

## **APPENDIX G**

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Noise and Vibration



# **APPENDIX G1**

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Fundamentals of Noise and Vibration



# APPENDIX G1. FUNDAMENTALS OF NOISE AND VIBRATION

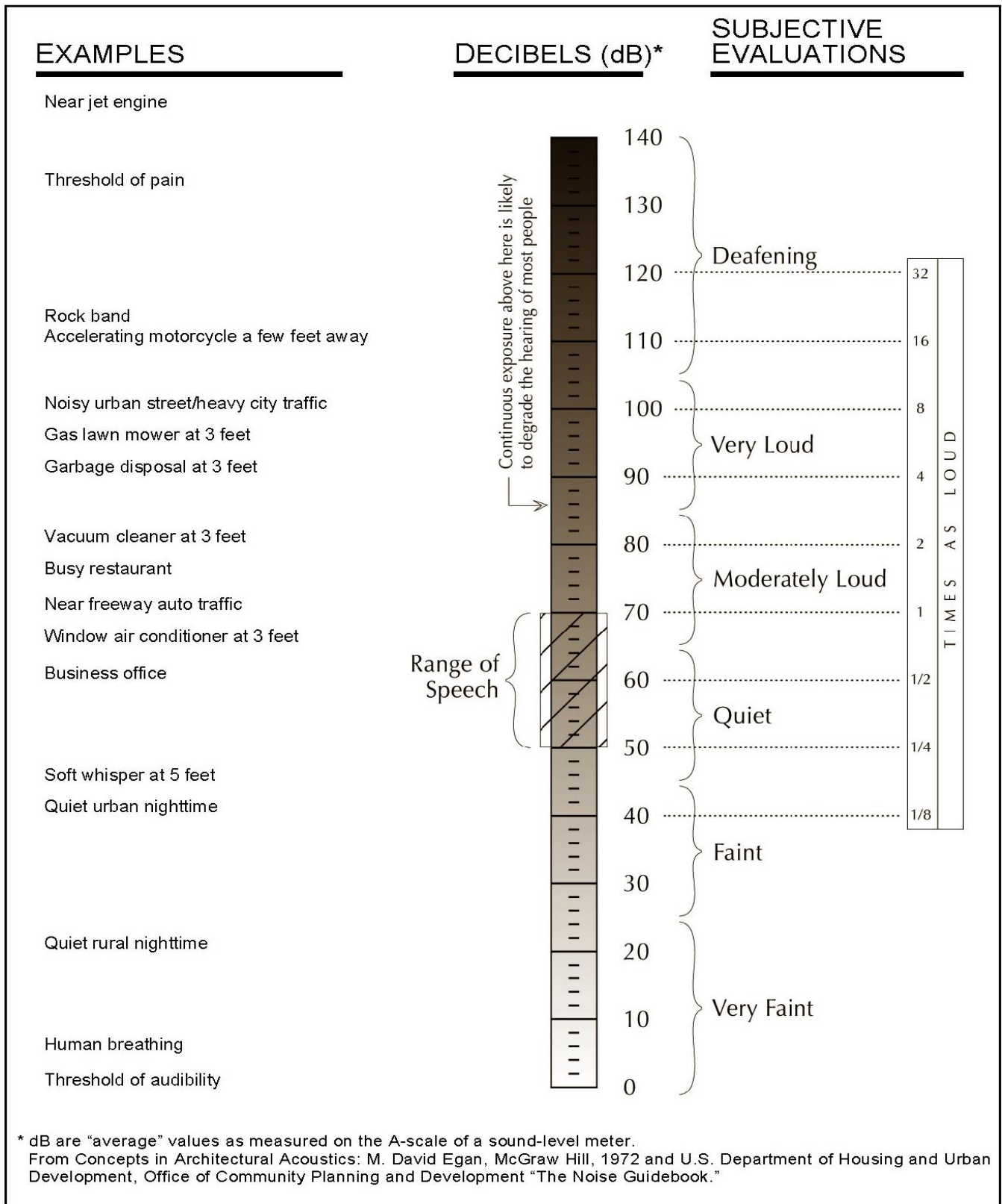
## G1.1 NOISE FUNDAMENTALS

Noise is generally defined as sound that is loud, disagreeable, unexpected, or unwanted.<sup>1</sup> The perception of sound is subjective and can vary substantially from person to person. Noise can be generated by mobile sources (transportation noise sources) such as automobiles, trucks, and airplanes, and by stationary sources (nontransportation noise sources) such as construction activity, machinery, and commercial and industrial operations. Common sources of environmental noise and noise levels are presented in Figure G-1.

Noise can be thought of as acoustic energy that propagates between the source and receiver. Noise levels attenuate (decrease) as a function of the distance from the source (divergence), ground absorption, atmospheric conditions, and the presence of physical barriers. Physical barriers to noise may be any natural or human-made feature such as a hill, tree, building, wall, or berm.<sup>2</sup>

The decibel (dB) scale was introduced to provide a practical way of expressing the range of sound pressures.<sup>3</sup> The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed. The standard weighting networks are identified as A through E. There is a strong correlation between the way humans perceive sound and A-weighted sound levels (dBA). Expressing sound levels in terms of dBA can help predict community response to noise. All sound levels reported in this section are in terms of A-weighted decibels unless specifically stated otherwise.

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- <sup>1</sup> A sound wave is initiated in a medium by a vibrating object (e.g., vocal cords, the string of a guitar, the diaphragm of a radio speaker). The wave consists of minute variations in pressure, oscillating above and below the ambient atmospheric pressure. The number of pressure variation cycles occurring per second is referred to as the frequency of the sound wave and is expressed in Hertz (abbreviated Hz), which is equivalent to one complete cycle per second.
- <sup>2</sup> Noise from mobile sources generally is attenuated at a rate of 3 dB (hard surfaces, such as asphalt) to 4.5 dB (soft surfaces, such as grasslands) per doubling of distance. Acoustic energy from stationary sources propagates over a spherical area, and is attenuated at a rate of 6 dB (hard surfaces) to 7.5 dB (soft surfaces) per doubling of distance. Atmospheric conditions such as wind speed, turbulence, temperature gradients, and humidity may affect the propagation of noise and levels at a receiver. Furthermore, the presence of a large object (e.g., barrier, topographic features, and intervening building façades) between the source and the receptor can provide significant attenuation of noise levels. The amount of noise level reduction or “shielding” provided by a barrier primarily depends on the size of the barrier, the location of the barrier in relation to the source and receivers, and the frequency content of the noise source. Natural barriers such as berms, hills, or dense woods, and human-made features such as buildings and walls may be used as noise barriers. The actual amount of attenuation depends on the barrier size and frequency of the sound.
- <sup>3</sup> A sound level expressed in decibels is the logarithmic ratio of two like pressure quantities, with one pressure quantity being a reference sound pressure. For sound pressure in air, the standard reference quantity is generally considered to be 20 micropascals (abbreviated  $\mu\text{Pa}$ ), which directly corresponds to the threshold of human hearing. The use of the decibel is a convenient way to handle the million-fold range of sound pressures to which the human ear is sensitive. A decibel is logarithmic; it does not follow normal algebraic methods and cannot be directly added. For example, a 65-dB source of sound, such as a truck, when joined by another 65-dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a 100-fold increase in acoustical energy.



Source: Data compiled by AECOM in 2014

Figure G-1

Common Noise Sources and Levels

## G1.2 NOISE DESCRIPTORS

The intensity of environmental noise fluctuates over time, and several different terms are used to describe time-averaged noise levels. The selection of an appropriate noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of both the noise source and the environment. The noise descriptors most often used to describe environmental noise are listed and defined below.

