

Appendix G

Noise Modeling Results

(Note: Appendices may identify the project being evaluated as the 2017 LRDP versus the 2018 LRDP. Where the 2017 LRDP is referenced, this should be interpreted as the 2018 LRDP. Refer to Section 2.7 in Chapter 2, “Project Description” for further clarification.)



Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L _{eq} dBA)	Equipment	Reference Emission Noise Levels (L _{max}) at 50 feet ¹	Usage Factor ¹
Threshold	99	86.0	Excavator	85	1
Residence 1	1120	64.9	Dozer	85	1
Residence 2	100	85.9	Dump Truck	84	1
			Front End Loader	80	1
			Grader	85	1
			Flat Bed Truck	84	1
			Ground Type	HARD	
			Source Height	8	
			Receiver Height	5	
			Ground Factor ²	0.00	
			Predicted Noise Level³	L_{eq} dBA at 50 feet³	
			Excavator	85.0	
			Dozer	85.0	
			Dump Truck	84.0	
			Front End Loader	80.0	
			Grader	85.0	
			Flat Bed Truck	84.0	
			Combined Predicted Noise Level (L_{eq} dBA at 50 feet)		
				91.9	

Sources:

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

² Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

³ Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.



Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L _{eq} dBA)	Equipment	Reference Emission Noise Levels (L _{max}) at 50 feet ¹	Usage Factor ¹
Threshold	62	86.0	Excavator	85	0.4
Residence 1	1350	59.3	Dozer	85	0.4
Residence 2	100	81.9	Dump Truck	84	0.4
			Front End Loader	80	0.4
			Grader	85	0.4
			Flat Bed Truck	84	0.4
			Ground Type	HARD	
			Source Height	8	
			Receiver Height	5	
			Ground Factor ²	0.00	
			Predicted Noise Level³	L_{eq} dBA at 50 feet³	
			Excavator	81.0	
			Dozer	81.0	
			Dump Truck	80.0	
			Front End Loader	76.0	
			Grader	81.0	
			Flat Bed Truck	80.0	
			Combined Predicted Noise Level (L_{eq} dBA at 50 feet)	87.9	

Sources:

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

² Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

³ Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L _{eq} dBA)	Equipment	Reference Emission	Usage
				Noise Levels (L _{max}) at 50 feet ¹	Factor ¹
Threshold	90	86.0	Excavator	85	1
Residence 1	1350	62.5	Dozer	85	1
Residence 2	100	85.1	Dump Truck	84	1
			Front End Loader	80	1
			Grader	85	1

Ground Type HARD
Source Height 8
Receiver Height 5
Ground Factor² 0.00

Predicted Noise Level ³	L _{eq} dBA at 50 feet ³
Excavator	85.0
Dozer	85.0
Dump Truck	84.0
Front End Loader	80.0
Grader	85.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
 91.1

Sources:

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

² Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

³ Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F. = Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Orchard Park Construction Noise



Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L _{eq} dBA)	Equipment	Reference Emission Noise Levels (L _{max}) at 50 feet ¹	Usage Factor ¹
Threshold	90	86.0	Excavator	85	1
Residence 1	100	85.1	Dozer	85	1
Residence 2	150	81.6	Dump Truck	84	1
			Front End Loader	80	1
			Grader	85	1
			Ground Type	HARD	
			Source Height	8	
			Receiver Height	5	
			Ground Factor ²	0.00	
			Predicted Noise Level³	L_{eq} dBA at 50 feet³	
			Excavator	85.0	
			Dozer	85.0	
			Dump Truck	84.0	
			Front End Loader	80.0	
			Grader	85.0	
			Combined Predicted Noise Level (L_{eq} dBA at 50 feet)		
					91.1

Sources:

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

² Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

³ Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Equipment Description	Acoustical Usage Factor (%)	Spec	Actual	No. of	Spec	Spec	Distance	Actual	Actual
		721.560 Lmax @ 50ft (dBA slow)	Measured Lmax @ 50ft (dBA slow)	Data Samples (count)	721.560 LmaxCalc	721.560 Leq		Measured LmaxCalc	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	na	0	74.0	67.0	100		
Blasting	na	94	na	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	na	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 s	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	na	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. Jac	25	80	82	6	74.0	68.0	100	76.0	70.0
Hydra Break Ram	10	90	na	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	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 Nozzl	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	na	0	74.0	71.0	100		
Tractor	40	84	na	0	78.0	74.0	100		
Vacuum Excavator (Vac-tru	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

Source:

FHWA Roadway Construction Noise Model, January 2006. Table 9.1

U.S. Department of Transportation

CA/T Construction Spec. 721.560

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).

