Appendix H

Noise Calculations

Existing	Existing Traffic Noise																	
Project:																		
								Input								Output		
	Noise Level Descriptor: Site Conditions: Traffic Input: Traffic K-Factor:	: Ldn : Hard : ADT :				Distanc	ce to											
	Sogmo	nt Description and Location			Speed	Directio	onal		Traffic D	ictribution	Characte	rictics		Ida	Dia	stance to Co	ntour (feet)	_
Numbor	Namo		То	ADT	(mnh)	Noar	For	% Auto	Modium				% Night	(dBA)				3 60 dBA
Number	Name		10	ADT	(inpii)	INEdi	Fai	78 Auto	78 Ivieuluiti	70 neavy	78 Day	78 LVE	70 Nigitt	(UDA) _{5,6,7}	75 UBA	70 UBA		OU UBA
1	Riverside Dr (Between Spruce	e Ave and the northernmost pr	oject driveway)	2,050	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.0	1	2	8	25
2	Riverside Dr (Between the no	rthernmost project driveway a	nd Fir Avenue)	2,060	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.6	1	4	11	36
3	Riverside Dr (Between Fir Ave	enue and the southernmost pro	oject driveway)	2,270	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.0	1	4	12	39
4	Riverside Dr (Between the sou	uthernmost project driveway a	nd Herndon Ave)	2,260	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.0	1	4	12	39
5	Herndon Ave (west of Riversio	de Drive)		24,880	45	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	70.8	19	61	191	605
6	Herndon Ave (Between Rivers	side Dr and Arthur Ave)		21,050	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	71.4	22	70	221	698
7	Herndon Ave (East of Arthur A	Ave)		21,050	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	71.4	22	70	221	698
8	ADT Limit to Comply with Ger	neral Plan Exterior Noise Stand	ard	9,000	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.0	5	16	49	156
					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%					
					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%					
					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%					
					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%					

CENIT

*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.

Existing-Plus-Project Traffic Noise													NT				
Project:	:																
							Input								Output		
Noise Level Descriptor: Ldn Site Conditions: Hard Traffic Input: ADT Traffic K-Factor: Segment Description and Location			Speed	Distance Directio Centerline	e to onal (feet)		Traffic Di	stribution	Characta	ristics		Ida	Di	stance to Co	ontour (feet	1	
Number	· Name From	То	ADT	(mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	(dBA) _{F 6 7}	75 dBA	70 dBA	65 dBA	⁷³ 60 dBA
				(,		, in the second second	,. 2 uy	,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(
1	Riverside Dr (Between Spruce Ave and the northernmost pr	oiect driveway)	5.536	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.3	2	7	21	67
2	Riverside Dr (Between the northernmost project driveway a	and Fir Avenue)	7,783	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.3	4	14	43	135
3	Riverside Dr (Between Fir Avenue and the southernmost pro	oject driveway)	19,500	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.3	11	34	107	339
4	Riverside Dr (Between the southernmost project driveway a	and Herndon Ave)	20,603	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.6	11	36	113	358
5	Herndon Ave (west of Riverside Drive)		37,158	45	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	72.6	29	90	286	904
6	Herndon Ave (Between Riverside Dr and Arthur Ave)		26,352	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	72.4	28	87	276	873
7	Herndon Ave (East of Arthur Ave)		26,321	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	72.4	28	87	276	872
				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%					
				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%					
				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%					
				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%					

