33	104	330	1044
5	Pleasant Grove	Market Street	Fiddyment Road	22,000	45	65	110	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		68.2	18	55	175	554
6	Westbrook Boulevard	Blue Oaks Boulevard	Pleasant Grove Boulevard	33,000	40	80	145	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		67.5	19	60	189	599
7	Hayden Parkway	Fiddyment Road	Blue Oaks Boulevard	5,600	35	40	65	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		61.4	2	7	22	70
8	Hayden Parkway	Blue Oaks Boulevard	Crawford Parkway	8,500	35	40	70	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		63.0	3	11	34	107
9	Fiddyment Road	Del Webb Boulevard	Blue Oaks Boulevard	35,600	45	80	115	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		69.6	28	88	278	880
10	Fiddyment Road	Blue Oaks Boulevard	Crawford Parkway	34,900	45	65	105	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		70.2	28	87	276	874
11	Placer Parkway	Blue Oaks Boulevard	North of the Project Site	20,600	45	100	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		66.5	16	50	159	504
12	Santuccie Boulevard	Blue Oaks Boulevard	Pleasant Grove Boulevard	31,100	45	100	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		68.3	24	76	241	761
13	Blue Oaks Boulevard	Phillip Road	Placer Parkway	13,800	45	100	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		64.8	11	34	107	338
14	Pleasant Grove	Westbrook Boulevard	Santucci Boulevard	13,600	45	90	110	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		65.2	11	33	105	333
15	Pleasant Grove	Fiddyment Road	East of Fiddyment Road	39,800	45	70	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		70.7	31	98	311	984
16	Westbrook blvd	Holt Parkway	North of Holt Parkway	28,300	45	100	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		67.9	22	69	219	693
17	Benchmark Drive	Westbrook Boulevard	Project Site	4,000	30	70	90	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		56.2	1	3	10	33

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Citation #	Citations	
1	Caltrans Technical Noise Supplement. 2009 (November). Table (5-11), Pg 5-60.	Caltrans Technical Noise Supplement. 2013 (September). Table (4-2), Pg 4-17.
2	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-26), Pg 5-60.	Caltrans Technical Noise Supplement. 2013 (September). Equation (4-5), Pg 4-17.
3	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-16), Pg 2-32.	FHWA 2004 TNM Version 2.5
4	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-11), Pg 5-47, 48.	FHWA 2004 TNM Version 2.5
5	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-26), Pg 2-55, 56.	Caltrans Technical Noise Supplement. 2013 (September). Equation (2-23), Pg 2-51
6	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-27), Pg 2-57.	Caltrans Technical Noise Supplement. 2013 (September). Equation (2-24), Pg 2-53
7	Caltrans Technical Noise Supplement. 2009 (November). Pg 2-53.	Caltrans Technical Noise Supplement. 2013 (September). Pg 2-57.
8	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-7), Pg 5-45.	FHWA 2004 TNM Version 2.5
9	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-8), Pg 5-45.	FHWA 2004 TNM Version 2.5
10	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-9), Pg 5-45.	FHWA 2004 TNM Version 2.5
11	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-13), Pg 5-49.	FHWA 2004 TNM Version 2.5
12	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-14), Pg 5-49.	FHWA 2004 TNM Version 2.5
13	Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (16), Pg 67	
14	Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (20), Pg 69	
15	Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (18), Pg 69	

References

California Department of Transportation (Caltrans). 2009 (November). Technical Noise Supplement. Available: http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf. Accessed Aug 2017.


Existing Roadway Network and
Average Daily Traffic Volume (ADT)


Existing Plus Project Roadway Network and
Average Daily Traffic Volume (ADT)


Cumulative No Project Roadway Network and
Average Daily Traffic Volume (ADT)

Attenuation Calculations for Stationary Noise Sources

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Project Name: Phillip Road Project

STEP 1: Identify the noise source and enter the reference noise level (dBA and distance).

STEP 2: Select the ground type (hard or soft), and enter the source and receiver heights.

STEP 3: Select the distance to the receiver.

Noise Source/ID	Reference Noise Level			Attenuation Characteristics				Attenuated Noise Level at Receptor		
	noise level (dBA)	@	distance (ft)	Ground Type (soft/hard)	Source Height (ft)	Receiver Height (ft)	Ground Factor	noise level (dBA)	@	distance (ft)
Loading Dock Activity	59.3	@	100	hard	3	5	0.00	48.7	@	340
Loading Dock Activity (Enclosed with proposed innovation centers)[1]	49.3	@	100	hard	20	5	0.00	38.7	@	340
HVAC L_{eq}	75.0	@	3	hard	20	5	0.00	38.5	@	200
HVAC L_{max}	78.0	@	3	hard	20	5	0.00	41.5	@	200
Diesel Generator	82.0	@	50	hard	3	5	0.00	70.0	@	200
Diesel Generator Daytime Standard	82.0	@	50	hard	3	5	0.00	56.9	@	900
Diesel Generator Nightime Standard	82.0	@	50	hard	3	5	0.00	51.9	@	1600
Diesel Generetor (acoustic enclosure)	71.0	@	50	hard	3	5	0.00	55.4	@	300
Two Simutanesouly Operating Loading Docks	62.3	@	100	hard	3	5	0.00	51.7	@	340
Two Simutanesouly Operating Loading Docks (Enclosed)	52.3	@	100	hard	3	5	0.00	41.7	@	340

Notes:

[1] Enclosed building typically yeilds 10 dBA of attenuation

Estimates of attenuated noise levels do not account for reductions from intervening barriers, including walls, trees, vegetation, or structures of any type.
Computation of the attenuated noise level is based on the equation presented on pg. 176 and 177 of FTA 2018.

Computation of the ground factor is based on the equation presentd in Table 4-26 on pg. 86 of FTA 2018, where the distance of the reference noise leve can be adjusted and the usage factor is not applied (i.e., the usage factor is equal to 1).

Sources:

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment. Washington, D.C. Available: <http://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf>Accessed: March 5, 2020.

Parking Lot Noise Calculation

KEY:	Orange cells are for input.	Modeled u
	Green cells are data to present in a written analysis (output).	

Number of automobiles per hour	750
Number of trucks per hour	10
Distance to nearest sensitive receptor (ft)	130

		distance (ft)	sound level
Reference Level	dBA Leq @	50	**64.4**
nearest sensitive receptor	dBA Leq @	130	**56.1**

Source

Federal Transit Administration. 2018 (September). Transit Noise and Vibration Impact Assessment. Washington, D.C. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed February 4, 2019. See pages 45–47, including Equation 4-14.