Appendix G:
Noise Supporting Information

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Project Number: 3426.0024 Sheet 1 of 2
Project Name: Chula Vista
Test Personnel: Victoria Chung

Noise Measurement Survey

Site Number: ST-1 Date: 12/12/18 Time: From 2:21 pm To 2:36 pm

Site Location:
Inside Villa Marina Apartments parking lot. Located 20 ft from western wall and 30 ft from Northern wall.

Primary Noise Sources: Constant heavy machinery operating on adjacent industrial site. Hauling dirt to and from another location.

Measurement Results

	dBA
Leq	60.1
Lmax	72.6
Lmin	54
L5	
L10	
L50	
L90	
Ldn	
CNEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
2:22	Industrial hauler back-up	64
2:29	Industrial hauler back-up	58
2:30	heavy machinery operating	60
2:30	helicopter (distant)	68-70

Comments: The occasional car drive-by

Equipment: Larson Davis LX-2 Measured Difference: 0.09 dBA
Settings: A-Weighted ☒ Other ☐ _____ Slow ☒ Fast ☐ Windscreen ☒

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
9.2	0.7	64°		
Comments:	Slightly Windy Conditions			

Photos Taken:

Photo Number	Location/Description
ST-1 N	East of the project site, facing N towards L St.
ST-1 S	" " facing S towards Moss St.
ST-1 E	" " facing E towards Broadway
ST-1 W	" " facing W towards Industrial Blvd.

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts

Diagram/Further Comments:

Project Number: 3426.0024
Project Name: Chula Vista
Test Personnel: Victoria Chung

Sheet 1 of 2

Noise Measurement Survey

Site Number: ST-2 Date: 12/12/18 Time: From 1:52 pm To 2:08 pm

Site Location:
SW corner of Colorado Ave & Moss St., Westside of Colorado Ave., located 3 ft S. of fire hydrant, & 20 ft from Westside light pole.

Primary Noise Sources: Cars & trucks & semis off Moss St., Railway signal lights & bells.

Measurement Results

	dBA
Leq	70.1
Lmax	92.3
Lmin	58.2
L5	
L10	
L50	
L90	
Ldn	
CNEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
1:52	train (horns & bells)	
1:54	truck hauling equip	74
1:57	train crossing bells	68-69
1:58	train goes by	79
~~1:59~~		
2:01	small tanker	92
2:03	Regular truck exhaust	80
2:06	helicopter	68

Comments: Prior to train crossing, signal light & siren start approx. 2-3 mins as a warning.
Heavy traffic on Industrial Blvd.

Equipment: Larson Davis LX-2 Measured Difference: -0.01 dBA
Settings: A-Weighted ☑ Other ☐ _____ Slow ☒ Fast ☐ Windscreen ☒

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
2.3	1.6	69.5		
Comments:				

Photos Taken:

Photo Number	Location/Description
ST-2 N	South of the project site, facing N towards Moss St.
ST-2 S	" " facing S towards parking lot
ST-2 E	" " facing E towards Colorado St.
ST-2 W	" " facing W towards Industrial Blvd

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts

Diagram/Further Comments:

Project Number: 3426.0024
Project Name: Chula Vista
Test Personnel: Victoria Chung

Sheet 1 of 2

Noise Measurement Survey

Site Number: ST-B Date: 12/12/18 Time: From 1:05 pm To 1:33 pm

Site Location:
In CDF marine, co. back parking Lot. 4 ft from West fence, 6 ft from N-side property fence,

Primary Noise Sources: freeway (I-5) traffic, heavy traffic from Industrial ~~Road~~ Blvd. & Moss St., San Diego MTS light rail (train)

Measurement Results

	dBA
Leq	69.6
Lmax	91.6
Lmin	62.2
L5	
L10	
L50	
L90	
Ldn	
CNEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
1:05	large semi truck	
1:06	train (bells & horn)	
1:10	train bells & horn	
1:14	ambulance siren	
1:19	semi truck	
1:22	train (bells & horn)	
1:23	Land vehicle exhaust	
1:25	distant plane	
1:30	train (horn & bells)	

Comments: Railway crossing lights & signal begins in the distance approx. 2-3 mins prior to train crossing. Two trains passed going southbound, two trains passed going northbound (Light rail San Diego MTS)