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 Leq (day)	82.0	@	50	hard	12	5	0.00	63.3	@	430
HVAC Leq (day)	70.0	@	50	hard	12	5	0.00	63.2	@	110
generator Leq (day)	73.0	@	45	hard	12	5	0.00	62.3	@	155
generator Leq (night)	73.0	@	45	hard	12	5	0.00	49.1	@	703
Stadium Noise	72.3	@	272	hard	12	5	0.00	53.8	@	2280
nighttime construction	82.0	@	50	hard	12	5	0.00	65.1	@	350
							0.66			
							0.66			
							0.66			
							0.66			
							0.66			
							0.66			

Notes:
 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. 12-3 and 12-4 of FTA 2006.
 Computation of the ground factor is based on the equation presented in Figure 6-23 on pg. 6-23 of FTA 2006, where the distance of the reference noise level can be adjusted and the usage factor is not applied (i.e., the usage factor is equal to 1).

Sources:
 Federal Transit Association (FTA). 2006 (May). Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. Washington, D.C. Available: <http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf>. Accessed: September 24, 2010.



Traffic Noise Spreadsheet Calculator

Project: 2017 UC Davis LRDP
 Data from F&P provided to Ascent on 2/28/2018

Number	Name	Segment Description and Location	Existing Conditions	2030 Plus Project	Δ Existing – Existing + Project	Cumulative No Project	Cumulative + Project	Change
Summary of Net Changes								
1	County Road 98:	north of Hutchison Drive	58.4	58.6	0.3	58.7	58.8	0.03
2	County Road 98:	south of Putah Creek	57.2	57.3	0.2	57.1	57.3	0.2
3	Russell Boulevard:	Arlington Boulevard to SR 113	62.9	63.1	0.2	63.1	63.2	0.1
4	Russell Boulevard:	SR 113 to La Rue Road	64.3	65.2	0.9	65.3	65.3	0.1
5	Russell Boulevard:	La Rue Road to California Avenue	65.0	66.3	1.3	66.0	66.5	0.5
6	Russell Boulevard:	California Avenue to A Street	64.9	66.3	1.4	65.8	66.4	0.6
7	La Rue Road:	south of Russell Boulevard	60.8	63.1	2.3	61.0	63.2	2.2
8	La Rue Road:	Orchard Park Drive to Hutchison Drive	60.8	62.5	1.7	61.1	62.6	1.5
9	La Rue Road:	Garrod Drive to Dairy Road	60.3	60.5	0.2	60.3	60.6	0.3
10	California Avenue:	south of Russell Boulevard	57.3	58.5	1.2	57.5	58.6	1.1
11	Howard Way:	south of Russell Boulevard	59.6	59.7	0.1	59.5	59.6	0.0
12	A Street:	First Street to Russell Boulevard	56.1	57.1	1.0	56.6	57.4	0.8
13	Old Davis Road:	south of First Street	60.1	63.1	3.0	62.9	63.4	0.5
14	First Street:	A Street to Richards Boulevard	62.0	62.9	0.9	62.7	62.9	0.2
15	Hutchison Drive:	west of SR-113	61.3	65.4	4.1	62.7	65.6	2.8
16	Hutchison Drive:	east of SR-113	63.5	65.0	1.5	64.3	65.3	0.9
17	Old Davis Road:	east of Alumni Lane	59.3	61.3	1.9	61.7	62.0	0.3
18	Old Davis Road:	north of I-80	61.3	63.1	1.8	63.0	63.2	0.2
19	Old Davis Road:	south of I-80	53.5	56.2	2.6	54.2	56.3	2.1
20	Sycamore Lane:	south of Covell Boulevard	58.8			59.5	59.6	0.1
21	Sycamore Lane:	north of Russell Boulevard	60.3			60.0	59.9	-0.1
22	Anderson Road:	south of Covell Boulevard	61.7			62.2	62.2	-0.1
23	Anderson Road:	north of Russell Boulevard	61.7			60.5	61.0	0.5
24	F Street:	north of 5th Street	60.0			60.5	60.5	0.0
25	Russell Boulevard:	west of Arlington Boulevard	60.7			61.0	61.1	0.1
26	Hutchison Drive:	east of Hopkins Road	56.6			57.4	57.9	0.5
27	Orchard Park Drive:	south of Orchard Park Circle	53.0			52.3	51.9	-0.4
28	5th Street:	east of B Street	63.2			64.3	64.7	0.4
29	5th Street:	west of Pole Line Road	62.2			64.4	64.4	0.0
30	Cowell Boulevard:	east of Research Park Drive	64.0			64.7	64.8	0.1

