Appendix H

Noise Modeling Results

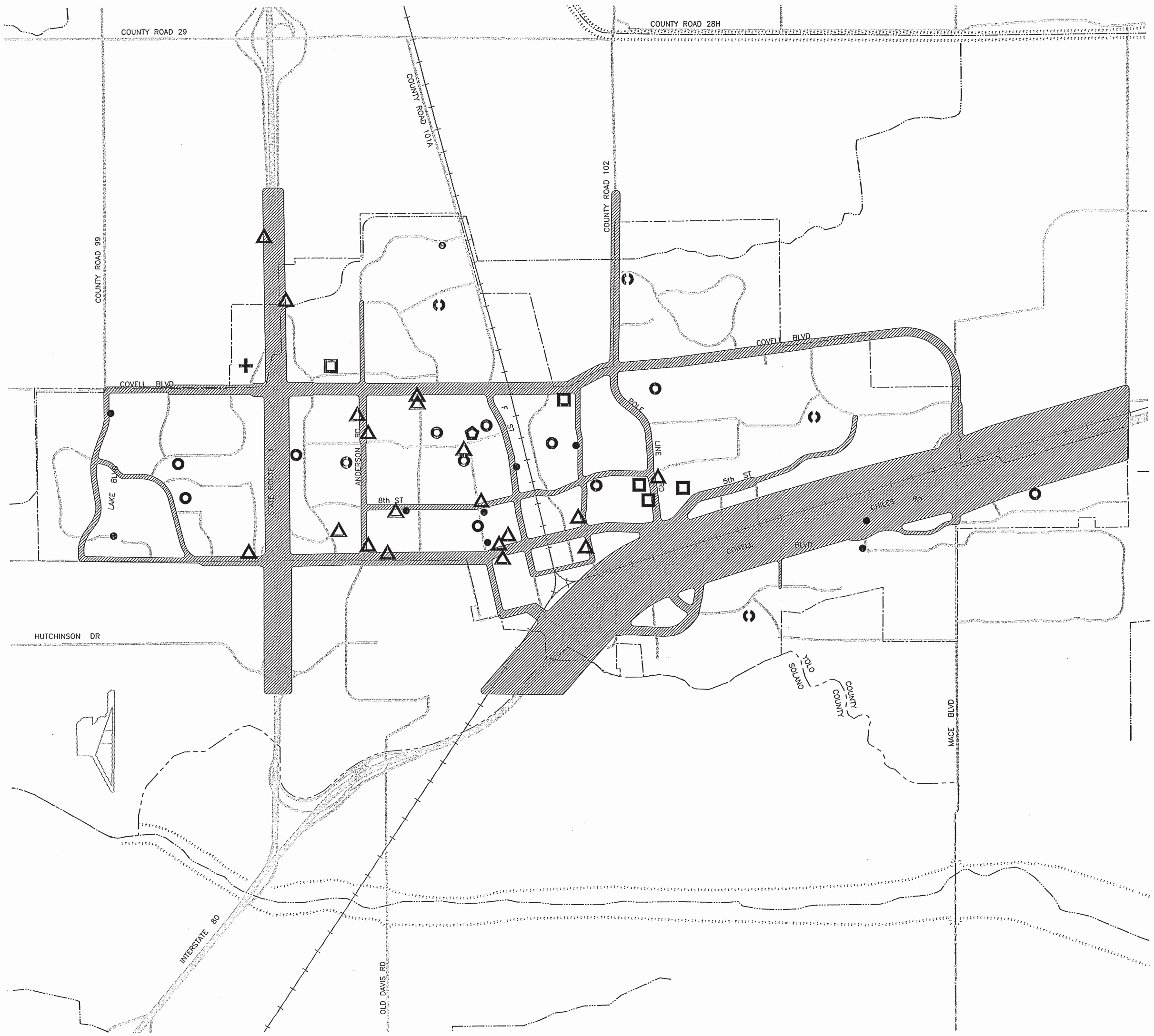

Figure 37
2010 Noise Contours

- School
- Church
- Nursing Home/Senior Housing
- Hospital
- Library
- Future School
- Day Care

NOTES

1. Contours shown on this map are an approximate representation of the 60 C.N.E.L. data contained in Appendix D of the Draft Program EIR for the City of Davis General Plan Update, January 2000.