Equipment: Larson Davis Lx-2 Measured Difference: 0.94 dBA
Settings: A-Weighted ☒ Other ☐ _____ Slow ☒ Fast ☐ Windscreen ☒

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
6.4	2.7	70°		
Comments:	slightly windy conditions			

Photos Taken:

Photo Number	Location/Description
ST-3 N	West of project site, facing N towards L St
ST-3 S	" " facing S towards Moss St
ST-3 E	" " facing E towards Broadway
ST-3 W	" " facing W towards Industrial Blvd

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts

Diagram/Further Comments:

TABLE Existing-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - L Street to I-5 interchange
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9900 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	61.9	131.3	281.9

TABLE Existing-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - I-5 interchange to Moss Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10100 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	61.9	132.7	285.7

TABLE Existing-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - Moss Street to Naples Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5500 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.02

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	88.7	190.6

TABLE Existing-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Moss Street - Industrial Boulevard to Colorado Avenue
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5500 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	55.9	119.8

TABLE Existing-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Moss Street - Colorado Avenue to Woodlawn Avenue
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5100 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	53.2	114.0

TABLE Existing-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Interstate 5 - north of Palomar Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 158000 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 48 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 80.12

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
406.7	871.1	1874.2	4035.9

TABLE Existing + Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - L Street to I-5 interchange
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10300 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.16

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	63.5	134.8	289.5

TABLE Existing + Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - I-5 interchange to Moss Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10700 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.91

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	64.3	137.9	296.9

TABLE Existing + Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - Moss Street to Naples Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5600 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	89.7	192.9

TABLE Existing + Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Moss Street - Industrial Boulevard to Colorado Avenue
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5500 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	55.9	119.8

TABLE Existing + Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Moss Street - Colorado Avenue to Woodlawn Avenue
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5100 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	53.2	114.0

TABLE Existing + Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Interstate 5 - north of Palomar Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 158000 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 48 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 80.12

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
406.7	871.1	1874.2	4035.9

TABLE Year 2045 Without Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - L Street to I-5 interchange
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12800 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	73.0	155.7	334.5

TABLE Year 2045 Without Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - I-5 interchange to Moss Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 22700 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.17

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	105.8	227.6	490.1

TABLE Year 2045 Without Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - Moss Street to Naples Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11400 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.18

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	67.0	143.9	309.7

TABLE Year 2045 Without Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Moss Street - Industrial Boulevard to Colorado Avenue
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6000 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	59.2	127.0

TABLE Year 2045 Without Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Moss Street - Colorado Avenue to Woodlawn Avenue
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5600 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.07

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	56.5	121.3

TABLE Year 2045 Without Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Interstate 5 - north of Palomar Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 178000 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 48 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 80.64

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
439.8	943.0	2029.1	4369.6

TABLE Year 2045 + Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - L Street to I-5 interchange
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13200 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.24

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	74.5	158.9	341.4

TABLE Year 2045 + Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - I-5 interchange to Moss Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 23400 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.31

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
50.4	107.9	232.2	500.1

TABLE Year 2045 + Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Industrial Boulevard - Moss Street to Naples Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11500 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.22

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	67.4	144.7	311.5

TABLE Year 2045 + Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Moss Street - Industrial Boulevard to Colorado Avenue
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6000 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	59.2	127.0

TABLE Year 2045 + Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Moss Street - Colorado Avenue to Woodlawn Avenue
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5600 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.07

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	56.5	121.3

TABLE Year 2045 + Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 08/12/2019
ROADWAY SEGMENT: Interstate 5 - north of Palomar Street
NOTES: Chula Vista Moss Street & Industrial Boulevard Residential Project - Year 2045 + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 178000 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 48 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 80.64

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
439.8	943.0	2029.1	4369.6

Noise Model Based on Federal Transit Adminstration General Transit Noise Assessment
Developed for Chicago Create Project
Copyright 2006, HMMH Inc.
Case: Chula Vista - Moss Street Project

RESULTS			
Noise Source	**Ldn (dB)**	**Leq - daytime (dB)**	**Leq - nighttime (dB)**
All Sources	67	62	61
Source 1	60	62	33
Source 2	67	41	61
Source 3	0	0	0
Source 4	0	0	0
Source 5	0	0	0
Source 6	0	0	0
Source 7	0	0	0
Source 8	0	0	0

Enter noise receiver land use category below.

LAND USE CATEGORY	
Noise receiver land use category (1, 2 or 3)	2

Enter data for up to 8 noise sources below - see reference list for source numbers.