*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: 2017 UC Davis LRDP

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

Number		Name	Segment Description and Location	Input							Output								
				ADT	Speed (mph)	Distance to Directional Centerline, (feet) ₄		Traffic Distribution Characteristics			CNEL, (dBA) _{5,6,7}	Distance to Contour, (feet) ₃							
						Near	Far	% Auto	% Medium	% Heavy		% Day	% Eve	% Night	70 dBA	65 dBA	60 dBA	55 dBA	
0																			
1		County Road 98: north of Hutchison Drive		4,690	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.4	7	22	68	216	
2		County Road 98: south of Putah Creek		3,580	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.2	5	17	52	165	
3		Russell Boulevard: Arlington Boulevard to SR 113		13,440	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.9	20	62	196	620	
4		Russell Boulevard: SR 113 to La Rue Road		18,630	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.3	27	86	272	859	
5		Russell Boulevard: La Rue Road to California Avenue		21,750	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.0	32	100	317	1003	
6		Russell Boulevard: California Avenue to A Street		20,990	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.9	31	97	306	968	
7		La Rue Road: south of Russell Boulevard		8,240	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.8	12	38	120	380	
8		La Rue Road: Orchard Park Drive to Hutchison Drive		8,260	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.8	12	38	120	381	
9		La Rue Road: Garrod Drive to Dairy Road		7,360	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.3	11	34	107	339	
10		California Avenue: south of Russell Boulevard		3,710	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.3	5	17	54	171	
11		Howard Way: south of Russell Boulevard		6,270	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.6	9	29	91	289	
12		A Street: First Street to Russell Boulevard		2,820	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.1	4	13	41	130	
13		Old Davis Road: south of First Street		7,040	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.1	10	32	103	325	
14		First Street: A Street to Richards Boulevard		10,870	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.0	16	50	159	501	
15		Hutchison Drive: west of SR-113		9,230	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.3	13	43	135	426	
16		Hutchison Drive: east of SR-113		15,440	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.5	23	71	225	712	
17		Old Davis Road: east of Alumni Lane		5,890	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.3	9	27	86	272	
18		Old Davis Road: north of I-80		9,290	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.3	14	43	135	428	
19		Old Davis Road: south of I-80		1,550	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	53.5	2	7	23	71	
20		Sycamore Lane: south of Covell Boulevard		5,250	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.8	8	24	77	242	
21		Sycamore Lane: north of Russell Boulevard		7,380	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.3	11	34	108	340	
22		Anderson Road: south of Covell Boulevard		10,100	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.7	15	47	147	466	
23		Anderson Road: north of Russell Boulevard		10,240	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.7	15	47	149	472	
24		F Street: north of 5th Street		6,860	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.0	10	32	100	316	
25		Russell Boulevard: west of Arlington Boulevard		8,130	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.7	12	37	119	375	
26		Hutchison Drive: east of Hopkins Road		3,130	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.6	5	14	46	144	
27		Orchard Park Drive: south of Orchard Park Circle		1,380	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	53.0	2	6	20	64	
28		5th Street: east of B Street		14,210	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.2	21	66	207	655	
29		5th Street: west of Pole Line Road		11,450	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.2	17	53	167	528	
30		Cowell Boulevard: east of Research Park Drive		17,190	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.0	25	79	251	793	
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						