Davis General Plan

100 acres
25

0 1000 3000 5000'

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: Site A - In Nishi, closer to I-80.
Measurement Date: 3/14/2015
Project Name: Nishi

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) Day	Evening	Night	Sound Power Breakdown by Period of Day Day	Evening	Night
0:00	57.7	588,844	0	0	1	0	0	588,844
1:00	54.6	288,403	0	0	1	0	0	288,403
2:00	55.9	389,045	0	0	1	0	0	389,045
3:00	58.0	630,957	0	0	1	0	0	630,957
4:00	62.5	1,778,279	0	0	1	0	0	1,778,279
5:00	60.3	1,071,519	0	0	1	0	0	1,071,519
6:00	60.6	1,148,154	0	0	1	0	0	1,148,154
7:00	64.7	2,951,209	1	0	0	2,951,209	0	0
8:00	61.8	1,513,561	1	0	0	1,513,561	0	0
9:00	61.7	1,479,108	1	0	0	1,479,108	0	0
10:00	60.7	1,184,044	1	0	0	1,184,044	0	0
11:00	57.7	588,844	1	0	0	588,844	0	0
12:00	57.7	588,844	1	0	0	588,844	0	0
13:00	58.0	630,957	1	0	0	630,957	0	0
14:00	58.9	776,247	1	0	0	776,247	0	0
15:00	58.6	724,436	1	0	0	724,436	0	0
16:00	60.4	1,096,478	1	0	0	1,096,478	0	0
17:00	62.8	1,905,461	1	0	0	1,905,461	0	0
18:00	63.1	2,041,738	1	0	0	2,041,738	0	0
19:00	60.3	1,071,519	0	1	0	0	1,071,519	0
20:00	60.5	1,122,018	0	1	0	0	1,122,018	0
21:00	58.8	758,578	0	1	0	0	758,578	0
22:00	61.8	1,513,561	0	0	1	0	0	1,513,561
23:00	59.7	933,254	0	0	1	0	0	933,254

	Day	Evening	Night
Sum of Sound Power during Period wo/penalty	15,480,928	2,952,115	8,342,017
Log Factor for CNEL Penalty (i.e., 10*log(x))	1	3	10
Sound Power during Period with penalty	15,480,928	8,856,346	83,420,172

Total Daily Sound Power, with penalties	107,757,446
Hours per Day	24
Average Hourly Sound Power, with penalties	4,489,894
CNEL	66.5

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	588,844
0	1	0	288,403
0	1	0	389,045
0	1	0	630,957
0	1	0	1,778,279
0	1	0	1,071,519
0	1	0	1,148,154
1	0	2,951,209	0
1	0	1,513,561	0
1	0	1,479,108	0
1	0	1,184,044	0
1	0	588,844	0
1	0	588,844	0
1	0	630,957	0
1	0	776,247	0
1	0	724,436	0
1	0	1,096,478	0
1	0	1,905,461	0
1	0	2,041,738	0
1	0	1,071,519	0
1	0	1,122,018	0
1	0	758,578	0
0	1	0	1,513,561
0	1	0	933,254

	Day	Night
Sum of Sound Power during Period wo/penalty	18,433,043	8,342,017
Log Factor for Penalty (i.e., 10*log(x))	1	10
Sound Power during Period with penalty	18,433,043	83,420,172

Total Daily Sound Power, with penalties	101,853,215
Hours per Day	24
Average Hourly Sound Power, with penalties	4,243,884
Ldn	66.3

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 Deaprtment of Transportation (Caltrans), Divisiong 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: Site B - In Nishi, closer to Railroad.
Measurement Date: 3/18/2015
Project Name: Nishi