*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 Calc	ulator															ASCE	NT
Project:																• · · ·		
Noise Level Descriptor: Ldn Site Conditions: Hard Traffic Input: ADT Traffic K-Factor: Segment Description and Location					Distanc	ce to onal	Input								Output			
N	Segme	ent Description and Location	T .		Speed	Centerline	, (feet) ₄	0/ 0	Traffic Di	stribution	Characte	ristics		Ldn,	Di:	stance to Co	ntour, (feet)	3
Number	Name	From	10	ADT	(mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% EVe	% Night	(abA) _{5,6,7}	75 dBA	70 dBA	65 dBA	60 dBA
1	Riverside Dr (Between Spruce	e Ave and Entry B)		6,124	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.7	2	7	23	74
2	Riverside Dr (Between Entry	B and Entry C)		9,483	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.2	5	16	52	165
3	Riverside Dr (Between Entry	C and Entry D)		23,459	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	69.1	13	41	129	408
4	Riverside Dr (Between Entry	D and Herndon Ave)		25,128	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	69.4	14	44	138	437
5	Herndon Ave (west of Riversi	ide Drive)		37,169	45	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	72.6	29	90	286	904
6	Herndon Ave (Between River	rside Dr and Arthur Ave)		26,332	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	72.4	28	87	276	873
7	Herndon Ave (East of Arthur	Ave)		26,332	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	72.4	28	87	276	873
				-	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%					
					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%					
				-	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%					
					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%					

*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

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- 2 Caltrans Technical Noise Supplement. 2009 (November). Equation (5-26), Pg 5-60.
- 3 Caltrans Technical Noise Supplement. 2009 (November). Equation (2-16), Pg 2-32.
- 4 Caltrans Technical Noise Supplement. 2009 (November). Equation (5-11), Pg 5-47, 48.
- 5 Caltrans Technical Noise Supplement. 2009 (November). Equation (2-26), Pg 2-55, 56.
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- 7 Caltrans Technical Noise Supplement. 2009 (November). Pg 2-53.
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- FHWA 2004 TNM Version 2.5
- FHWA 2004 TNM Version 2.5
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- 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

<u>References</u>

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



Fresno Costco Onsite Construction Noise

				Reference Emission	
	Distance to Nearest	Combined Predicted		Noise Levels (L _{max}) at 50	Usage
Location	Receptor in feet	Noise Level (L _{eq} dBA)	Equipment	feet ¹	Factor ¹
Threshold	1,193	60.0	Paver	85	0.2
	50	87.6	Grader	85	0.4
Single-Family Residence				85	
(West Parr Avenue west of			Roller		
project site)	90	82.4			0.2
Rio Vista Middle School	850	62.9	Scraper	85	0.4
River Bluff Elementary					
School	1230	59.7			

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor ²	0.00

Predicted Noise Level ³	L _{eq} dBA at 50 feet ³
Paver	78.0
Grader	81.0
Roller	78.0
Scraper	81.0

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

88

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}(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;

Sources:

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



Fresno Costco Offsite Construction Noise

				Reference Emission	
	Distance to Nearest	Combined Predicted		Noise Levels (L _{max}) at 50	Usage
Location	Receptor in feet	Noise Level (L _{eq} dBA)	Equipment	feet ¹	Factor ¹
Threshold	974	60.0	Paver	85	0.2
	50	85.8	Grader	85	0.4
Nearest Residence	90	80.7			
Off-site improvements					
corresponding with					
infrastructure improvment					
1 in PD	60	84.2			
Off-site improvements					
corresponding with					
infrastructure improvment					
3 in PD	1000	59.8			
Off-site improvements					
corresponding with					
infrastructure improvment					
5 in PD	80	81.7			

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor ²	0.00

Predicted Noise Level ³	L _{eq} dBA at 50 feet ³
Paver	78.0
Grader	81.0

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

86

Sources: $^1\,\rm Obtained$ 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).