Traffic Noise Spreadsheet Calculator



Project: 2017 UC Davis LRDP

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

Segment Description and Location		Input									Output					
		ADT	Speed (mph)	Distance to Directional Centerline, (feet) ₄		Traffic Distribution Characteristics					CNEL, (dBA) _{5,6,7}	Distance to Contour, (feet) ₃				
Number	Name			Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night		70 dBA	65 dBA	60 dBA	55 dBA
2030 No Project																
1	County Road 98: north of Hutchison Drive	4,890	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.5	7	23	71	226
2	County Road 98: south of Putah Creek	3,490	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.1	5	16	51	161
3	Russell Boulevard: Arlington Boulevard to SR 113	13,850	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.1	20	64	202	639
4	Russell Boulevard: SR 113 to La Rue Road	22,140	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.1	32	102	323	1021
5	Russell Boulevard: La Rue Road to California Avenue	25,370	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.7	37	117	370	1170
6	Russell Boulevard: California Avenue to A Street	24,710	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.6	36	114	360	1140
7	La Rue Road: south of Russell Boulevard	7,950	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.6	12	37	116	367
8	La Rue Road: Orchard Park Drive to Hutchison Drive	8,400	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.9	12	39	123	387
9	La Rue Road: Garrod Drive to Dairy Road	7,350	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.3	11	34	107	339
10	California Avenue: south of Russell Boulevard	3,800	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.4	6	18	55	175
11	Howard Way: south of Russell Boulevard	6,250	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.6	9	29	91	288
12	A Street: First Street to Russell Boulevard	3,090	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.5	5	14	45	143
13	Old Davis Road: south of First Street	12,060	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.5	18	56	176	556
14	First Street: A Street to Richards Boulevard	11,420	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.2	17	53	167	527
15	Hutchison Drive: west of SR-113	11,870	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.4	17	55	173	547
16	Hutchison Drive: east of SR-113	17,760	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.1	26	82	259	819
17	Old Davis Road: east of Alumni Lane	8,370	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.9	12	39	122	386
18	Old Davis Road: north of I-80	12,650	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.7	18	58	184	583
19	Old Davis Road: south of I-80	1,690	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	53.9	2	8	25	78
20	Sycamore Lane: south of Covell Boulevard		35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
21	Sycamore Lane: north of Russell Boulevard		35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
22	Anderson Road: south of Covell Boulevard		35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
23	Anderson Road: north of Russell Boulevard		35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
24	F Street: north of 5th Street		35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
25	Russell Boulevard: west of Arlington Boulevard		35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
26	Hutchison Drive: east of Hopkins Road		35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
27	Orchard Park Drive: south of Orchard Park Circle		35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
28	5th Street: east of B Street		35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
29	5th Street: west of Pole Line Road		35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
30	Cowell Boulevard: east of Research Park Drive		35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					

Traffic Noise Spreadsheet Calculator



Project: 2017 UC Davis LRDP		Input										Output					
Noise Level Descriptor: CNEL Site Conditions: Hard Traffic Input: ADT Traffic K-Factor:																	
Number	Name	Segment Description and Location	ADT	Speed (mph)	Distance to Directional Centerline, (feet) ₄		Traffic Distribution Characteristics					CNEL, (dBA) _{5,6,7}	Distance to Contour, (feet) ₃				
					Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve		% Night	70 dBA	65 dBA	60 dBA	55 dBA
2030 Plus Project																	
1	County Road 98: north of Hutchison Drive		4,970	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.6	7	23	72	229
2	County Road 98: south of Putah Creek		3,710	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.3	5	17	54	171
3	Russell Boulevard: Arlington Boulevard to SR 113		14,020	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.1	20	65	204	647
4	Russell Boulevard: SR 113 to La Rue Road		22,660	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.2	33	105	330	1045
5	Russell Boulevard: La Rue Road to California Avenue		29,060	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	66.3	42	134	424	1340
6	Russell Boulevard: California Avenue to A Street		28,960	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	66.3	42	134	422	1336
7	La Rue Road: south of Russell Boulevard		13,900	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.1	20	64	203	641
8	La Rue Road: Orchard Park Drive to Hutchison Drive		12,310	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.5	18	57	180	568
9	La Rue Road: Garrod Drive to Dairy Road		7,780	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.5	11	36	113	359
10	California Avenue: south of Russell Boulevard		4,860	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.5	7	22	71	224
11	Howard Way: south of Russell Boulevard		6,350	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.7	9	29	93	293
12	A Street: First Street to Russell Boulevard		3,550	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.1	5	16	52	164
13	Old Davis Road: south of First Street		14,040	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.1	20	65	205	648
14	First Street: A Street to Richards Boulevard		13,440	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.9	20	62	196	620
15	Hutchison Drive: west of SR-113		23,650	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.4	34	109	345	1091
16	Hutchison Drive: east of SR-113		21,810	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.0	32	101	318	1006
17	Old Davis Road: east of Alumni Lane		9,220	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.3	13	43	134	425
18	Old Davis Road: north of I-80		14,020	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.1	20	65	204	647
19	Old Davis Road: south of I-80		2,830	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.2	4	13	41	131
20	Sycamore Lane: south of Covell Boulevard			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
21	Sycamore Lane: north of Russell Boulevard			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
22	Anderson Road: south of Covell Boulevard			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
23	Anderson Road: north of Russell Boulevard			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
24	F Street: north of 5th Street			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
25	Russell Boulevard: west of Arlington Boulevard			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
26	Hutchison Drive: east of Hopkins Road			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
27	Orchard Park Drive: south of Orchard Park Circle			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
28	5th Street: east of B Street			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
29	5th Street: west of Pole Line Road			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
30	Cowell Boulevard: east of Research Park Drive			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
				35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
				35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					