- ▶ *SEL (sound exposure level)*: The equivalent sound level over a 1-second time interval for a discrete sound event (e.g., aircraft overflight).
- ▶ *L<sub>max</sub> (maximum noise level)*: The maximum instantaneous noise level during a specific period of time.
- ▶ *L<sub>n</sub> (statistical descriptor)*: The noise level exceeded n% of a specific period of time. For example, L<sub>50</sub> is the median noise level, or the level exceeded 50% of the time.
- ▶ *L<sub>eq</sub> (equivalent noise level)*: The average noise level. (This is also sometimes called the equivalent or energy-averaged sound level.) The L<sub>eq</sub> represents an average of the sound energy occurring over a specified time period. In effect, the L<sub>eq</sub> is the steady-state sound level containing the same acoustic energy as the time-varying sound that actually occurs during the same period. The 1-hour, A-weighted equivalent sound level (L<sub>eq[h]</sub>) is the energy average of A-weighted sound levels occurring during a 1-hour period.
- ▶ *L<sub>dn</sub> (day-night average noise level)*: The 24-hour L<sub>eq</sub> with a 10-dB “penalty” for noise events that occur during the noise-sensitive hours between 10 p.m. and 7 a.m. In other words, 10 dB is “added” to noise events that occur in the nighttime hours, and this generates a higher reported noise level when determining compliance with noise standards. The L<sub>dn</sub> accounts for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- ▶ *CNEL (community noise equivalent level)*: The CNEL is similar to the L<sub>dn</sub> described above, but with an additional 5-dB “penalty” added to noise events that occur during the noise-sensitive hours between 7 p.m. and 10 p.m., which are typically reserved for relaxation, conversation, reading, and other activities that could be disrupted by noise. When the same 24-hour noise data are used, the reported CNEL is typically approximately 0.5 dB higher than the L<sub>dn</sub>.

A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level L<sub>eq</sub> which corresponds to a steady-state, A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually 1 hour). The L<sub>eq</sub> is the foundation of the composite noise descriptors, such as L<sub>dn</sub> and CNEL, and shows very good correlation with community response to noise.

## **G1.3 HUMAN RESPONSE TO NOISE**

Excessive and chronic exposure to elevated noise levels can result hearing loss at very high levels and interference with communications, sleep, and learning. The degree to which noise results in annoyance and interference is highly subjective and may be influenced by several nonacoustic factors. The number and effect of these nonacoustic environmental and physical factors vary depending on individual characteristics of the noise environment, such as sensitivity, level of activity, location, time of day, and length of exposure. One key aspect in predicting human response to new noise environments is the individual level of adaptation to an existing noise environment. The greater the change in noise level that is attributed to a new noise source, relative to the environment to which an individual has become accustomed, the less tolerable the new noise source will be.

One way of anticipating a person's subjective reaction to a new noise is to compare the new noise with the existing noise in the surrounding environment to which the person has become adapted, i.e., the "ambient" noise level. Generally, a 1-dB increase in noise level is imperceptible, a 3-dB increase is barely perceptible, a 6-dB increase is clearly noticeable, and a 10-dB increase is perceived as approximately twice as loud (Egan 1988:21).<sup>4</sup>

## **G1.4 FUNDAMENTAL NOISE CONTROL OPTIONS**

Three basic elements are considered in analyzing a noise problem: the noise source, the transmission path, and the receiver. Appropriate mitigation for noise impacts considers the nature of the noise source and the sensitivity of the receiver. Responses to potential noise impacts may be defined in terms of the appropriate criteria for noise measurement ( $L_{dn}$ ,  $L_{eq}$ , or  $L_{max}$ ), the location of the sensitive receiver (inside or outside), and the time of day that the noise occurs. Potential noise control options are described below.

### **G1.4.1 SETBACKS**

Noise exposure may be reduced by increasing the distance between the noise source and the receiving use. The available noise attenuation from this technique is limited by the characteristics of the noise source and the area available for setback, but is generally between 4 and 6 dB.

### **G1.4.2 SITE PLANNING AND DESIGN**

Thoughtful site planning and design can address noise exposure issues, while avoiding the additional up-front and ongoing maintenance expense required when using barriers to shield against noise. For example, buildings can shield outdoor gathering areas from intruding noise and prevent an increase in noise levels attributable to surface reflections. Site design that accounts for building placement should avoid creating reflecting surfaces that may increase on-site noise levels.

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<sup>4</sup> These reactions to changes in noise levels were developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broadband noise and to changes in levels of a given noise source. They are probably most applicable to noise levels in the range of 50–70 dB, because this is the usual range of voice and interior noise levels.



### **G1.4.3 BUILDING FAÇADES**

Noise reduction may be obtained through detailed acoustical design of building façades. Standard construction practices provide an interior-to-exterior noise reduction of 10–15 dB for building façades with doors and windows open and a noise reduction of approximately 25 dB when doors and windows are closed. Thus, an exterior-to-interior noise reduction of 25 dB can be obtained with adequate ventilation systems that allow windows to remain closed under any weather condition.

Acoustical treatment of the building façades can achieve noise reduction of greater than 25 dB, depending on the treatment type and material. Reducing the window surface area of building façades is the most effective control technique, followed by providing acoustical glazing (thicker glass or increased air space between panes) in frames with low air infiltration rates, using fixed (nonmovable) acoustical glazing, or eliminating windows. Noise transmitted through walls can be reduced by increasing wall mass (using stucco or brick in lieu of wood siding), isolating wall parts through the use of double or staggered stud walls, or mounting interior walls on resilient channels. Noise control for exterior doorways can be provided by reducing door area, using solid-core doors, or acoustically sealing door perimeters with suitable gaskets. Roof treatments can also reduce noise by increasing the mass of plywood sheathing under roofing materials.

### **G1.4.4 VEGETATION**

To achieve a 5-dB attenuation of traffic noise, approximately 100 feet of dense foliage must be provided (so that no visual path extends through the foliage). Vegetation can be used to acoustically “soften” intervening ground between a noise source and a receiver, by increasing ground absorption of sound and thus increasing the attenuation of sound with distance.

### **G1.4.5 BARRIERS**

Barrier shielding can be obtained by placing walls, berms, or other structures (e.g., buildings) between the noise source and the receiver. The effectiveness of a barrier depends on the ability to block the line of sight between the source and receiver. Effectiveness is improved when sound must travel a longer distance to pass over the barrier than if it were traveling in a straight line from source to receiver.<sup>5</sup> Barrier effectiveness also depends on the relative heights of the source, barrier, and receiver. In general, barriers are most effective when placed close to either the receiver or the source.<sup>6</sup>

There are practical limits to the noise reduction provided by barriers. For vehicular traffic or railroad noise, a noise reduction of between 5 and 10 dB may often be reasonably attained. Noise barriers

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<sup>5</sup> The difference between a barrier and a straight line between source and receiver is called the “path length difference” and is the basis for calculating barrier noise reduction.

<sup>6</sup> An intermediate barrier location yields a smaller path length difference for a given increase in barrier height than does a location closer to either the source or the receiver. The path length difference is the difference between the straight-line distance the noise travels to the receptor with the barrier and the distance traveled without the barrier.

within a development may inadvertently reflect noise back to a noise-sensitive area unless located carefully and complemented with landscaping materials.<sup>7</sup>

Earth, in the form of berms or the face of a depressed area, is also an effective barrier material. The use of an earth berm in lieu of a solid wall may provide up to 3 dB in additional attenuation over that attained by a solid wall alone because of the absorption provided by the earth. Berm/wall combinations are used frequently; they offer slightly better acoustical performance than solid walls alone and often are preferred for aesthetic reasons.

## G1.5 VIBRATION FUNDAMENTALS

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous (e.g., operating factory machinery) or transient (e.g., explosions). Vibration levels can be depicted in terms of amplitude and frequency relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (FTA 2006:7-1 to 7-8; Caltrans 2004:5-7). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response to vibration. The response of the human body to vibration relates well to average vibration amplitude. Therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity. Similar to airborne sound, vibration velocity can be expressed in decibel notation, as vibration decibels (VdB).<sup>8</sup>

Typical outdoor sources of perceptible groundborne vibration include construction equipment, steel-wheeled trains, and traffic on rough roads. Although the effects of vibration may be imperceptible at low levels, moderate and high levels of vibration may be detectible and may damage nearby buildings (e.g., by loosening and cracking plaster or stucco coatings). The range of vibration that is relevant to the CEQA analysis presented in Section 3.9, "Noise," of this EIR occurs from approximately 50 VdB, which is the typical background vibration level, to 100 VdB, which is the general threshold where minor damage can occur to fragile buildings (FTA 2006:8-1 to 8-8).