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

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

	A	Spec	Actual	No. of	<u> </u>	<u> </u>			
	Acoustical	721.560	Measured	Actual Data	Spec	Spec	Distance	Actual	Actual
	Factor (%)	50ft (dBA	50ft	Samples	LmaxCalc	721.560 Lea	Distance	LmaxCalc	Lea
Equipment Description	1 00001 (70)	slow)	(dBA slow)	(count)					4
Auger Drill Rig	20	85	84	36	79.0	72.0	100	78.0	71.0
Backhoe	40	80	/8	372	74.0	/0.0	100	/2.0	68.0
Bar Bender	20	80	na	0	74.0	67.0	100		
Boring lack Power Unit	50	94 80	11a 83	1	74.0	71.0	100	77.0	74.0
Chain Saw	20	85	84	46	74.0	72.0	100	77.0	74.0
Clam Shovel (dronning)	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 01	96	74.0	70.0	100	73.0	69.0 72.0
Generator $(<25K)/A$ VMS signs)	50	82 70	81 72	19 74	70.0 64.0	73.0 61.0	100	75.0 67.0	72.0 64.0
Gradall	30 40	70 85	73 83	74	79.0	75.0	100	77.0	04.0 73.0
Grader	40	85	na	0	79.0	75.0	100	77.0	75.0
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	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 (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	/6.0	100	79.0	76.0
Pumps Defrigerator Unit	50	// 02	81 72	17	71.0	68.U	100	75.0	72.0
Reingerator Unit	100	82 95	73	3 10	70.0	70.0	100	07.0 72.0	67.0
Rock Drill	20	85	79 81	19	79.0	72.0	100	75.0	68 0
Boller	20	85	80	16	79.0	72.0	100	75.0	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	na	0	74.0	71.0	100		
Tractor	40	84	na	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 0E	101	44 1 C	89.0	82.0	100	95.0	88.0
Welder / Torch	ح ۱۸	50 72	03 7/1	12 E	/9.U 67 0	00.U	100	//.U	04.U
chinner	40	75 75	/4	Э	07.0	03.0	100	08.0	04.0
cilippei		15							

Source:

FHWA Roadway Construction Noise Model, January 2006. Table 9.1

U.S. Department of Transportation

CA/T Construction Spec. 721.560



Nightime Construction Activities- Concrete Pour

	Distance to Nearest	Combined Predicted	Interior Noise		Reference Emission Noise Levels (L _{max}) at 50	Usage
Location	Receptor in feet	Noise Level (L _{eq} dBA)	Level (Leq dBA)	Equipment	feet	Factor ⁺
threshold	3,077	50.0		Concrete Mixer Truck	85	0.4
					85	
Single-family Residence (West Parr				Concrete Mixer Truck		
Avenue west of project site)	400	67.7	43.7			0.4
Rio Vista Middle School	1400	56.8	32.8	Concrete Pump Truck	82	0.16
River Bluff Elementary School	1550	56.0	32.0	Tractor	84	0.4
						0.4
						0.4
						0.4
						0.4
					•	
				Ground Type	hard	
				Source Height	8	
				Receiver Height	5	
				Ground Eactor ²	0.00	
				Ground Factor	0.00	
				Predicted Noise Level ³	L _{eq} dBA at 50 feet ³	
				Concrete Mixer Truck	81.0	
				Concrete Mixer Truck	81.0	
				Concrete Pump Truck	74.0	
				Tractor	80.0	

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

85.8

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

Where: E.L. = Emission Level;

U.F.= Usage Factor;

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



Nightime Construction Activities- Concrete Pour

				Reference Emission	
	Distance to Nearest	Combined Predicted		Noise Levels (L _{max}) at 50	Usage
Location	Receptor in feet	Noise Level (L _{eq} dBA)	Equipment	feet ¹	Factor ¹
threshold	5,104	50.0	Concrete Mixer Truck	85	1
Single-family Residence (West Parr			Concrete Mixer Truck	85	
Avenue west of project site)	400	72.1	Concrete Wilker Truck		1
Rio Vista Middle School	1400	61.2	Concrete Pump Truck	82	1
River Bluff Elementary School	1550	60.4	Tractor	84	1
					1
					1
					1
					1
	·,				
				-	
			Ground Type	hard	
			Source Height	8	
			Receiver Height	5	
			Ground Factor ²	0.00	
			Duadiated Naiss Laural ³	$d \mathbf{P} \mathbf{A}$ at $\mathbf{F} \mathbf{O}$ feat ³	
				L _{eq} dBA at 50 feet	
			Concrete Mixer Truck	85.0	
			Concrete Mixer Truck	85.0	
			Concrete Pump Truck	82.0	
			Tractor	84.0	

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

90.2

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}(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;