Computation of CNEL

Hour of Day (military time)	Sound Level Leq (dBA)	Sound Power =10*Log(dBA/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	60.0	1,000,000	0	0	1	0	0	1,000,000
1:00	56.2	416,869	0	0	1	0	0	416,869
2:00	54.7	295,121	0	0	1	0	0	295,121
3:00	67.0	5,011,872	0	0	1	0	0	5,011,872
4:00	58.8	758,578	0	0	1	0	0	758,578
5:00	61.0	1,258,925	0	0	1	0	0	1,258,925
6:00	67.9	6,165,950	0	0	1	0	0	6,165,950
7:00	60.3	1,071,519	1	0	0	1,071,519	0	0
8:00	57.9	616,595	1	0	0	616,595	0	0
9:00	59.5	891,251	1	0	0	891,251	0	0
10:00	67.9	6,165,950	1	0	0	6,165,950	0	0
11:00	63.4	2,187,762	1	0	0	2,187,762	0	0
12:00	58.2	660,693	1	0	0	660,693	0	0
13:00	53.8	239,883	1	0	0	239,883	0	0
14:00	59.0	794,328	1	0	0	794,328	0	0
15:00	55.5	354,813	1	0	0	354,813	0	0
16:00	60.0	1,000,000	1	0	0	1,000,000	0	0
17:00	59.0	794,328	1	0	0	794,328	0	0
18:00	53.3	213,796	1	0	0	213,796	0	0
19:00	57.6	575,440	0	1	0	0	575,440	0
20:00	60.8	1,202,264	0	1	0	0	1,202,264	0
21:00	61.6	1,445,440	0	1	0	0	1,445,440	0
22:00	69.0	7,943,282	0	0	1	0	0	7,943,282
23:00	65.2	3,311,311	0	0	1	0	0	3,311,311

	Day	Evening	Night
Sum of Sound Power during Period wo/penalty	14,990,920	3,223,144	26,161,909
Log Factor for CNEL Penalty (i.e., 10*log(x))	1	3	10
Sound Power during Period with penalty	14,990,920	9,669,432	#########

Total Daily Sound Power, with penalties	286,279,444
Hours per Day	24
Average Hourly Sound Power, with penalties	11,928,310
CNEL	70.8

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	1,000,000
0	1	0	416,869
0	1	0	295,121
0	1	0	5,011,872
0	1	0	758,578
0	1	0	1,258,925
0	1	0	6,165,950
1	0	1,071,519	0
1	0	616,595	0
1	0	891,251	0
1	0	6,165,950	0
1	0	2,187,762	0
1	0	660,693	0
1	0	239,883	0
1	0	794,328	0
1	0	354,813	0
1	0	1,000,000	0
1	0	794,328	0
1	0	213,796	0
1	0	575,440	0
1	0	1,202,264	0
1	0	1,445,440	0
0	1	0	7,943,282
0	1	0	3,311,311

	Day	Night
Sum of Sound Power during Period wo/penalty	18,214,064	26,161,909
Log Factor for Penalty (i.e., 10*log(x))	1	10
Sound Power during Period with penalty	18,214,064	261,619,092

Total Daily Sound Power, with penalties	279,833,156
Hours per Day	24
Average Hourly Sound Power, with penalties	11,659,715
Ldn	70.7

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 Deaprtment of Transportation (Caltrans), Divisiong of Environmental Analysis. 2009 (November). *2009 Technical Noise Supplement* . Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed September 24, 2010.

Construction Source Noise Prediction Model

Hourly Average Construction Noise Levels from Nishi Development

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	73	86.0
Acoustical Center to Boundary	375	67.1
Acoustical Center to Solano	500	63.8
Threshold	50	90.1
West Olive to Aggie Village	400	66.3

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1] (scaled by number of equipment)
Welder / Torch	73	0.4
Compressor (air)	80	0.4
Crane	85	0.16
Excavator	85	0.4
Generator	82	0.5
Grader	85	0.4
Paver	85	0.5
Compactor (ground)	80	0.2
Pumps	77	0.5
Roller	85	0.2
Scraper	85	0.4
Tractor	84	0.8

Reflects Phase 1 conditions. Building Construction during Phase 1 will have the most number of equipment

Number of Equipment	Equipment Type
1	Air Compressors
1	Cranes
1	Crawler Tractors
1	Excavators
1	Forklifts
1	Generator Sets
1	Graders
1	Pavers
1	Paving Equipment
1	Plate Compactors
1	Pumps
1	Rollers
1	Rough Terrain Forklifts
1	Rubber Tired Loaders
1	Scrapers
1	Signal Boards
1	Tractors/Loaders/Backhoes
1	Welders

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]	L_{eq} dBA at 25 feet[3]
Welder / Torch	69.0	99.6
Compressor (air)	76.0	107.0
Crane	77.0	112.2
Excavator	81.0	112.2
Generator	79.0	109.1
Grader	81.0	112.2
Paver	82.0	112.2
Compactor (ground)	73.0	107.0
Pumps	74.0	103.8
Roller	78.0	112.2
Scraper	81.0	112.2
Tractor	83.0	111.2

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

90.1

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}(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

D = Distance from source to receiver.