Traffic Noise Spreadsheet Calculator



Project: 2017 UC Davis LRDP		Input										Output					
Noise Level Descriptor: CNEL Site Conditions: Hard Traffic Input: ADT Traffic K-Factor:																	
Number	Name	Segment Description and Location	ADT	Speed (mph)	Distance to Directional Centerline, (feet) ₄		Traffic Distribution Characteristics					CNEL, (dBA) _{5,6,7}	Distance to Contour, (feet) ₃				
					Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve		% Night	70 dBA	65 dBA	60 dBA	55 dBA
2030 Plus Project																	
1	County Road 98: north of Hutchison Drive		5,140	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.7	7	24	75	237
2	County Road 98: south of Putah Creek		3,520	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.1	5	16	51	162
3	Russell Boulevard: Arlington Boulevard to SR 113		14,130	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.1	21	65	206	652
4	Russell Boulevard: SR 113 to La Rue Road		23,130	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.3	34	107	337	1067
5	Russell Boulevard: La Rue Road to California Avenue		27,300	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	66.0	40	126	398	1259
6	Russell Boulevard: California Avenue to A Street		26,120	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.8	38	120	381	1205
7	La Rue Road: south of Russell Boulevard		8,640	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.0	13	40	126	398
8	La Rue Road: Orchard Park Drive to Hutchison Drive		8,820	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.1	13	41	129	407
9	La Rue Road: Garrod Drive to Dairy Road		7,300	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.3	11	34	106	337
10	California Avenue: south of Russell Boulevard		3,880	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.5	6	18	57	179
11	Howard Way: south of Russell Boulevard		6,160	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.5	9	28	90	284
12	A Street: First Street to Russell Boulevard		3,120	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.6	5	14	46	144
13	Old Davis Road: south of First Street		13,230	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.9	19	61	193	610
14	First Street: A Street to Richards Boulevard		12,740	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.7	19	59	186	588
15	Hutchison Drive: west of SR-113		12,860	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.7	19	59	188	593
16	Hutchison Drive: east of SR-113		18,610	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.3	27	86	271	858
17	Old Davis Road: east of Alumni Lane		10,040	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.7	15	46	146	463
18	Old Davis Road: north of I-80		13,650	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.0	20	63	199	630
19	Old Davis Road: south of I-80		1,790	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	54.2	3	8	26	83
20	Sycamore Lane: south of Covell Boulevard		6,060	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.5	9	28	88	279
21	Sycamore Lane: north of Russell Boulevard		6,840	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.0	10	32	100	315
22	Anderson Road: south of Covell Boulevard		11,500	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.2	17	53	168	530
23	Anderson Road: north of Russell Boulevard		7,760	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.5	11	36	113	358
24	F Street: north of 5th Street		7,680	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.5	11	35	112	354
25	Russell Boulevard: west of Arlington Boulevard		8,710	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.0	13	40	127	402
26	Hutchison Drive: east of Hopkins Road		3,770	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.4	5	17	55	174
27	Orchard Park Drive: south of Orchard Park Circle		1,160	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	52.3	2	5	17	54
28	5th Street: east of B Street		18,640	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.3	27	86	272	860
29	5th Street: west of Pole Line Road		18,740	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.4	27	86	273	864
30	Cowell Boulevard: east of Research Park Drive		20,080	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.7	29	93	293	926
				35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
				35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
				35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					