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

Equipment	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
Description		/	()						
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	8/	4	87.0	80.0	100	81.0	74.0
Compactor (ground)	20	80	83	57	74.0	67.U 70.0	100	77.0	70.0
Concrete Batch Plant	40	80 02	78	18	74.0	70.0 69 7	100	72.0	08.0
Concrete Mixer Truck	10	05 85	11a 70	40	77.0	75.0	100	73.0	69.0
Concrete Pump Truck	20	82	81	30	75.0	69 D	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	/4.0	100	05.0	00.0
Impact Pile Driver	20	95 0F	101	11	89.0	82.0	100	95.0	88.0
Jacknammer	20	80 95	89 75	133	79.0	72.0	100	60 O	70.0 62.0
Mounted Impact Hammer (20	90 90	90	23	79.0 84.0	72.0	100	84.0	77.0
Pavement Scarafier	20	85	90	212	79.0	77.0	100	84.0	77.0
Paver	50	85	77	9	79.0	72.0	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	na	0	74.0	/1.0	100		
Vacuum Excavator (Vac tru	40	84 0E	na or	140	78.0	74.0	100	70.0	75.0
Vacuum Excavator (Vac-tru	40 10	00 00	65 07	149 10	79.0	/5.U	100	79.0	15.0
Ventilation Fan	100	00 Q5	02 70	13 12	74.0	04.U 70.0	100	/0.U 0 כד	0.00. ס כד
Vibrating Honner	50	85 85	87	1	79.0 79.0	79.0	100	73.0 <u></u> <u>21</u> 0	73.0 78 N
Vibratory Concrete Mixer	20	80	80	- 1	73.0 74 N	, 0.0 67 N	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



Grey cells are intermediate calculations performed by the model.

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

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.

Attenuated Noise Level at Receptor

@

@

@

@

@

@

distance

(ft)

90

73

90

90

90

Distance to sensitive receptor

80 vdb

Threshold

vibration level

(VdB)

77.3

80.0

41.3

70.3

69.3

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

Noise Source/ID	Reference Noise Level				
	vibration level	distance			
	(VdB)	@	(ft)		
Vibratory Roller	94	@	25		
Vibratory Roller	94	@	25		
Small bull dozer	58.0	@	25		
Large bull dozer	87.0	@	25		
Loaded trucks	86.0	@	25		

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

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

STEP 3B: Select the distance to

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

Noise Source/ID	Reference	Reference Noise Level				
	vibration level	vibration level			vibr	
	(PPV)	@	(ft)			
Vibratory Roller	0.210	@	25			
Vibratory Roller	0.210	@	25			
Small bull dozer	0.003	@	25			
Large bull dozer	0.089	@	25			
Loaded trucks	0.076	@	25			

the receiver.

	Attenuated Noi	se Lo	evel at Receptor	
9	vibration level		distance	
	(PPV)	@	(ft)	
	0.031	@	90	Distance to sensitive receptor
	0.198	@	26	Threshold
	0.000	@	90	
	0.013	@	90	0.2 ppv
	0.011	@	90	

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

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.

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



Grey cells are intermediate calculations performed by the model.

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

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 Leve				
	vibration level		distance	
	(VdB)	@	(ft)	
loaded truck	86	@	25	
loaded truck	86	@	25	
loaded truck	86	@	25	
loaded truck	86	@	25	

Receptor
stance
(ft)
60 Off-s
LOOO Off-s
80 Off-s
40 Thre
1

80 vdb

f-site improvements corresponding with infrastructure improvment 1 in PD f-site improvements corresponding with infrastructure improvment 3 in PD f-site improvements corresponding with infrastructure improvment 5 in PD reshold

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

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	Referen	ce Noi	se Level	Attenuated No	ise L	evel at Receptor
	vibration level		distance	vibration level		distance
	(PPV)	@	(ft)	(PPV)	@	(ft)
loaded truck	0.076	@	25	0.020	@	60
loaded truck	0.076	@	25	0.000	@	1000
loaded truck	0.076	@	25	0.013	@	80
loaded truck	0.076	@	25	0.181	@	14

0.2 ppv

Off-site improvements corresponding with infrastructure improvment 1 in PD Off-site improvements corresponding with infrastructure improvment 3 in PD Off-site improvements corresponding with infrastructure improvment 5 in PD Threshold

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

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.