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<sup>7</sup> For maximum effectiveness, barriers must be continuous and airtight along their length and height. To ensure that sound transmission through the barrier is insignificant, barrier mass should be about 4 pounds per square foot, although a lesser mass may be acceptable if the barrier material will still ensure that a substantial amount of transmission loss does not occur. To satisfy the above criteria, substantial and well-fitted barrier materials must be placed to intercept the line of sight to all substantial noise sources.

<sup>8</sup> Just as with noise levels, the logarithmic nature of the decibel serves to compress the broad range of numbers required to describe vibration.

## **APPENDIX G2**

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### Noise Modeling Results





**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
Model Input Sheet

**Project Name :** Sacramento Common

**Project Number :** 60310303

**Modeling Condition :** Existing NP plus Construction Traffic

**Ground Type :** Soft

**Metric (L<sub>eq</sub>, L<sub>dn</sub>, CNEL) :** Leq

**K Factor :** 10

**Traffic Desc. (Peak or ADT) :** ADT

Input Form  
Clear Traffic Vol

Clear Data

Clear All

Segment	Roadway	From	To	Segment	Traffic Vol.	(Mph)	Speed Distance to CL	%Autos	%MT	%HT	Day %	Eve %	Night %	Offset (dB)
1	4th Street	O Street	N Street		3,190	25	50	97	2	1	87	0	13	
2	4th Street	O Street	P Street		3,295	25	50	97	2	1	87	0	13	
3	O Street	5th Street	4th Street		2,715	25	50	97	2	1	87	0	13	
4	5th Street	N Street	Capitol Mall		7,615	25	50	97	2	1	87	0	13	
5	5th Street	N Street	Driveway 7		9,870	25	50	97	2	1	87	0	13	
6	N Street	5th Street	4th Street		5,000	25	50	97	2	1	87	0	13	
7	N Street	5th Street	Driveway 1		7,255	25	50	97	2	1	87	0	13	
8	5th Street	O Street	Driveway 7		9,895	25	50	97	2	1	87	0	13	
9	5th Street	O Street	Driveway 6		10,585	25	50	97	2	1	87	0	13	
10	5th Street	P Street	Driveway 6		8,250	25	50	97	2	1	87	0	13	
11	5th Street	P Street	Q Street		9,035	25	50	97	2	1	87	0	13	
12	P Street	5th Street	4th Street		11,645	25	50	97	2	1	87	0	13	
13	P Street	5th Street	6th Street		11,860	25	50	97	2	1	87	0	13	
14	6th Street	P Street	Q Street		1,385	25	50	97	2	1	87	0	13	
15	P Street	6th Street	Driveway 5		11,545	25	50	97	2	1	87	0	13	
16	6th Street	Q Street	R Street		2,335	25	50	97	2	1	87	0	13	
17	Q Street	6th Street	7th Street		12,640	25	50	97	2	1	87	0	13	
18	Q Street	6th Street	5th Street		13,220	25	50	97	2	1	87	0	13	
19	6th Street	R Street	S Street		2,290	25	50	97	2	1	87	0	13	
20	R Street	6th Street	7th Street		1,585	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)  
0  
Predicted Noise Levels**

**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** Existing NP plus Construction Traffic  
**Metric (Leq, Ldn, CNEL) :** Leq

Segment	Roadway	Segment		Noise Levels, dB Leq				Distance to Traffic Noise Contours, Feet				
		From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB
1	4th Street	O Street	N Street	53.8	48.5	53.2	57.1	7	15	32	69	149
2	4th Street	O Street	P Street	53.9	48.7	53.3	57.3	7	15	33	71	153
3	O Street	5th Street	4th Street	53.1	47.8	52.5	56.4	6	13	29	62	134
4	5th Street	N Street	Capitol Mall	57.6	52.3	56.9	60.9	12	27	57	124	267
5	5th Street	N Street	Driveway 7	58.7	53.4	58.1	62.0	15	32	68	147	317
6	N Street	5th Street	4th Street	55.7	50.5	55.1	59.1	9	20	43	94	202
7	N Street	5th Street	Driveway 1	57.3	52.1	56.7	60.7	12	26	56	120	258
8	5th Street	O Street	Driveway 7	58.7	53.5	58.1	62.0	15	32	68	147	318
9	5th Street	O Street	Driveway 6	59.0	53.7	58.4	62.3	15	33	72	154	332
10	5th Street	P Street	Driveway 6	57.9	52.7	57.3	61.3	13	28	61	131	281
11	5th Street	P Street	Q Street	58.3	53.1	57.7	61.7	14	30	64	139	299
12	P Street	5th Street	4th Street	59.4	54.2	58.8	62.8	16	35	76	164	354
13	P Street	5th Street	6th Street	59.5	54.2	58.9	62.8	17	36	77	166	359
14	6th Street	P Street	Q Street	50.1	44.9	49.5	53.5	4	9	18	40	86
15	P Street	6th Street	Driveway 5	59.4	54.1	58.7	62.7	16	35	76	163	352
16	6th Street	Q Street	R Street	52.4	47.2	51.8	55.8	6	12	26	56	121
17	Q Street	6th Street	7th Street	59.8	54.5	59.1	63.1	17	37	81	174	374
18	Q Street	6th Street	5th Street	59.9	54.7	59.3	63.3	18	39	83	179	385
19	6th Street	R Street	S Street	52.3	47.1	51.7	55.7	6	12	26	56	120
20	R Street	6th Street	7th Street	50.7	45.5	50.1	54.1	4	9	20	44	94



**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
Model Input Sheet

**Project Name :** Sacramento Common

**Project Number :** 60310303

**Modeling Condition :** Existing NP plus Construction Traffic

**Ground Type :** Soft

**Metric (L<sub>eq</sub>, L<sub>dn</sub>, CNEL) :** Leq

**K Factor :** 10

**Traffic Desc. (Peak or ADT) :** ADT

Input Form  
Clear Traffic Vol  
Clear Data  
Clear All

Segment	Roadway	From	To	Segment	Traffic Vol.	(Mph)	Speed Distance to CL	%Autos	%MT	%HT	Day %	Eve %	Night %	Offset (dB)
1	R Street	6th Street	5th Street	5th Street	1,675	25	50	97	2	1	87	0	13	
2	7th Street	N Street	Capitol Mall	Capitol Mall	5,445	25	50	97	2	1	87	0	13	
3	7th Street	N Street	Driveway 2	Driveway 2	6,055	25	50	97	2	1	87	0	13	
4	N Street	7th Street	8th Street	8th Street	5,775	25	50	97	2	1	87	0	13	
5	N Street	7th Street	Driveway 1	Driveway 1	6,385	25	50	97	2	1	87	0	13	
6	7th Street	O Street	Driveway 2	Driveway 2	5,995	25	50	97	2	1	87	0	13	
7	7th Street	O Street	Driveway 3	Driveway 3	5,835	25	50	97	2	1	87	0	13	
8	O Street	7th Street	8th Street	8th Street	915	25	50	97	2	1	87	0	13	
9	7th Street	P Street	Driveway 4	Driveway 4	5,635	25	50	97	2	1	87	0	13	
10	7th Street	P Street	Q Street	Q Street	4,770	25	50	97	2	1	87	0	13	
11	P Street	7th Street	8th Street	8th Street	10,085	25	50	97	2	1	87	0	13	
12	P Street	7th Street	Driveway 5	Driveway 5	11,545	25	50	97	2	1	87	0	13	
13	7th Street	Q Street	R Street	R Street	4,435	25	50	97	2	1	87	0	13	
14	Q Street	7th Street	8th Street	8th Street	12,795	25	50	97	2	1	87	0	13	
15	7th Street	R Street	S Street	S Street	3,405	25	50	97	2	1	87	0	13	
16	R Street	7th Street	8th Street	8th Street	1,780	25	50	97	2	1	87	0	13	
17	8th Street	O Street	N Street	N Street	4,085	25	50	97	2	1	87	0	13	
18	8th Street	O Street	P Street	P Street	4,345	25	50	97	2	1	87	0	13	
19	O Street	8th Street	9th Street	9th Street	1,175	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)  
0  
Predicted Noise Levels**