Traffic Noise Spreadsheet Calculator



Project: 2017 UC Davis LRDP

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

Segment Description and Location		Input									Output					
		ADT	Speed (mph)	Distance to Directional Centerline, (feet) ₄		Traffic Distribution Characteristics					CNEL, (dBA) _{5,6,7}	Distance to Contour, (feet) ₃				
Number	Name			Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night		70 dBA	65 dBA	60 dBA	55 dBA
2030 Plus Project																
1	County Road 98: north of Hutchison Drive	5,170	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.8	8	24	75	238
2	County Road 98: south of Putah Creek	3,720	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.3	5	17	54	172
3	Russell Boulevard: Arlington Boulevard to SR 113	14,310	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.2	21	66	209	660
4	Russell Boulevard: SR 113 to La Rue Road	23,450	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.3	34	108	342	1082
5	Russell Boulevard: La Rue Road to California Avenue	30,920	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	66.5	45	143	451	1426
6	Russell Boulevard: California Avenue to A Street	30,240	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	66.4	44	139	441	1395
7	La Rue Road: south of Russell Boulevard	14,420	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.2	21	67	210	665
8	La Rue Road: Orchard Park Drive to Hutchison Drive	12,450	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.6	18	57	182	574
9	La Rue Road: Garrod Drive to Dairy Road	7,840	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.6	11	36	114	362
10	California Avenue: south of Russell Boulevard	4,970	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.6	7	23	72	229
11	Howard Way: south of Russell Boulevard	6,230	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.6	9	29	91	287
12	A Street: First Street to Russell Boulevard	3,760	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.4	5	17	55	173
13	Old Davis Road: south of First Street	14,970	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.4	22	69	218	690
14	First Street: A Street to Richards Boulevard	13,240	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.9	19	61	193	611
15	Hutchison Drive: west of SR-113	24,690	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.6	36	114	360	1139
16	Hutchison Drive: east of SR-113	23,100	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.3	34	107	337	1065
17	Old Davis Road: east of Alumni Lane	10,880	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.0	16	50	159	502
18	Old Davis Road: north of I-80	14,250	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.2	21	66	208	657
19	Old Davis Road: south of I-80	2,920	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.3	4	13	43	135
20	Sycamore Lane: south of Covell Boulevard	6,250	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.6	9	29	91	288
21	Sycamore Lane: north of Russell Boulevard	6,740	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.9	10	31	98	311
22	Anderson Road: south of Covell Boulevard	11,280	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.2	16	52	165	520
23	Anderson Road: north of Russell Boulevard	8,620	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.0	13	40	126	398
24	F Street: north of 5th Street	7,610	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.5	11	35	111	351
25	Russell Boulevard: west of Arlington Boulevard	8,910	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.1	13	41	130	411
26	Hutchison Drive: east of Hopkins Road	4,210	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.9	6	19	61	194
27	Orchard Park Drive: south of Orchard Park Circle	1,050	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	51.9	2	5	15	48
28	5th Street: east of B Street	20,300	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.7	30	94	296	936
29	5th Street: west of Pole Line Road	18,680	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.4	27	86	272	862
30	Cowell Boulevard: east of Research Park Drive	20,640	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.8	30	95	301	952
			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
			35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					

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, 52. |
| 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 August 17, 2017.

California Department of Transportation (Caltrans). 2013 (September). Technical Noise Supplement. Available: http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013A.pdf. Accessed August 17, 2017.

Federal Highway Administration. 2004. Traffic Noise Model Version 2.5. Available: https://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25/. Accessed August 17, 2017.

70 CNEL/leq Calculation

- 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: Used to calculate Leq value that equals 70 dba CNEL
Measurement Date: NA
Project Name: LRDP

Computation of CNEL

Hour of Day (military time)	Sound Level Leq (dBA)	Sound Power =10*Log(dB A/10)	Period of 24-Hour Day (1=included, 0=not)			Sound Power Breakdown by Period of Day		
			Day	Evening	Night	Day	Evening	Night
			0:00	63.3	2,137,962	0	0	1
1:00	63.3	2,137,962	0	0	1	0	0	2,137,962
2:00	63.3	2,137,962	0	0	1	0	0	2,137,962
3:00	63.3	2,137,962	0	0	1	0	0	2,137,962
4:00	63.3	2,137,962	0	0	1	0	0	2,137,962
5:00	63.3	2,137,962	0	0	1	0	0	2,137,962
6:00	63.3	2,137,962	0	0	1	0	0	2,137,962
7:00	63.3	2,137,962	1	0	0	2,137,962	0	0
8:00	63.3	2,137,962	1	0	0	2,137,962	0	0
9:00	63.3	2,137,962	1	0	0	2,137,962	0	0
10:00	63.3	2,137,962	1	0	0	2,137,962	0	0
11:00	63.3	2,137,962	1	0	0	2,137,962	0	0
12:00	63.3	2,137,962	1	0	0	2,137,962	0	0
13:00	63.3	2,137,962	1	0	0	2,137,962	0	0
14:00	63.3	2,137,962	1	0	0	2,137,962	0	0
15:00	63.3	2,137,962	1	0	0	2,137,962	0	0
16:00	63.3	2,137,962	1	0	0	2,137,962	0	0
17:00	63.3	2,137,962	1	0	0	2,137,962	0	0
18:00	63.3	2,137,962	1	0	0	2,137,962	0	0
19:00	63.3	2,137,962	0	1	0	0	2,137,962	0
20:00	63.3	2,137,962	0	1	0	0	2,137,962	0
21:00	63.3	2,137,962	0	1	0	0	2,137,962	0
22:00	63.3	2,137,962	0	0	1	0	0	2,137,962
23:00	63.3	2,137,962	0	0	1	0	0	2,137,962