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



Grey cells are intermediate calculations performed by the model.

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

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	Referen	Reference Noise Level			Attenuated Noise Level at Receptor			
	vibration level		distance		vibration level		distance	
	(VdB)	@	(ft)		(VdB)	@	(ft)	80 vdb
large bull dozer	87.0	@	25	1	49.1	@	460	Learn4Life Highschool
large bull dozer	87.0	@	25		79.9	@	43	Threshold

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

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				
	vibration level	distance			
	(PPV)	@	(ft)		
large bull dozer	0.089	@	25		
large bull dozer	0.089	@	25		

Attenuated Noi			
vibration level		distance	
(PPV)	@	(ft)	0.2 ppv
0.001	@	460	Learn4Life Highschool
0.191	@	15	Threshold

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

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.

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



Decommissioning

				Reference Emission	
	Distance to Nearest	Combined Predicted		Noise Levels (L _{max}) at 50	Usage
Location	Receptor in feet	Noise Level (L _{eq} dBA)	Equipment	feet ¹	Factor ¹
Threshold	1,732	50.0	Concrete Saw	90	0.2
Learn4Life Highschool	450	63.4	Excavator	85	0.4
Nearest Residence				85	
(West San Jose Ave and			Excavator		
North Gates Ave)	1400	50.4			0.4
_		-	Excavator	85	0.4
			Dozer	85	0.4
			Dozer	85	0.4

Ground Type	Soft
Source Height	8
Receiver Height	5
Ground Factor ²	0.63

Predicted Noise Level ³ L _{eq} dBA at 50 feet ³	
Concrete Saw 83.0	
Excavator 81.0	
Excavator 81.0	
Excavator 81.0	
Dozer 81.0	
Dozer 81.0	

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

88.5

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}(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 2006: pg 6-23); and

	A	Spec	Actual	No. of	<u> </u>	<u> </u>			
	Acoustical	721.560	Measured	Actual Data	Spec	Spec	Distance	Actual	Actual
	Factor (%)	50ft (dBA	50ft	Samples	LmaxCalc	721.560 Lea	Distance	LmaxCalc	Lea
Equipment Description		slow)	(dBA slow)	(count)					1
Auger Drill Rig	20	85	84	36	79.0	72.0	100	78.0	71.0
Backhoe Bar Bondor	40	80 90	78	372	74.0	/U.U	100	72.0	68.0
Blasting	20	00 Q/	na	0	74.0	07.0	100		
Boring lack Power Unit	50	94 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	74.0
Clam Shovel (dronning)	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 signs)	50	70	73	74	64.0	61.0	100	67.0	64.0
Gradall	40	85	83	70	79.0	75.0	100	//.0	/3.0
Grader Grannla (an Baskhaa)	40	85	na oz	0	79.0	75.0	100	91.0	77.0
Grappie (on Backnoe)	40 25	85	87	I C	79.0	/5.0	100	81.0	77.0
Hudra Broak Bam	25	00	82	0	74.0	74.0	100	76.0	70.0
Impact Pile Driver	20	90	101	11	84.0	22 O	100	95.0	88.0
lackhammer	20	95 85	201	133	79.0	72.0	100	95.0 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
	50	82	80	/5	76.0	/3.0	100	74.0	/1.0
	50	80	na	0	74.0	/1.0	100		
Mactor	40	84 0E	na oc	140	78.0	74.0	100	70.0	75.0
Vacuum Street Sweeper	40 10	20 20	co ço	149 10	79.0 7/ 0	/ J.U	100	79.U 76 0	75.U 66 0
Ventilation Fan	100	00 85	02 70	12	74.U 70 0	04.U 70 0	100	70.U 72 A	00.0 72 A
Vibrating Honner	50	05 85	75 87	10 1	79.0 70 0	79.0	100	75.U 21 O	73.U 72 N
Vibratory Concrete Miver	20 20	80 80	07 20	1	79.0 7/1 0	70.0 67 0	100	01.U 7/ 0	70.U 67 0
Vibratory Pile Driver	20	90 92	101	т ЛЛ	24.0 29 N	07.0 ۵۶ ۵	100	74.U Q5 N	07.0 88 N
Warning Horn	5	85	83	12	79.0	66 N	100	77 N	64 N
Welder / Torch	40	73	74	5	67.0	63.0	100	68.0	64.0
chipper		75		-	07.0	23.0	_ ~ ~	20.0	0.110
		-							