**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** Existing NP plus Construction Traffic  
**Metric (Leq, Ldn, CNEL) :** Leq

Segment	Roadway		Segment		Noise Levels, dB Leq				Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB		
1	R Street	6th Street	51.0	45.7	50.4	54.3	5	10	21	45	97		
2	7th Street	N Street	56.1	50.9	55.5	59.5	10	21	46	99	213		
3	7th Street	N Street	56.6	51.3	55.9	59.9	11	23	49	106	229		
4	N Street	7th Street	56.4	51.1	55.7	59.7	10	22	48	103	222		
5	N Street	7th Street	56.8	51.5	56.2	60.1	11	24	51	110	237		
6	7th Street	O Street	56.5	51.3	55.9	59.9	11	23	49	106	228		
7	7th Street	O Street	56.4	51.2	55.8	59.8	10	22	48	104	223		
8	O Street	7th Street	48.3	43.1	47.7	51.7	3	6	14	30	65		
9	7th Street	P Street	56.2	51.0	55.6	59.6	10	22	47	101	218		
10	7th Street	P Street	55.5	50.3	54.9	58.9	9	20	42	91	195		
11	P Street	7th Street	58.8	53.5	58.2	62.1	15	32	69	149	322		
12	P Street	7th Street	59.4	54.1	58.7	62.7	16	35	76	163	352		
13	7th Street	Q Street	55.2	50.0	54.6	58.6	9	19	40	86	186		
14	Q Street	7th Street	59.8	54.6	59.2	63.2	18	38	81	175	377		
15	7th Street	R Street	54.1	48.8	53.4	57.4	7	16	34	72	156		
16	R Street	7th Street	51.2	46.0	50.6	54.6	5	10	22	47	101		
17	8th Street	O Street	54.8	49.6	54.2	58.2	8	18	38	82	176		
18	8th Street	O Street	55.1	49.9	54.5	58.5	9	18	40	85	184		
19	O Street	8th Street	49.4	44.2	48.8	52.8	4	8	17	36	77		



**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Model Input Sheet**



**Project Name :** Sacramento Commons

**Project Number :** 60310303

**Modeling Condition :** Existing NP plus Construction Traffic

**Ground Type :** Soft

**Metric (L<sub>eq</sub>, L<sub>din</sub>, CNEq) :** Ldn

**K Factor :** N/A

**Traffic Desc. (Peak or ADT) :** ADT

Input Form  
 Clear Traff Vol  
 Clear Data  
 Clear All

Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	% MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	4th Street	O Street	N Street	N Street	2,940	25	50	97	2	1	87	0	13	
2	4th Street	O Street	P Street	P Street	3,045	25	50	97	2	1	87	0	13	
3	O Street	5th Street	4th Street	4th Street	2,465	25	50	97	2	1	87	0	13	
4	5th Street	N Street	Capitol Mall	Capitol Mall	7,365	25	50	97	2	1	87	0	13	
5	5th Street	N Street	Driveway 7	Driveway 7	9,620	25	50	97	2	1	87	0	13	
6	N Street	5th Street	4th Street	4th Street	4,750	25	50	97	2	1	87	0	13	
7	N Street	5th Street	Driveway 1	Driveway 1	7,005	25	50	97	2	1	87	0	13	
8	5th Street	O Street	Driveway 7	Driveway 7	9,645	25	50	97	2	1	87	0	13	
9	5th Street	O Street	Driveway 6	Driveway 6	10,335	25	50	97	2	1	87	0	13	
10	5th Street	P Street	Driveway 6	Driveway 6	8,000	25	50	97	2	1	87	0	13	
11	5th Street	P Street	Q Street	Q Street	8,785	25	50	97	2	1	87	0	13	
12	P Street	5th Street	4th Street	4th Street	11,395	25	50	97	2	1	87	0	13	
13	P Street	5th Street	6th Street	6th Street	11,610	25	50	97	2	1	87	0	13	
14	6th Street	P Street	Q Street	Q Street	1,135	25	50	97	2	1	87	0	13	
15	P Street	6th Street	Driveway 5	Driveway 5	11,295	25	50	97	2	1	87	0	13	
16	6th Street	Q Street	R Street	R Street	2,085	25	50	97	2	1	87	0	13	
17	Q Street	6th Street	7th Street	7th Street	12,390	25	50	97	2	1	87	0	13	
18	Q Street	6th Street	5th Street	5th Street	12,970	25	50	97	2	1	87	0	13	
19	6th Street	R Street	S Street	S Street	2,040	25	50	97	2	1	87	0	13	
20	R Street	6th Street	7th Street	7th Street	1,335	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Predicted Noise Levels**

**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** Existing INP plus Construction Traffic  
**Metric (Leq, Ldn, CNEL) :** Ldn

Segment	Roadway		Segment		Noise Levels, dB Ldn			Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB	
1	4th Street	O Street	53.0	47.7	52.4	56.3	6	13	29	61	132	
2	4th Street	O Street	53.1	47.9	52.5	56.5	6	14	29	63	135	
3	O Street	5th Street	52.2	47.0	51.6	55.6	5	12	25	55	118	
4	5th Street	N Street	57.0	51.7	56.4	60.3	11	24	53	113	244	
5	5th Street	N Street	58.1	52.9	57.5	61.5	14	29	63	135	292	
6	N Street	5th Street	55.1	49.8	54.4	58.4	8	18	39	85	182	
7	N Street	5th Street	56.8	51.5	56.1	60.1	11	24	51	110	236	
8	5th Street	O Street	58.1	52.9	57.5	61.5	14	29	63	136	292	
9	5th Street	O Street	58.4	53.2	57.8	61.8	14	31	66	142	306	
10	5th Street	P Street	57.3	52.1	56.7	60.7	12	26	56	120	258	
11	5th Street	P Street	57.7	52.5	57.1	61.1	13	27	59	127	274	
12	P Street	5th Street	58.9	53.6	58.2	62.2	15	33	70	152	326	
13	P Street	5th Street	58.9	53.7	58.3	62.3	15	33	71	153	331	
14	6th Street	P Street	48.8	43.6	48.2	52.2	3	7	15	33	70	
15	P Street	6th Street	58.8	53.6	58.2	62.2	15	32	70	151	325	
16	6th Street	Q Street	51.5	46.3	50.9	54.8	5	11	23	49	105	
17	Q Street	6th Street	59.2	54.0	58.6	62.6	16	35	74	160	345	
18	Q Street	6th Street	59.4	54.2	58.8	62.8	17	36	77	165	356	
19	6th Street	R Street	51.4	46.2	50.8	54.8	5	10	22	48	104	
20	R Street	6th Street	49.6	44.3	48.9	52.9	4	8	17	36	78	



**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Model Input Sheet**

**Project Name :** Sacramento Common

**Project Number :** 60310303

**Modeling Condition :** Existing NP plus Construction Traffic

**Ground Type :** Soft

**Metric (L<sub>eq</sub>, L<sub>din</sub>, CNEqL) :** Ldn

**K Factor :** N/A

**Traffic Desc. (Peak or ADT) :** ADT

Input Form  
 Clear Traff Vol  
 Clear Data  
 Clear All

Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	% MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	R Street	6th Street	5th Street		1,425	25	50	97	2	1	87	0	13	
2	7th Street	N Street	Capitol Mall		5,195	25	50	97	2	1	87	0	13	
3	7th Street	N Street	Driveway 2		5,805	25	50	97	2	1	87	0	13	
4	N Street	7th Street	8th Street		5,525	25	50	97	2	1	87	0	13	
5	N Street	7th Street	Driveway 1		6,135	25	50	97	2	1	87	0	13	
6	7th Street	O Street	Driveway 2		5,745	25	50	97	2	1	87	0	13	
7	7th Street	O Street	Driveway 3		5,585	25	50	97	2	1	87	0	13	
8	O Street	7th Street	8th Street		665	25	50	97	2	1	87	0	13	
9	7th Street	P Street	Driveway 4		5,385	25	50	97	2	1	87	0	13	
10	7th Street	P Street	Q Street		4,520	25	50	97	2	1	87	0	13	
11	P Street	7th Street	8th Street		9,835	25	50	97	2	1	87	0	13	
12	P Street	7th Street	Driveway 5		11,295	25	50	97	2	1	87	0	13	
13	7th Street	Q Street	R Street		4,185	25	50	97	2	1	87	0	13	
14	Q Street	7th Street	8th Street		12,545	25	50	97	2	1	87	0	13	
15	7th Street	R Street	S Street		3,155	25	50	97	2	1	87	0	13	
16	R Street	7th Street	8th Street		1,530	25	50	97	2	1	87	0	13	
17	8th Street	O Street	N Street		3,835	25	50	97	2	1	87	0	13	
18	8th Street	O Street	P Street		4,095	25	50	97	2	1	87	0	13	
19	O Street	8th Street	9th Street		925	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Predicted Noise Levels**