NOISE SOURCE PARAMETERS						
Parameter	**Source 1**		**Source 2**		**Source 3**	
Source Num.	Commuter Electric Locomotive	1	Freight Locomotive	9		
Distance (source to receiver)	distance (ft)	55	distance (ft)	55		
Daytime Hours	speed (mph)	40	speed (mph)	40		
(7 AM - 10 PM)	trains/hour	8	trains/hour	0		
	locos/train	1	locos/train	0		
Nighttime Hours	speed (mph)	40	speed (mph)	40		
(10 PM - 7 AM)	trains/hour	0	trains/hour	1		
	locos/train	0	locos/train	1		
Wheel Flats?		N		N		
Jointed Track?	Y/N	N	Y/N	N		
Embedded Track?	Y/N	N	Y/N	N		
Aerial Structure?	Y/N	N	Y/N	N		
Barrier Present?	Y/N	N	Y/N	N		
Intervening Rows of of Buildings	number of rows	0	number of rows	0		

SOURCE REFERENCE LIST	
Source	**Number**
Commuter Electric Locomotive	1
Commuter Diesel Locomotive	2
Commuter Rail Cars	3
RRT/LRT	4
AGT, Steel Wheel	5
AGT, Rubber Tire	6
Monorail	7
Maglev	8
Freight Locomotive	9
Freight Cars	10
Hopper Cars (empty)	11
Hopper Cars (full)	12
Crossover	13
Automobiles	14
City Buses	15
Commuter Buses	16
Rail Yard or Shop	17
Layover Tracks	18
Bus Storage Yard	19
Bus Op. Facility	20
Bus Transit Center	21
Parking Garage	22
Park & Ride Lot	23

Train Horn CNEL Calculation

FTA Transit Noise and Vibration Impact Assessment Manual, September 2018.
According to Table 4-21 of the FTA Manual:

Formula for Locomotive Warning Horns Leq(1hr) at 50 feet from centerline
LeqLHorns(1hr) = SELref + 10log(V) - 35.6

V = average hourly volume of train traffic, trains per hour

SELref = 113 - 3 x (Dp/660) (According to Table 4-20 of the FTA Manual)

Dp = distance from grade crossing parallel to tracks

Project Calculations:

Dp = 350 feet (nearest project façade to rail line is 350' from the grade crossing)

V = 4/24 (4 freight trains per day)
= 0.166667

SELref = 113 - 3 x (350/660)
= 111.4091

LeqLHorns(1hr) = 111.4 + 10log(0.167) - 35.6
= **68.01849**

CNEL Calculations					
	Time	Hourly Leq	Leq'	0.1*Leq	antiLog
Night	12:00 AM	**68.0**	78.0	7.802	63386971
	1:00 AM	**68.0**	78.0	7.802	63386971
	2:00 AM	**68.0**	78.0	7.802	63386971
	3:00 AM	**68.0**	78.0	7.802	63386971
	4:00 AM	**68.0**	78.0	7.802	63386971
	5:00 AM	**68.0**	78.0	7.802	63386971
	6:00 AM	**68.0**	78.0	7.802	63386971
Day	7:00 AM	**68.0**	68.0	6.802	6338697
	8:00 AM	**68.0**	68.0	6.802	6338697
	9:00 AM	**68.0**	68.0	6.802	6338697
	10:00 AM	**68.0**	68.0	6.802	6338697
	11:00 AM	**68.0**	68.0	6.802	6338697
	12:00 PM	**68.0**	68.0	6.802	6338697
	1:00 PM	**68.0**	68.0	6.802	6338697
	2:00 PM	**68.0**	68.0	6.802	6338697
	3:00 PM	**68.0**	68.0	6.802	6338697
	4:00 PM	**68.0**	68.0	6.802	6338697
	5:00 PM	**68.0**	68.0	6.802	6338697
	6:00 PM	**68.0**	68.0	6.802	6338697
Evening	7:00 PM	**68.0**	73.0	7.302	20044720
	8:00 PM	**68.0**	73.0	7.302	20044720
	9:00 PM	**68.0**	73.0	7.302	20044720
Night	10:00 PM	**68.0**	78.0	7.802	63386971
	11:00 PM	**68.0**	78.0	7.802	63386971
			Sum		7.07E+08
			Sum/24		29445053
			Log10(Sum/24)		7.469012
			10*Log10(Sum/24)		74.69012
			24 Hour CNEL		74.7

Calculated Horn Noise CNEL at 50' from tracks =	**74.7 dBA CNEL**	(No shielding assumed)
Calculated Horn Noise CNEL at nearest Façade =	**73.9 dBA CNEL**	(No shielding assumed)

(Nearest façade is approximately 55 feet from centerline of tracks where freight trains would pass. Distance attenuation at 55' compared to 50' is -0.8 dB.)