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 (HVAC and Car Wash)

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	e Noi	ise Level	Δ	ttenuation C	haracteristics	Attenuated Noise Level at Receptor					
	noise level		distance	Ground Type	Source	Receiver	Ground		noise leve		distance	
	(dBA)	@	(ft)	(soft/hard)	Height (ft)	Height (ft)	Factor		(dBA)	@	(ft)	
HVAC units	70.0	@	50	soft	10	5	0.62		46.4	@	400	
HVAC units	70.0	@	50	hard	10	5	0.00		44.9	@	900	
Car Wash Dryers	69.0	@	50	hard	10	5	0.00		43.9	@	900	

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. 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-



Attenuation Calculations for Stationary Noise Sources (Heavy Vehicle Loading)

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	Referenc	e No	ise Level	A	Attenuation Characteristics						evel at Receptor		
	noise level distance		Ground Type	Ground Type Source Receiver		Ground		noise leve	I	distance			
	(dBA)	@	(ft)	(soft/hard)	Height (ft)	Height (ft)	Factor		(dBA)	@	(ft)		
Operational Noise Lmax at													
nearest residence	86.0	@	50	hard	5	8	0.00		66.0	@	500		
Operational Noise CNEL at													
nearest residence	88.7	@	50	hard	5	8	0.00		68.7	@	500		
Operational Noise Leq at nearest													
residence	84.0	@	50	hard	5	8	0.00		64.0	@	500		
							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. 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-



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	e Noi	se Level	Δ	Attenuated Noise Level at Receptor				tor			
	noise level		distance	Ground Type	Source	Receiver	Ground	1	noise leve	I	distance	
	(dBA)	@	(ft)	(soft/hard)	Height (ft)	Height (ft)	Factor		(dBA)	@	(ft)	
Tire Center	65.0	@	50	hard	2	5	0.00	1	46.9	@	400	
								1				
								1				
								1				
								1				
								1				
								1				
								1				
								1				
								1				
								1				
								1				

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. 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: Accessed: March 5, 2020.

Parking Lot Noise Calculation

KEY: Orange cells are for input.

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

Number of automobiles per hour	2130
Number of buses per hour	0
Distance to sensitive receptor (feet)	400

	<u>distance</u>	<u>sound level</u>
Leq @	50	65.7
Leq @	400	47.6

<u>Source</u>

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/researchinnovation/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.





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.

the receiver.

Noise Source/ID	Reference Noise Level			Attenuation Characteristics				Attenuated Noise Level at Receptor					
	noise level		distance	Ground Type	Source	Receiver	Ground		noise leve	I	distance		
	(dBA)	@	(ft)	(soft/hard)	Height (ft)	Height (ft)	Factor		(dBA)	@	(ft)		
Trash Compactor	50.0	@	50	hard	5	5	0.00		31.9	@	400		Distance to nearest residence west of project site

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. 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.

STEP 3: Select the distance to



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	Referenc	e No	ise Level	A	Atter	uated Nois							
	noise leve	l	distance	Ground Type	Source	Receiver	Ground		noise leve	1	distance		
	(dBA)	@	(ft)	(soft/hard)	Height (ft)	Height (ft)	Factor		(dBA)	@	(ft)		
High range of typical SENL (Haul Truck)	90.0	@	50	soft	8	5	0.63		92.6	@	40	neares	t recpetor w/ sound wal
High range of typical SENL (Haul Truck)	90.0	@	50	hard	8	5	0.00		91.9	@	40	neares	t recpetor w/ sound wal
							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. 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-