**Project Name :** Sacramento Commons  
**Project Number :** 60310303  
**Modeling Condition :** Existing INP plus Construction Traffic  
**Metric (Leq, Ldn, CNEqL) :** Ldn

Segment	Roadway		Segment		Noise Levels, dB Ldn			Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB	
1	R Street	6th Street	49.8	44.6	49.2	53.2	4	8	18	38	82	
2	7th Street	N Street	55.5	50.2	54.8	58.8	9	19	42	90	193	
3	7th Street	N Street	55.9	50.7	55.3	59.3	10	21	45	97	208	
4	N Street	7th Street	55.7	50.5	55.1	59.1	9	20	43	94	201	
5	N Street	7th Street	56.2	50.9	55.6	59.5	10	22	47	100	216	
6	7th Street	O Street	55.9	50.7	55.3	59.2	10	21	45	96	207	
7	7th Street	O Street	55.8	50.5	55.2	59.1	9	20	44	94	203	
8	O Street	7th Street	46.5	41.3	45.9	49.9	2	5	11	23	49	
9	7th Street	P Street	55.6	50.4	55.0	59.0	9	20	43	92	198	
10	7th Street	P Street	54.8	49.6	54.2	58.2	8	18	38	82	176	
11	P Street	7th Street	58.2	53.0	57.6	61.6	14	30	64	137	296	
12	P Street	7th Street	58.8	53.6	58.2	62.2	15	32	70	151	325	
13	7th Street	Q Street	54.5	49.3	53.9	57.9	8	17	36	78	167	
14	Q Street	7th Street	59.3	54.0	58.7	62.6	16	35	75	162	348	
15	7th Street	R Street	53.3	48.0	52.7	56.6	6	14	30	64	139	
16	R Street	7th Street	50.1	44.9	49.5	53.5	4	9	18	40	86	
17	8th Street	O Street	54.1	48.9	53.5	57.5	7	16	34	73	158	
18	8th Street	O Street	54.4	49.2	53.8	57.8	8	17	36	77	165	
19	O Street	8th Street	48.0	42.7	47.3	51.3	3	6	13	28	61	



**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
Model Input Sheet

**Project Name :** Sacramento Commons  
**Project Number :** 60310303  
**Modeling Condition :** Existing Project 1  
**Ground Type :** Soft  
**Metric (L<sub>eq</sub>, L<sub>dn</sub>, C<sub>NEL</sub>) :** Ldn

**K Factor :** N/A  
**Traffic Desc. (Peak or ADT) :** ADT

Input Form  
 Clear Traff Vol  
 Clear Data  
 Clear All

Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	% MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	4th Street	O Street	N Street		2,620	25	50	97	2	1	87	0	13	
2	4th Street	O Street	P Street		2,675	25	50	97	2	1	87	0	13	
3	O Street	5th Street	4th Street		2,135	25	50	97	2	1	87	0	13	
4	5th Street	N Street	Capitol Mall		6,865	25	50	97	2	1	87	0	13	
5	5th Street	N Street	Driveway 7		9,620	25	50	97	2	1	87	0	13	
6	N Street	5th Street	4th Street		4,385	25	50	97	2	1	87	0	13	
7	N Street	5th Street	Driveway 1		7,140	25	50	97	2	1	87	0	13	
8	5th Street	O Street	Driveway 7		9,235	25	50	97	2	1	87	0	13	
9	5th Street	O Street	Driveway 6		9,870	25	50	97	2	1	87	0	13	
10	5th Street	P Street	Driveway 6		7,635	25	50	97	2	1	87	0	13	
11	5th Street	P Street	Q Street		8,290	25	50	97	2	1	87	0	13	
12	P Street	5th Street	4th Street		11,095	25	50	97	2	1	87	0	13	
13	P Street	5th Street	6th Street		11,580	25	50	97	2	1	87	0	13	
14	6th Street	P Street	Q Street		635	25	50	97	2	1	87	0	13	
15	P Street	6th Street	Driveway 5		11,265	25	50	97	2	1	87	0	13	
16	6th Street	Q Street	R Street		1,585	25	50	97	2	1	87	0	13	
17	Q Street	6th Street	7th Street		11,890	25	50	97	2	1	87	0	13	
18	Q Street	6th Street	5th Street		12,470	25	50	97	2	1	87	0	13	
19	6th Street	R Street	S Street		1,735	25	50	97	2	1	87	0	13	
20	R Street	6th Street	7th Street		990	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**0**  
**Predicted Noise Levels**

**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** Existing Project 1  
**Metric (Leq, Ldn, CNEL) :** Ldn

Segment	Roadway		Segment		Noise Levels, dB Ldn				Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB		
1	4th Street	O Street	52.5	47.2	51.9	55.8	6	12	26	57	123		
2	4th Street	O Street	52.6	47.3	52.0	55.9	6	12	27	58	124		
3	O Street	5th Street	51.6	46.4	51.0	54.9	5	11	23	50	107		
4	5th Street	N Street	56.7	51.4	56.0	60.0	11	23	50	108	233		
5	5th Street	N Street	58.1	52.9	57.5	61.5	14	29	63	135	292		
6	N Street	5th Street	54.7	49.5	54.1	58.1	8	17	37	80	173		
7	N Street	5th Street	56.8	51.6	56.2	60.2	11	24	51	111	239		
8	5th Street	O Street	58.0	52.7	57.3	61.3	13	28	61	132	284		
9	5th Street	O Street	58.2	53.0	57.6	61.6	14	30	64	138	297		
10	5th Street	P Street	57.1	51.9	56.5	60.5	12	25	54	116	250		
11	5th Street	P Street	57.5	52.2	56.9	60.8	12	26	57	123	264		
12	P Street	5th Street	58.7	53.5	58.1	62.1	15	32	69	149	321		
13	P Street	5th Street	58.9	53.7	58.3	62.3	15	33	71	153	330		
14	6th Street	P Street	46.3	41.1	45.7	49.7	2	5	10	22	48		
15	P Street	6th Street	58.8	53.6	58.2	62.2	15	32	70	150	324		
16	6th Street	Q Street	50.3	45.1	49.7	53.7	4	9	19	41	88		
17	Q Street	6th Street	59.0	53.8	58.4	62.4	16	34	72	156	336		
18	Q Street	6th Street	59.3	54.0	58.6	62.6	16	35	75	161	347		
19	6th Street	R Street	50.7	45.5	50.1	54.0	4	9	20	43	93		
20	R Street	6th Street	48.3	43.0	47.6	51.6	3	6	14	30	64		



**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
Model Input Sheet

**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** Existing Project 1  
**Ground Type :** Soft  
**Metric (L<sub>eq</sub>, L<sub>din</sub>, CNEqL) :** Ldn