Construction Source Noise Prediction Model - Nishi-Gateway Project

Maximum Construction Noise Levels from Nishi Development

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	144	83.0
Acoustical Center to Boundary	375	71.5
Acoustical Center to Solano	500	68.2
Threshold	50	94.5
West Olive to Aggie Village	400	70.7

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1] (scaled by number of equipment)
Welder / Torch	73	1
Compressor (air)	80	1
Crane	85	1
Excavator	85	1
Generator	82	1
Grader	85	1
Paver	85	1
Compactor (ground)	80	1
Pumps	77	1
Roller	85	1
Scraper	85	1
Tractor	84	2

Reflects Phase 1 conditions. Building Construction during Phase 1 will have the most number of equipment

Number of Equipment	Equipment Type
1	Air Compressors
1	Cranes
1	Crawler Tractors
1	Excavators
1	Forklifts
1	Generator Sets
1	Graders
1	Pavers
1	Paving Equipment
1	Plate Compactors
1	Pumps
1	Rollers
1	Rough Terrain Forklifts
1	Rubber Tired Loaders
1	Scrapers
1	Signal Boards
1	Tractors/Loaders/Backhoes
1	Welders

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]	L_{eq} dBA at 25 feet[3]
Welder / Torch	73.0	99.6
Compressor (air)	80.0	107.0
Crane	85.0	112.2
Excavator	85.0	112.2
Generator	82.0	109.1
Grader	85.0	112.2
Paver	85.0	112.2
Compactor (ground)	80.0	107.0
Pumps	77.0	103.8
Roller	85.0	112.2
Scraper	85.0	112.2
Tractor	87.0	111.2

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
94.5

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

D = Distance from source to receiver.

Construction Source Noise Prediction Model

Hourly Average Construction Noise Levels from West Olive Drive Redevelopment

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	42	86.0
West Olive to Aggie Village	400	60.3

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1] (scaled by number of equipment)
Welder / Torch	73	0.1
Compressor (air)	80	0.1
Crane	85	0.04
Excavator	85	0.1
Generator	82	0.125
Grader	85	0.1
Paver	85	0.125
Compactor (ground)	80	0.05
Pumps	77	0.125
Roller	85	0.05
Scraper	85	0.1
Tractor	84	0.2

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

West Olive Assumed to have 1/4 of equipment used on Nishi

Number of Equipment	Equipment Type
0.25	Air Compressors
0.25	Cranes
0.25	Crawler Tractors
0.25	Excavators
0.25	Forklifts
0.25	Generator Sets
0.25	Graders
0.25	Pavers
0.25	Paving Equipment
0.25	Plate Compactors
0.25	Pumps
0.25	Rollers
0.25	Rough Terrain Forklifts
0.25	Rubber Tired Loaders
0.25	Scrapers
0.25	Signal Boards
0.25	Tractors/Loaders/Backhoes
0.25	Welders

Predicted Noise Level[3]	L_{eq} dBA at 50 feet[3]	L_{eq} dBA at 25 feet[3]
Welder / Torch	63.0	99.6
Compressor (air)	70.0	107.0
Crane	71.0	112.2
Excavator	75.0	112.2
Generator	73.0	109.1
Grader	75.0	112.2
Paver	76.0	112.2
Compactor (ground)	67.0	107.0
Pumps	68.0	103.8
Roller	72.0	112.2
Scraper	75.0	112.2
Tractor	77.0	111.2

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
84.1

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}(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

D = Distance from source to receiver.