(It should be noted that this calculation is conservative as it does not account for the fact that there is an existing structure that would provide shielding from trains approaching the crossing from the south. In addition, the project will include a soundwall.)

(distance from track to closest facade)

$L_v = 92.28 + 14.81 \log(55) - 14.17 \log(55^2) + 1.65 \log(55^3) = 77.3$

Table 6-10 Generalized Ground Surface Vibration Equations

Curve	Equation	
Locomotive Powered Passenger or Freight Curve	$L_v = 92.28 + 14.81 \log(D) - 14.17 \log(D)^2 + 1.65 \log(D)^3$	**Eq. 6-1**
Rapid Transit or Light Rail Vehicles Curve	$L_v = 85.88 - 1.06 \log(D) - 2.32 \log(D)^2 - 0.87 \log(D)^3$	**Eq. 6-2**
Rubber-Tired Vehicles Curve	$L_v = 66.08 + 34.28 \log(D) - 30.25 \log(D)^2 + 5.40 \log(D)^3$	**Eq. 6-3**
L_v = velocity level, VdB D = distance, ft		

Considerations for selecting a base curve for different transit modes include:

77.3
− 1.9 -(adjust to 40 mph curve)
− 5.0 -(adjust for coupling to building foundation for Wood-Frame structure)
70.4

- **Intercity passenger trains** – Although intercity passenger trains can be an important source of environmental vibration, it is rare that they are considered for FTA-funded projects unless a new transit mode uses an existing rail alignment. When a new transit line uses an existing rail alignment, changes in the intercity passenger traffic can result in either positive or negative impacts. Use the locomotive-powered passenger or freight curve for intercity passenger trains unless there are specific data available on the ground-borne vibration created by the new train operations.

- **Locomotive-powered commuter rail** – Use the locomotive-powered passenger or freight curve for all commuter rail system powered by either diesel or electric locomotives.

- **Electric multiple unit (EMU)** – Use the rapid transit or light rail vehicles curve for self-powered electric commuter rail trains.

- **Diesel multiple unit (DMU)** – Self-powered DMUs create vibration levels somewhere between rapid transit vehicles and locomotive-powered passenger trains. A vibration curve for DMUs can be estimated by lowering the locomotive-powered passenger or freight curve by 5 dB.

- **Subway heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for subway heavy rail and subway light rail. Although vibrations from subway and at-grade tracks have very different characteristics, the overall vibration velocity levels are comparable. When applied to subways, the rapid transit or light rail vehicles curve assumes a relatively lightweight bored concrete tunnel in soil. The vibration levels will be lower for heavier subway structures such as cut-and-cover box structures and stations.

- **At-grade heavy rail or light rail** – Use the rapid transit or light rail vehicles curve for at-grade heavy rail or light rail. Heavy rail and LRT vehicles have similar suspension systems and axle loads and create similar levels of ground-borne vibration.

mitigation measures because they are based on typical vibration spectra. However, these adjustments are not adequate for detailed evaluations of impact of vibration-sensitive buildings or for detailed specification of mitigation measures.

2a. Apply source adjustments to the base curve using Table 6-11 and the descriptions below to account for the project-specific source characteristics.

Table 6-11 Source Adjustment Factors for Generalized Predictions of GB Vibration and Noise