**K Factor :** N/A  
**Traffic Desc. (Peak or ADT) :** ADT

Input Form  
 Clear Traff Vol  
 Clear Data  
 Clear All

Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	%Autos	%MT	%HT	Day %	Eve %	Night %	Offset (dB)
1	R Street	6th Street	5th Street		950	25	50	97	2	1	87	0	13	
2	7th Street	N Street	Capitol Mall		5,180	25	50	97	2	1	87	0	13	
3	7th Street	N Street	Driveway 2		5,980	25	50	97	2	1	87	0	13	
4	N Street	7th Street	8th Street		5,280	25	50	97	2	1	87	0	13	
5	N Street	7th Street	Driveway 1		6,105	25	50	97	2	1	87	0	13	
6	7th Street	O Street	Driveway 2		6,085	25	50	97	2	1	87	0	13	
7	7th Street	O Street	Driveway 3		5,900	25	50	97	2	1	87	0	13	
8	O Street	7th Street	8th Street		195	25	50	97	2	1	87	0	13	
9	7th Street	P Street	Driveway 4		5,750	25	50	97	2	1	87	0	13	
10	7th Street	P Street	Q Street		4,750	25	50	97	2	1	87	0	13	
11	P Street	7th Street	8th Street		9,660	25	50	97	2	1	87	0	13	
12	P Street	7th Street	Driveway 5		11,250	25	50	97	2	1	87	0	13	
13	7th Street	Q Street	R Street		3,915	25	50	97	2	1	87	0	13	
14	Q Street	7th Street	8th Street		12,545	25	50	97	2	1	87	0	13	
15	7th Street	R Street	S Street		2,765	25	50	97	2	1	87	0	13	
16	R Street	7th Street	8th Street		1,045	25	50	97	2	1	87	0	13	
17	8th Street	O Street	N Street		3,365	25	50	97	2	1	87	0	13	
18	8th Street	O Street	P Street		3,595	25	50	97	2	1	87	0	13	
19	O Street	8th Street	9th Street		425	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
 Predicted Noise Levels

Project Name : Sacramento Commons  
 Project Number : 60310303  
 Modeling Condition : Existing Project 1  
 Metric (Leq, Ldn, CNEL) : Ldn

Segment	Roadway		Segment		Noise Levels, dB Ldn			Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB	
1	R Street	6th Street	48.1	42.8	47.5	51.4	3	6	13	29	62	
2	7th Street	N Street	55.4	50.2	54.8	58.8	9	19	42	90	193	
3	7th Street	N Street	56.1	50.8	55.4	59.4	10	21	46	99	212	
4	N Street	7th Street	55.5	50.3	54.9	58.9	9	20	42	91	195	
5	N Street	7th Street	56.2	50.9	55.5	59.5	10	22	46	100	215	
6	7th Street	O Street	56.1	50.9	55.5	59.5	10	21	46	100	215	
7	7th Street	O Street	56.0	50.8	55.4	59.4	10	21	45	98	210	
8	O Street	7th Street	41.2	36.0	40.6	44.6	1	2	5	10	22	
9	7th Street	P Street	55.9	50.7	55.3	59.3	10	21	45	96	207	
10	7th Street	P Street	55.1	49.8	54.4	58.4	8	18	39	85	182	
11	P Street	7th Street	58.1	52.9	57.5	61.5	14	29	63	136	292	
12	P Street	7th Street	58.8	53.6	58.2	62.2	15	32	70	150	324	
13	7th Street	Q Street	54.2	49.0	53.6	57.6	7	16	35	74	160	
14	Q Street	7th Street	59.3	54.0	58.7	62.6	16	35	75	162	348	
15	7th Street	R Street	52.7	47.5	52.1	56.1	6	13	27	59	127	
16	R Street	7th Street	48.5	43.3	47.9	51.8	3	7	14	31	66	
17	8th Street	O Street	53.6	48.3	52.9	56.9	7	14	31	67	145	
18	8th Street	O Street	53.9	48.6	53.2	57.2	7	15	33	70	151	
19	O Street	8th Street	44.6	39.3	44.0	47.9	2	4	8	17	36	





**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
Model Input Sheet

**Project Name :** Sacramento Commons  
**Project Number :** 60310303  
**Modeling Condition :** Existing Project 2  
**Ground Type :** Soft  
**Metric (L<sub>eq</sub>, L<sub>dn</sub>, CNEQ) :** Ldn

**K Factor :** N/A  
**Traffic Desc. (Peak or ADT) :** ADT

Input Form  
 Clear Traff Vol  
 Clear Data  
 Clear All

Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	% MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	4th Street	O Street	N Street		2,630	25	50	97	2	1	87	0	13	
2	4th Street	O Street	P Street		2,680	25	50	97	2	1	87	0	13	
3	O Street	5th Street	4th Street		2,180	25	50	97	2	1	87	0	13	
4	5th Street	N Street	Capitol Mall		6,865	25	50	97	2	1	87	0	13	
5	5th Street	N Street	Driveway 7		9,420	25	50	97	2	1	87	0	13	
6	N Street	5th Street	4th Street		4,350	25	50	97	2	1	87	0	13	
7	N Street	5th Street	Driveway 1		6,905	25	50	97	2	1	87	0	13	
8	5th Street	O Street	Driveway 7		9,240	25	50	97	2	1	87	0	13	
9	5th Street	O Street	Driveway 6		9,955	25	50	97	2	1	87	0	13	
10	5th Street	P Street	Driveway 6		7,760	25	50	97	2	1	87	0	13	
11	5th Street	P Street	Q Street		8,325	25	50	97	2	1	87	0	13	
12	P Street	5th Street	4th Street		10,965	25	50	97	2	1	87	0	13	
13	P Street	5th Street	6th Street		11,455	25	50	97	2	1	87	0	13	
14	6th Street	P Street	Q Street		635	25	50	97	2	1	87	0	13	
15	P Street	6th Street	Driveway 5		11,195	25	50	97	2	1	87	0	13	
16	6th Street	Q Street	R Street		1,585	25	50	97	2	1	87	0	13	
17	Q Street	6th Street	7th Street		11,890	25	50	97	2	1	87	0	13	
18	Q Street	6th Street	5th Street		12,470	25	50	97	2	1	87	0	13	
19	6th Street	R Street	S Street		1,775	25	50	97	2	1	87	0	13	
20	R Street	6th Street	7th Street		1,000	25	50	97	2	1	87	0	13	

**0**  
**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Predicted Noise Levels**

**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** Existing Project 2  
**Metric (Leq, Ldn, CNEL) :** Ldn

Segment	Roadway		Segment		Noise Levels, dB Ldn			Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB	
1	4th Street	O Street	52.5	47.3	51.9	55.9	6	12	26	57	123	
2	4th Street	O Street	52.6	47.3	52.0	55.9	6	12	27	58	124	
3	O Street	5th Street	51.7	46.4	51.1	55.0	5	11	23	50	108	
4	5th Street	N Street	56.7	51.4	56.0	60.0	11	23	50	108	233	
5	5th Street	N Street	58.0	52.8	57.4	61.4	13	29	62	133	288	
6	N Street	5th Street	54.7	49.4	54.1	58.0	8	17	37	80	172	
7	N Street	5th Street	56.7	51.5	56.1	60.0	11	23	50	109	234	
8	5th Street	O Street	58.0	52.7	57.3	61.3	13	28	61	132	284	
9	5th Street	O Street	58.3	53.0	57.7	61.6	14	30	64	138	298	
10	5th Street	P Street	57.2	52.0	56.6	60.6	12	25	54	117	253	
11	5th Street	P Street	57.5	52.3	56.9	60.9	12	26	57	123	265	
12	P Street	5th Street	58.7	53.5	58.1	62.1	15	32	69	148	318	
13	P Street	5th Street	58.9	53.6	58.3	62.2	15	33	71	152	328	
14	6th Street	P Street	46.3	41.1	45.7	49.7	2	5	10	22	48	
15	P Street	6th Street	58.8	53.5	58.2	62.1	15	32	70	150	323	
16	6th Street	Q Street	50.3	45.1	49.7	53.7	4	9	19	41	88	
17	Q Street	6th Street	59.0	53.8	58.4	62.4	16	34	72	156	336	
18	Q Street	6th Street	59.3	54.0	58.6	62.6	16	35	75	161	347	
19	6th Street	R Street	50.8	45.6	50.2	54.1	4	9	20	44	95	
20	R Street	6th Street	48.3	43.1	47.7	51.7	3	6	14	30	64	



**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
Model Input Sheet

**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** Existing Project 2  
**Ground Type :** Soft  
**Metric (L<sub>eq</sub>, L<sub>din</sub>, CNEq) :** Ldn