Construction Source Noise Prediction Model

Maximum Construction Noise Levels from West Olive Drive Redevelopment

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	61	86.0
West Olive to Aggie Village	400	64.3

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1] (scaled by number of equipment)
Welder / Torch	73	0.25
Compressor (air)	80	0.25
Crane	85	0.25
Excavator	85	0.25
Generator	82	0.25
Grader	85	0.25
Paver	85	0.25
Compactor (ground)	80	0.25
Pumps	77	0.25
Roller	85	0.25
Scraper	85	0.25
Tractor	84	0.25

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

West Olive Assumed to have 1/4 of equipment used on Nishi

Number of Equipment	Equipment Type
0.25	Air Compressors
0.25	Cranes
0.25	Crawler Tractors
0.25	Excavators
0.25	Forklifts
0.25	Generator Sets
0.25	Graders
0.25	Pavers
0.25	Paving Equipment
0.25	Plate Compactors
0.25	Pumps
0.25	Rollers
0.25	Rough Terrain Forklifts
0.25	Rubber Tired Loaders
0.25	Scrapers
0.25	Signal Boards
0.25	Tractors/Loaders/Backhoes
0.25	Welders

Predicted Noise Level[3]	L_{eq} dBA at 50 feet[3]	L_{eq} dBA at 25 feet[3]
Welder / Torch	67.0	99.6
Compressor (air)	74.0	107.0
Crane	79.0	112.2
Excavator	79.0	112.2
Generator	76.0	109.1
Grader	79.0	112.2
Paver	79.0	112.2
Compactor (ground)	74.0	107.0
Pumps	71.0	103.8
Roller	79.0	112.2
Scraper	79.0	112.2
Tractor	78.0	111.2

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
88.1

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}(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

D = Distance from source to receiver.

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	80.0	@	291.47663
blasting	109	@	25	79.0	@	250
large bull dozer	87.0	@	25	78.0	@	50

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	0.190	@	100
blasting	1.130	@	25	0.180	@	85
large bull dozer	0.089	@	25			

Notes:

Computation of propagated vibration levels is based on the equations presented on pg. 12-11 of FTA 2006. 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.

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.

Attenuation Calculations for Stationary Noise Sources

ASCENT ENVIRONMENTAL

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 (high)	70.0	@	50	soft	50	5	0.26	52.4	@	300
HVAC (low)	45.0	@	50.00	soft	6	5	0.65	24.4	@	300
Emergency Generator (at-grade)	84.0	@	45	soft	6	5	0.65	62.2	@	300
Emergency Generator (roof)	84.0	@	45	soft	50	5	0.26	65.4	@	300
Parking Lot	78.1	@	15	soft	6	5	0.65	50.0	@	172
Loading Dock (day)	82.0	@	50	soft	6	5	0.65	50.0	@	805
Train Horn Blast	100.0	@	320	soft	6	5	0.65	90.0	@	763
							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 presentd in Figure 6-23 on pg. 6-23 of FTA 2006, 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). 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 —Traffic Noise Levels from Interstate 80 and Affected Roadways

Project: Nishi Gateway

Noise Level Descriptor: CNEL
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor: 10

Segment Description and Location	Input										Output				
	ADT	Speed (mph)	Distance to Directional Centerline, (feet)4 Near	Far	Traffic Distribution Characteristics % Auto	% Medium	% Heavy	% Day	% Eve	% Night	CNEL, (dBA)5,6,7	Distance to Contour, (feet)3 65 dBA	60 dBA	55 dBA	50 dBA
Existing Conditions															
Old Davis Road, between I-80 and Hutchinson Drive	7,105	25	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	54.1	19	41	87	188
Richards Blvd, East of Research Park Drive	10,526	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.1	41	88	189	407
I-80, Between Old Davis Road and Mace Boulevard	96,737	65	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	76.6	592	1276	2748	5921
1st Street, East of D Street	13,158	25	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.8	28	61	132	284
Existing + Project Conditions															
Access 1															
Old Davis Road, between I-80 and Hutchinson Drive	7,421	25	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	54.3	19	42	90	194
Richards Blvd, East of Research Park Drive	8,632	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.3	36	77	165	356
I-80, Between Old Davis Road and Mace Boulevard (100 ft from freeway centerline	96,842	65	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	76.6	593	1277	2750	5925
1st Street, East of D Street	11,789	25	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.3	26	57	123	264
Access 2															
Old Davis Road, between I-80 and Hutchinson Drive	7,526	25	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	54.4	20	42	91	196
Richards Blvd, East of Research Park Drive	9,684	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.8	38	83	179	385
I-80, Between Old Davis Road and Mace Boulevard (100 ft from freeway centerline	98,421	65	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	76.7	599	1290	2780	5990
1st Street, East of D Street	12,842	25	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.7	28	60	130	280
Cumulative + Project Conditions															
Access 1															
Old Davis Road, between I-80 and Hutchinson Drive	13,947	25	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.1	30	64	137	295
Richards Blvd, East of Research Park Drive	14,000	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.4	49	106	228	492
I-80, Between Old Davis Road and Mace Boulevard (100 ft from freeway centerline	143,556	65	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	78.3	770	1660	3576	7703
1st Street, East of D Street	19,263	25	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.5	37	79	170	366
Access 2															
Old Davis Road, between I-80 and Hutchinson Drive	14,158	25	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.1	30	64	138	298
Richards Blvd, East of Research Park Drive	14,333	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.5	50	108	232	500
I-80, Between Old Davis Road and Mace Boulevard (100 ft from freeway centerline	147,444	65	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	78.4	784	1689	3640	7842
1st Street, East of D Street	20,333	25	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.7	38	82	176	380