Source Factor	Adjustment to Propagation Curve			Comment
		Reference Speed		
	Vehicle Speed	50 mph	30 mph	
Speed	60 mph	+1.6 dB	+6.0 dB	Vibration level is approximately proportional to 20log(speed/speed$_{ref}$), see Eq. 6-4.
	50 mph	0.0 dB	+4.4 dB	
	40 mph	-1.9 dB	+2.5 dB	
	30 mph	-4.4 dB	0.0 dB	
	20 mph	-8.0 dB	-3.5 dB	
Vehicle Parameters (not additive, apply greatest value only)				
Vehicle with stiff primary suspension	+8 dB			Transit vehicles with stiff primary suspensions have been shown to create high vibration levels. Include this adjustment when the primary suspension has a vertical resonance frequency greater than 15 Hz.
Resilient Wheels	0 dB			Resilient wheels do not generally affect ground-borne vibration except at frequencies greater than about 80 Hz.
Worn Wheels or Wheels with Flats	+10 dB			Wheel flats or wheels that are unevenly worn can cause high vibration levels.
Track Conditions (not additive, apply greatest value only)				
Worn or Corrugated Track	+10 dB			Corrugated track is a common problem. Mill scale* on new rail can cause higher vibration levels until the rail has been in use for some time. If there are adjustments for vehicle parameters and the track is worn or corrugated, only include one adjustment.
Special Trackwork within 200 ft	+10 dB (within 100 ft) +5 dB (between 100 and 200 ft)			Wheel impacts at special trackwork will greatly increase vibration levels. The increase will be less at greater distances from the track. Do not include an adjustment for special trackwork more than 200 ft away.
Jointed Track	+5 dB			Jointed track can cause higher vibration levels than welded track.
Uneven Road Surfaces	+5 dB			Rough roads or expansion joints are sources of increased vibration for rubber-tire transit.
Track Treatments (not additive, apply greatest value only)				
Floating Slab Trackbed	-15 dB			The reduction achieved with a floating slab trackbed is strongly dependent on the frequency characteristics of the vibration.
Ballast Mats	-10 dB			Actual reduction is strongly dependent on frequency of vibration.
High-Resilience Fasteners	-5 dB			Slab track with track fasteners that are very compliant in the vertical direction can reduce vibration at frequencies greater than 40 Hz.

*Mill scale on a new rail is a slightly corrugated condition caused by certain steel mill techniques.

Table 6-12 Path Adjustment Factors for Generalized Predictions of GB Vibration and Noise

Path Factor	Adjustment to Propagation Curve			Comment
Resiliently Supported Ties (Low-Vibration Track, LVT)	-10 dB			Resiliently supported tie systems have been found to provide very effective control of low-frequency vibration.
Track Structure (not additive, apply greatest value only)				
Type of Transit Structure	Relative to at-grade tie & ballast:			In general, the heavier the structure, the lower the vibration levels. Putting the track in cut may reduce the vibration levels slightly. Rock-based subways generate higher-frequency vibration.
	Elevated structure		-10 dB	
	Open cut		0 dB	
	Relative to bored subway tunnel in soil:			
	Station		-5 dB	
	Cut and cover		-3 dB	
	Rock-based		-15 dB	
Ground-borne Propagation Effects				
Geologic conditions that promote efficient vibration propagation	Efficient propagation in soil		+10 dB	Refer to the text for guidance on identifying areas where efficient propagation is possible.
	Propagation in rock layer	Dist.	Adjust.	The positive adjustment accounts for the lower attenuation of vibration in rock compared to soil. It is generally more difficult to excite vibrations in rock than in soil at the source.
		50 ft	+2 dB	
		100 ft	+4 dB	
		150 ft	+6 dB	
		200 ft	+9 dB	
Coupling to building foundation	Wood-Frame Houses		-5 dB	In general, the heavier the building construction, the greater the coupling loss.
	1-2 Story Masonry		-7 dB	
	3-4 Story Masonry		-10 dB	
	Large Masonry on Piles		-10 dB	
	Large Masonry on Spread Footings		-13 dB	
	Foundation in Rock		0 dB	

In addition to the comments in Table 6-12, use the following guidelines to select the appropriate adjustment factors.

- **Track Structure** – The weight and size of a transit structure affects the vibration radiated by that structure. In general, vibration levels are lower for heavier transit structures. Therefore, the vibration levels from a cut-and-cover concrete double-box subway can be assumed to be lower than the vibration from a lightweight concrete-lined bored tunnel.

  The vibration from elevated structures is lower than from at-grade track because of the mass and damping of the structure and the extra distance that the vibration must travel before it reaches the receiver. Elevated structures in AGT applications are sometimes designed to bear on building elements. This is a special case and may require detailed design considerations.

  The adjustments in this category are not additive; apply the greatest applicable value only.

Railroad info

Light rail – blue line, runs every 15 minutes (https://www.sdmts.com/schedules-real-time-maps-and-routes/trolley), therefore assume 4 trains per hour each direction, so 8 train passings per hour.