**K Factor :** N/A  
**Traffic Desc. (Peak or ADT) :** ADT

Input Form  
 Clear Traff Vol  
 Clear Data  
 Clear All

Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	% MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	R Street	6th Street	5th Street		980	25	50	97	2	1	87	0	13	
2	7th Street	N Street	Capitol Mall		5,085	25	50	97	2	1	87	0	13	
3	7th Street	N Street	Driveway 2		5,925	25	50	97	2	1	87	0	13	
4	N Street	7th Street	8th Street		5,215	25	50	97	2	1	87	0	13	
5	N Street	7th Street	Driveway 1		6,055	25	50	97	2	1	87	0	13	
6	7th Street	O Street	Driveway 2		5,980	25	50	97	2	1	87	0	13	
7	7th Street	O Street	Driveway 3		5,770	25	50	97	2	1	87	0	13	
8	O Street	7th Street	8th Street		215	25	50	97	2	1	87	0	13	
9	7th Street	P Street	Driveway 4		5,625	25	50	97	2	1	87	0	13	
10	7th Street	P Street	Q Street		4,890	25	50	97	2	1	87	0	13	
11	P Street	7th Street	8th Street		9,770	25	50	97	2	1	87	0	13	
12	P Street	7th Street	Driveway 5		11,180	25	50	97	2	1	87	0	13	
13	7th Street	Q Street	R Street		4,155	25	50	97	2	1	87	0	13	
14	Q Street	7th Street	8th Street		12,460	25	50	97	2	1	87	0	13	
15	7th Street	R Street	S Street		3,000	25	50	97	2	1	87	0	13	
16	R Street	7th Street	8th Street		1,045	25	50	97	2	1	87	0	13	
17	8th Street	O Street	N Street		3,365	25	50	97	2	1	87	0	13	
18	8th Street	O Street	P Street		3,595	25	50	97	2	1	87	0	13	
19	O Street	8th Street	9th Street		445	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Predicted Noise Levels**

**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** Existing Project 2  
**Metric (Leq, Ldn, CNEL) :** Ldn

Segment	Roadway		Segment				Noise Levels, dB Ldn				Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB	30	14	8	4
1	R Street	6th Street	48.2	43.0	47.6	51.6	3	6	14	30	64				
2	7th Street	N Street	55.4	50.1	54.7	58.7	9	19	41	88	191				
3	7th Street	N Street	56.0	50.8	55.4	59.4	10	21	45	98	211				
4	N Street	7th Street	55.5	50.2	54.9	58.8	9	19	42	90	194				
5	N Street	7th Street	56.1	50.9	55.5	59.5	10	21	46	99	214				
6	7th Street	O Street	56.1	50.8	55.4	59.4	10	21	46	99	212				
7	7th Street	O Street	55.9	50.7	55.3	59.3	10	21	45	96	207				
8	O Street	7th Street	41.6	36.4	41.0	45.0	1	2	5	11	23				
9	7th Street	P Street	55.8	50.6	55.2	59.2	9	20	44	95	204				
10	7th Street	P Street	55.2	50.0	54.6	58.5	9	19	40	86	186				
11	P Street	7th Street	58.2	53.0	57.6	61.6	14	29	63	137	295				
12	P Street	7th Street	58.8	53.5	58.2	62.1	15	32	69	150	322				
13	7th Street	Q Street	54.5	49.2	53.9	57.8	8	17	36	77	167				
14	Q Street	7th Street	59.3	54.0	58.6	62.6	16	35	75	161	346				
15	7th Street	R Street	53.1	47.8	52.5	56.4	6	13	29	62	134				
16	R Street	7th Street	48.5	43.3	47.9	51.8	3	7	14	31	66				
17	8th Street	O Street	53.6	48.3	52.9	56.9	7	14	31	67	145				
18	8th Street	O Street	53.9	48.6	53.2	57.2	7	15	33	70	151				
19	O Street	8th Street	44.8	39.5	44.2	48.1	2	4	8	17	38				



**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
Model Input Sheet

**Project Name :** Sacramento Commons  
**Project Number :** 60310303  
**Modeling Condition :** 2035 No Project  
**Ground Type :** Soft  
**Metric (L<sub>eq</sub>, L<sub>dn</sub>, C<sub>NEL</sub>) :** Ldn

**K Factor :** N/A  
**Traffic Desc. (Peak or ADT) :** ADT

Input Form  
 Clear Traff Vol  
 Clear Data  
 Clear All

Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	% MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	4th Street	O Street	N Street	N Street	2,440	25	50	97	2	1	87	0	13	
2	4th Street	O Street	P Street	P Street	2,545	25	50	97	2	1	87	0	13	
3	O Street	5th Street	4th Street	4th Street	1,965	25	50	97	2	1	87	0	13	
4	5th Street	N Street	Capitol Mall	Capitol Mall	12,075	25	50	97	2	1	87	0	13	
5	5th Street	N Street	Driveway 7	Driveway 7	11,370	25	50	97	2	1	87	0	13	
6	N Street	5th Street	4th Street	4th Street	7,230	25	50	97	2	1	87	0	13	
7	N Street	5th Street	Driveway 1	Driveway 1	6,525	25	50	97	2	1	87	0	13	
8	5th Street	O Street	Driveway 7	Driveway 7	11,180	25	50	97	2	1	87	0	13	
9	5th Street	O Street	Driveway 6	Driveway 6	11,865	25	50	97	2	1	87	0	13	
10	5th Street	P Street	Driveway 6	Driveway 6	9,440	25	50	97	2	1	87	0	13	
11	5th Street	P Street	Q Street	Q Street	10,415	25	50	97	2	1	87	0	13	
12	P Street	5th Street	4th Street	4th Street	14,540	25	50	97	2	1	87	0	13	
13	P Street	5th Street	6th Street	6th Street	14,575	25	50	97	2	1	87	0	13	
14	6th Street	P Street	Q Street	Q Street	2,590	25	50	97	2	1	87	0	13	
15	P Street	6th Street	Driveway 5	Driveway 5	13,125	25	50	97	2	1	87	0	13	
16	6th Street	Q Street	R Street	R Street	3,615	25	50	97	2	1	87	0	13	
17	Q Street	6th Street	7th Street	7th Street	11,910	25	50	97	2	1	87	0	13	
18	Q Street	6th Street	5th Street	5th Street	12,575	25	50	97	2	1	87	0	13	
19	6th Street	R Street	S Street	S Street	3,710	25	50	97	2	1	87	0	13	
20	R Street	6th Street	7th Street	7th Street	1,005	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
 Predicted Noise Levels

Project Name : Sacramento Common  
 Project Number : 60310303  
 Modeling Condition : 2035 No Project  
 Metric (Leq, Ldn, CNEqL) : Ldn

Segment	Roadway		Segment		Noise Levels, dB Ldn			Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB	
1	4th Street	O Street	52.2	46.9	51.6	55.5	5	12	25	54	117	
2	4th Street	O Street	52.4	47.1	51.7	55.7	6	12	26	56	120	
3	O Street	5th Street	51.2	46.0	50.6	54.6	5	10	22	47	101	
4	5th Street	N Street	59.1	53.9	58.5	62.5	16	34	73	157	339	
5	5th Street	N Street	58.9	53.6	58.2	62.2	15	33	70	151	326	
6	N Street	5th Street	56.9	51.7	56.3	60.2	11	24	52	112	241	
7	N Street	5th Street	56.4	51.2	55.8	59.8	10	23	48	104	225	
8	5th Street	O Street	58.8	53.5	58.2	62.1	15	32	69	150	322	
9	5th Street	O Street	59.0	53.8	58.4	62.4	16	34	72	156	335	
10	5th Street	P Street	58.0	52.8	57.4	61.4	13	29	62	134	288	
11	5th Street	P Street	58.5	53.2	57.9	61.8	14	31	66	143	307	
12	P Street	5th Street	59.9	54.7	59.3	63.3	18	38	83	178	384	
13	P Street	5th Street	59.9	54.7	59.3	63.3	18	38	83	179	385	
14	6th Street	P Street	52.4	47.2	51.8	55.8	6	12	26	56	122	
15	P Street	6th Street	59.5	54.2	58.9	62.8	17	36	77	166	359	
16	6th Street	Q Street	53.9	48.6	53.3	57.2	7	15	33	70	152	
17	Q Street	6th Street	59.1	53.8	58.4	62.4	16	34	72	156	336	
18	Q Street	6th Street	59.3	54.1	58.7	62.7	16	35	75	162	349	
19	6th Street	R Street	54.0	48.8	53.4	57.3	7	15	33	72	154	
20	R Street	6th Street	48.3	43.1	47.7	51.7	3	6	14	30	65	