Sum of Sound Power during Period wo/penalty	25,655,545	6,413,886	19,241,659
Log Factor for CNEL Penalty (i.e., 10*log(x))	1	3	10
Sound Power during Period with penalty	25,655,545	19,241,659	192,416,588

Total Daily Sound Power, with penalties	237,313,792
Hours per Day	24
Average Hourly Sound Power, with penalties	9,888,075
CNEL	70.0

Ldn computation on next page.

Computation of Ldn

Period of 24-Hour Day (1=included, 0=not)		Sound Power Breakdown by Period of Day	
Day	Night	Day	Night
0	1	0	2,137,962
0	1	0	2,137,962
0	1	0	2,137,962
0	1	0	2,137,962
0	1	0	2,137,962
0	1	0	2,137,962
0	1	0	2,137,962
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
1	0	2,137,962	0
0	1	0	2,137,962
0	1	0	2,137,962

Sum of Sound Power during Period wo/penalty	32,069,431	19,241,659
Log Factor for Penalty (i.e., 10*log(x))	1	10
Sound Power during Period with penalty	32,069,431	192,416,588

Total Daily Sound Power, with penalties	224,486,019
Hours per Day	24
Average Hourly Sound Power, with penalties	9,353,584
Ldn	69.7

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 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 Site: LRDP
Measurement Date: 11/14/2016
Project Name: LRDP

Computation of CNEL

Hour of Day (military time)	Sound Level Leq (dBA)	Sound Power =10*Log(dB A/10)	Period of 24-Hour Day (1=included, 0=not)			Sound Power Breakdown by Period of Day		
			Day	Evening	Night	Day	Evening	Night
0:00	52.9	193,539	0	0	1	0	0	193,539
1:00	59.4	875,913	0	0	1	0	0	875,913
2:00	65.7	3,724,132	0	0	1	0	0	3,724,132
3:00	52.7	186,465	0	0	1	0	0	186,465
4:00	54.2	260,426	0	0	1	0	0	260,426
5:00	63.2	2,076,160	0	0	1	0	0	2,076,160
6:00	66.7	4,716,260	0	0	1	0	0	4,716,260
7:00	62.7	1,858,150	1	0	0	1,858,150	0	0
8:00	64.6	2,867,213	1	0	0	2,867,213	0	0
9:00	65.5	3,544,944	1	0	0	3,544,944	0	0
10:00	64.8	2,986,096	1	0	0	2,986,096	0	0
11:00	66.5	4,469,568	1	0	0	4,469,568	0	0
12:00	63.9	2,459,950	1	0	0	2,459,950	0	0
13:00	58.3	670,654	1	0	0	670,654	0	0
14:00	69.2	8,310,621	1	0	0	8,310,621	0	0
15:00	53.9	243,920	1	0	0	243,920	0	0
16:00	65.7	3,741,253	1	0	0	3,741,253	0	0
17:00	65.3	3,399,426	1	0	0	3,399,426	0	0
18:00	57.4	545,008	1	0	0	545,008	0	0
19:00	58.9	783,694	0	1	0	0	783,694	0
20:00	56.1	409,522	0	1	0	0	409,522	0
21:00	64.9	3,073,972	0	1	0	0	3,073,972	0
22:00	55.7	369,650	0	0	1	0	0	369,650
23:00	62.2	1,661,369	0	0	1	0	0	1,661,369

Sum of Sound Power during Period wo/penalty	35,096,804	4,267,189	14,063,914
Log Factor for CNEL Penalty (i.e., 10*log(x))	1	3	10
Sound Power during Period with penalty	35,096,804	12,801,566	140,639,145

Total Daily Sound Power, with penalties	188,537,515
Hours per Day	24
Average Hourly Sound Power, with penalties	7,855,730
CNEL	69.0

Ldn computation on next page.

