Appendix C

Noise Modeling Outputs

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)
HVAC	70.0	@	3	hard	8	5	0.00	50.0	@	30
HVAC				hard	8	5	0.00			

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:

Distance Propagation Calculations for Stationary Sources of Ground Vibration

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: 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)
Impact pile driver	112	@	25	72.0	@	540
Vibratory Roller	104	@	25	72.0	@	292
large bull dozer	87.0	@	25	78.0	@	50
commuter rail, upper range	88	@	50	100	@	20
	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 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)
Impact pile driver	1.518	@	25	0.199	@	97
Vibratory roller	0.210	@	25	0.020	@	120
large bull dozer	0.089	@	25	0.124	@	20
train	0.360	@	10	0.006	@	150
loaded truck	0.076	@	25	0.0018	@	300
	0.076	@	25	0.11	@	20

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

Traffic Noise Increase Calculations

Roadway	From	To	ADT Volumes			Noise Increase, dBA Ldn
			Baseline	Cumulative No Project	Cumulative Plus Project	Project's Contribution to Cumulative
E. Bidwell Street	E. Bidwell Street	Glenn Drive	9,042	9,516	10,447	0.4
Riley Street	E. Bidwell Street	Glenn Drive	5,541	5,362	6,371	0.7
Riley Street	Glenn Drive	Blue Ravine Road	5,826	5,994	8,510	1.5
Blue Ravine Road	E. Bidwell Street	Oak Avenue Parkway	16,544	16,509	17,078	0.1
Blue Ravine Road	Riley Street	E. Bidwell Street	20,356	20,563	21,202	0.1
Creekside Drive	Harrington Way	E. Bidwell Street	2,576	2,673	2,988	0.5
Creekside Drive	E. Bidwell Street	Oak Avenue Parkway	9,582.45	9,622.59	9,938.81	0.1
E. Bidwell Street	Blue Ravine Road	Oak Avenue Parkway	25,069	27,813	30,701	0.4
Oak Avenue Parkway	E. Bidwell Street	Blue Ravine Road	19,992	19,790	20,165	0.1
S. Lexington Drive	Oak Avenue Parkway	Silberhorn Drive	741	757	764	0.0
E. Bidwell Street	Oak Avenue Parkway	Scholar Way	37,814	41,855	44,987	0.3
Silberhorn Drive	Scholar Way	S. Lexington Drive	2,686	2,682	2,687	0.0
Scholar Way	E. Bidwell Street	Broadstone Parkway	5,239	4,624	4,709	0.1
E. Bidwell Street	Clarksville Road	Broadstone Parkway	33,267	37,643	39,366	0.2
Cavitt Drive	Scholar Way	Broadstone Parkway	815	929	951	0.1
Broadstone Parkway	E. Bidwell Street	Scholar Way	11,111	10,114	10,223	0.0
Broadstone Parkway	E. Bidwell Street	Iron Point Road	7,486	7,948	8,249	0.2
Clarksville Road	E. Bidwell Street	Broadstone Parkway	7,480	8,623	9,574	0.5
E. Bidwell Street	Broadstone Parkway	Iron Point Road	40,873	49,830	51,374	0.1
Iron Point Road	Broadstone Parkway	E. Bidwell Street	14,111	18,431	19,721	0.3
Iron Point Road	Placerville Road	Empire Ranch Road	10,608	14,887	15,232	0.1
E. Bidwell Street	Iron Point Road	US 50	47,039	62,710	64,850	0.1
US 50	Prairie City Road	E. Bidwell Street	6,715	6,273	6,447	0.1
US 50	E. Bidwell Street	Latrobe Road	37,239	36,609	36,613	0.0
E. Bidwell Street	US 50	White Rock Road	11,296	22,354	22,569	0.0
White Rock Road	E. Bidwell Street	Prairie City Road	12,442	15,427	15,405	0.0
Prairie City Road	US 50	White Rock Road	11,008	24,397	26,267	0.3
Folsom Boulevard	US 50	Iron Point Road	40,215	40,399	42,651	0.2
Folsom Boulevard	Iron Point Road	Blue Ravine Road	42,380	41,622	43,230	0.2
Natoma Station Drive	Folsom Boulevard	Ingersoll Way	12,349	11,848	12,028	0.1
Iron Point Road	Folsom Boulevard	Ingersoll Way	6,046	7,748	10,825	1.5
Ingersoll Way	Natoma Station Drive	Iron Point Road	1,681	1,602	2,417	1.8

Traffic Noise Increase Calculations

Roadway	From	To	ADT Volumes			Noise Increase, dBA Ldn
			Baseline	Cumulative No Project	Cumulative Plus Project	Project's Contribution to Cumulative
Natoma Station Drive	Blue Ravine Road	Coventry Court	13,124	13,041	14,199	0.4
Blue Ravine Road	Folsom Boulevard	Prairie City Road	35,746	37,155	38,468	0.2
Folsom Boulevard	Blue Ravine Road	Glenn Drive	34,474	34,960	36,517	0.2
Glenn Drive	Folsom Boulevard	Sibley Street	2,105	2,460	5,656	**3.6**