*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 —Traffic Noise Levels from Interstate 80 between Old Davis Road and Richards Boulevard

Project: **Nishi Gateway**

Noise Level Descriptor: CNEL
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor: 10

Scenario / Segment Description and Location	Input: ADT	Speed (mph)	Distance to Directional Centerline, (feet)[4]: Near	Far	Traffic Distribution Characteristics: % Auto	% Medium	% Heavy	% Day	% Eve	% Night	Output: CNEL, (dBA)[5,6,7]	Distance to Contour, (feet)[3]: 70 dBA	65 dBA	60 dBA	55 dBA
Existing Conditions															
I-80, Between Old Davis Road and Mace Boulevard (100 ft from freeway centerline)	96,737	65	118	194	91.2%	3.5%	8.8%	70.0%	15.0%	15.0%	78.1	521	1122	2418	5209
I-80, Between Old Davis Road and Mace Boulevard (400 ft from freeway centerline)	96,737	65	418	494	87.8%	3.5%	8.8%	70.0%	15.0%	15.0%	70.5	494	1064	2293	4940
I-80, Between Old Davis Road and Mace Boulevard (900 ft from freeway centerline (i.e., at far centerline of pr	96,737	65	918	994	87.8%	3.5%	8.8%	70.0%	15.0%	15.0%	65.7	492	1060	2284	4920
Cumulative Plus Project Conditions - at nearest residential outdoor activity area (300 ft from edge)	147,444	65	418	494	87.8%	3.5%	8.8%	70.0%	15.0%	15.0%	72.4	654	1410	3037	6543
Approx. 3 dBA of attenuation provided by intervening row of non-residential buildings (Caltrans 2013:2-35)											3.0				
The residential buildings would also act as a sound barrier that protects the residential courtyards located on the opposite side of the buildings from I-80.															
The estimated building height of the residential structures (rental and for-sale) is approximately 70-75 feet.															
A sound barrier that blocks the line of site between the source and receptor provides 5 dB reduction plus an additional 1 dB for every 2 feet higher than the line of site (FHWA 2010:56).															
Thus, the residential buildings would provide a minimum 10 dB reduction.											10.0				
= Resultant noise level at the residential courtyards											59.4				
Cumulative Plus Project Conditions - at nearest non-residential building (100 ft from edge)	147,444	65	118	194	87.8%	3.5%	8.8%	70.0%	15.0%	15.0%	79.8	681	1467	3161	6811
The non-residential buildings will not include any outdoor activity areas.															
Cumulative Plus Project Conditions - at nearest garden area (350 feet from edge)	147,444	65	368	444	93.1%	3.5%	3.5%	70.0%	15.0%	15.0%	72.0	547	1179	2541	5475
Approx. 3 dBA of attenuation provided by intervening row of non-residential buildings (Caltrans 2013:2-35)											3.0				

*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.

Distance Propagation Calculations for Stationary Sources of Ground Vibration

ASCENT ENVIRONMENTAL

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)
commuter rail, upper	85.000	@	50	70.7	@	150
commer	85.0	@	50	74.7	@	110

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)

Notes:

Computation of propagated vibration levels is based on the equations presented on pg. 12-11 of FTA 2006. 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.

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.