Computation of Ldn

Period of 24-Hour Day (1=included, 0=not)		Sound Power Breakdown by Period of Day	
Day	Night	Day	Night
0	1	0	193,539
0	1	0	875,913
0	1	0	3,724,132
0	1	0	186,465
0	1	0	260,426
0	1	0	2,076,160
0	1	0	4,716,260
1	0	1,858,150	0
1	0	2,867,213	0
1	0	3,544,944	0
1	0	2,986,096	0
1	0	4,469,568	0
1	0	2,459,950	0
1	0	670,654	0
1	0	8,310,621	0
1	0	243,920	0
1	0	3,741,253	0
1	0	3,399,426	0
1	0	545,008	0
1	0	783,694	0
1	0	409,522	0
1	0	3,073,972	0
0	1	0	369,650
0	1	0	1,661,369

Sum of Sound Power during Period wo/penalty	39,363,993	14,063,914
Log Factor for Penalty (i.e., 10*log(x))	1	10
Sound Power during Period with penalty	39,363,993	140,639,145

Total Daily Sound Power, with penalties	180,003,137
Hours per Day	24
Average Hourly Sound Power, with penalties	7,500,131
Ldn	68.8

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 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 Site: LRDP
Measurement Date: 11/14/2016
Project Name: LRDP

Computation of CNEL

Hour of Day (military time)	Sound Level Leq (dBA)	Sound Power =10*Log(dB A/10)	Period of 24-Hour Day (1=included, 0=not)			Sound Power Breakdown by Period of Day		
			Day	Evening	Night	Day	Evening	Night
0:00	51.2	131,826	0	0	1	0	0	131,826
1:00	50.4	109,648	0	0	1	0	0	109,648
2:00	51.1	128,825	0	0	1	0	0	128,825
3:00	52.7	186,209	0	0	1	0	0	186,209
4:00	56.1	407,380	0	0	1	0	0	407,380
5:00	58.5	707,946	0	0	1	0	0	707,946
6:00	60.5	1,122,018	0	0	1	0	0	1,122,018
7:00	61.1	1,288,250	1	0	0	1,288,250	0	0
8:00	59.9	977,237	1	0	0	977,237	0	0
9:00	58.3	676,083	1	0	0	676,083	0	0
10:00	57.7	588,844	1	0	0	588,844	0	0
11:00	58.0	630,957	1	0	0	630,957	0	0
12:00	58.2	660,693	1	0	0	660,693	0	0
13:00	58.6	724,436	1	0	0	724,436	0	0
14:00	58.5	707,946	1	0	0	707,946	0	0
15:00	58.8	758,578	1	0	0	758,578	0	0
16:00	59.9	977,237	1	0	0	977,237	0	0
17:00	64.8	3,019,952	1	0	0	3,019,952	0	0
18:00	60.4	1,096,478	1	0	0	1,096,478	0	0
19:00	58.9	776,247	0	1	0	0	776,247	0
20:00	58.7	741,310	0	1	0	0	741,310	0
21:00	57.3	537,032	0	1	0	0	537,032	0
22:00	55.1	323,594	0	0	1	0	0	323,594
23:00	54.1	257,040	0	0	1	0	0	257,040

Sum of Sound Power during Period wo/penalty	12,106,691	2,054,589	3,374,485
Log Factor for CNEL Penalty (i.e., 10*log(x))	1	3	10
Sound Power during Period with penalty	12,106,691	6,163,767	33,744,849

Total Daily Sound Power, with penalties	52,015,307
Hours per Day	24
Average Hourly Sound Power, with penalties	2,167,304
CNEL	63.4

Ldn computation on next page.

Computation of Ldn

Period of 24-Hour Day (1=included, 0=not)		Sound Power Breakdown by Period of Day	
Day	Night	Day	Night
0	1	0	131,826
0	1	0	109,648
0	1	0	128,825
0	1	0	186,209
0	1	0	407,380
0	1	0	707,946
0	1	0	1,122,018
1	0	1,288,250	0
1	0	977,237	0
1	0	676,083	0
1	0	588,844	0
1	0	630,957	0
1	0	660,693	0
1	0	724,436	0
1	0	707,946	0
1	0	758,578	0
1	0	977,237	0
1	0	3,019,952	0
1	0	1,096,478	0
1	0	776,247	0
1	0	741,310	0
1	0	537,032	0
0	1	0	323,594
0	1	0	257,040

Sum of Sound Power during Period wo/penalty	14,161,280	3,374,485
Log Factor for Penalty (i.e., 10*log(x))	1	10
Sound Power during Period with penalty	14,161,280	33,744,849

Total Daily Sound Power, with penalties	47,906,129
Hours per Day	24
Average Hourly Sound Power, with penalties	1,996,089
Ldn	63.0

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.