**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
Model Input Sheet

**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** 2035 No Project  
**Ground Type :** Soft  
**Metric (L<sub>eq</sub>, L<sub>din</sub>, CNEq) :** Ldn

**K Factor :** N/A  
**Traffic Desc. (Peak or ADT) :** ADT

Input Form  
 Clear Traff Vol  
 Clear Data  
 Clear All

Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	%Autos	%MT	%HT	Day %	Eve %	Night %	Offset (dB)
1	R Street	6th Street	5th Street		1,080	25	50	97	2	1	87	0	13	
2	7th Street	N Street	Capitol Mall Driveway 2		9,870	25	50	97	2	1	87	0	13	
3	7th Street	N Street	8th Street		10,160	25	50	97	2	1	87	0	13	
4	N Street	7th Street	7th Street		5,345	25	50	97	2	1	87	0	13	
5	N Street	7th Street	Driveway 1		5,635	25	50	97	2	1	87	0	13	
6	7th Street	O Street	Driveway 2		9,995	25	50	97	2	1	87	0	13	
7	7th Street	O Street	Driveway 3		9,720	25	50	97	2	1	87	0	13	
8	O Street	7th Street	8th Street		275	25	50	97	2	1	87	0	13	
9	7th Street	P Street	Driveway 4		9,535	25	50	97	2	1	87	0	13	
10	7th Street	P Street	Q Street		7,965	25	50	97	2	1	87	0	13	
11	P Street	7th Street	8th Street		11,130	25	50	97	2	1	87	0	13	
12	P Street	7th Street	Driveway 5		13,120	25	50	97	2	1	87	0	13	
13	7th Street	Q Street	R Street		6,965	25	50	97	2	1	87	0	13	
14	Q Street	7th Street	8th Street		12,710	25	50	97	2	1	87	0	13	
15	7th Street	R Street	S Street		5,715	25	50	97	2	1	87	0	13	
16	R Street	7th Street	8th Street		1,095	25	50	97	2	1	87	0	13	
17	8th Street	O Street	N Street		6,430	25	50	97	2	1	87	0	13	
18	8th Street	O Street	P Street		6,720	25	50	97	2	1	87	0	13	
19	O Street	8th Street	9th Street		565	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
 Predicted Noise Levels

Project Name : Sacramento Commons  
 Project Number : 60310303  
 Modeling Condition : 2035 No Project  
 Metric (Leq, Ldn, CNEqL) : Ldn

Segment	Roadway		Segment		Noise Levels, dB Ldn			Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB	
1	R Street	6th Street	48.6	43.4	48.0	52.0	3	7	15	31	68	
2	7th Street	N Street	58.2	53.0	57.6	61.6	14	30	64	138	297	
3	7th Street	N Street	58.4	53.1	57.7	61.7	14	30	65	140	302	
4	N Street	7th Street	55.6	50.3	55.0	58.9	9	20	42	91	197	
5	N Street	7th Street	55.8	50.6	55.2	59.2	9	20	44	95	204	
6	7th Street	O Street	58.3	53.1	57.7	61.7	14	30	64	139	299	
7	7th Street	O Street	58.2	52.9	57.6	61.5	14	29	63	136	294	
8	O Street	7th Street	42.7	37.5	42.1	46.0	1	3	6	13	27	
9	7th Street	P Street	58.1	52.9	57.5	61.4	13	29	62	135	290	
10	7th Street	P Street	57.3	52.1	56.7	60.7	12	26	55	119	257	
11	P Street	7th Street	58.8	53.5	58.1	62.1	15	32	69	149	321	
12	P Street	7th Street	59.5	54.2	58.9	62.8	17	36	77	166	359	
13	7th Street	Q Street	56.7	51.5	56.1	60.1	11	24	51	109	235	
14	Q Street	7th Street	59.3	54.1	58.7	62.7	16	35	76	163	351	
15	7th Street	R Street	55.9	50.6	55.2	59.2	10	21	44	96	206	
16	R Street	7th Street	48.7	43.5	48.1	52.0	3	7	15	32	68	
17	8th Street	O Street	56.4	51.1	55.8	59.7	10	22	48	103	223	
18	8th Street	O Street	56.6	51.3	56.0	59.9	11	23	49	107	230	
19	O Street	8th Street	45.8	40.6	45.2	49.2	2	4	9	20	44	



**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Model Input Sheet**



**Project Name :** Sacramento Commons  
**Project Number :** 60310303  
**Modeling Condition :** 2035 Project 1  
**Ground Type :** Soft  
**Metric (L<sub>eq</sub>, L<sub>dn</sub>, CNEq) :** Ldn

**K Factor :** N/A  
**Traffic Desc. (Peak or ADT) :** ADT

Input Form

Clear Traff Vol.

Clear Data

Clear All

Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	%Autos	%MT	%HT	Day %	Eve %	Night %	Offset (dB)
1	4th Street	O Street	N Street		2,575	25	50	97	2	1	87	0	13	
2	4th Street	O Street	P Street		2,645	25	50	97	2	1	87	0	13	
3	O Street	5th Street	4th Street		2,190	25	50	97	2	1	87	0	13	
4	5th Street	N Street	Capitol Mall		12,350	25	50	97	2	1	87	0	13	
5	5th Street	N Street	Driveway 7		12,280	25	50	97	2	1	87	0	13	
6	N Street	5th Street	4th Street		7,310	25	50	97	2	1	87	0	13	
7	N Street	5th Street	Driveway 1		7,240	25	50	97	2	1	87	0	13	
8	5th Street	O Street	Driveway 7		12,055	25	50	97	2	1	87	0	13	
9	5th Street	O Street	Driveway 6		12,645	25	50	97	2	1	87	0	13	
10	5th Street	P Street	Driveway 6		10,185	25	50	97	2	1	87	0	13	
11	5th Street	P Street	Q Street		10,705	25	50	97	2	1	87	0	13	
12	P Street	5th Street	4th Street		14,600	25	50	97	2	1	87	0	13	
13	P Street	5th Street	6th Street		15,055	25	50	97	2	1	87	0	13	
14	6th Street	P Street	Q Street		2,590	25	50	97	2	1	87	0	13	
15	P Street	6th Street	Driveway 5		13,635	25	50	97	2	1	87	0	13	
16	6th Street	Q Street	R Street		3,615	25	50	97	2	1	87	0	13	
17	Q Street	6th Street	7th Street		11,910	25	50	97	2	1	87	0	13	
18	Q Street	6th Street	5th Street		12,575	25	50	97	2	1	87	0	13	
19	6th Street	R Street	S Street		3,780	25	50	97	2	1	87	0	13	
20	R Street	6th Street	7th Street		1,045	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
 Predicted Noise Levels

Project Name : Sacramento Common  
 Project Number : 60310303  
 Modeling Condition : 2035 Project 1  
 Metric (Leq, Ldn, CNEL) : Ldn

Segment	Roadway		Segment		Noise Levels, dB Ldn				Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB		
1	4th Street	N Street	52.4	47.2	51.8	55.8	6	12	26	56	121		
2	4th Street	P Street	52.5	47.3	51.9	55.9	6	12	27	57	123		
3	O Street	4th Street	51.7	46.5	51.1	55.1	5	11	23	50	109		
4	5th Street	N Street	59.2	54.0	58.6	62.6	16	34	74	160	344		
5	5th Street	N Street	59.2	54.0	58.6	62.5	16	34	74	159	343		
6	N Street	4th Street	56.9	51.7	56.3	60.3	11	24	52	113	243		
7	N Street	Driveway 1	56.9	51.7	56.3	60.3	11	24	52	112	241		
8	5th Street	Driveway 7	59.1	53.9	58.5	62.5	16	34	73	157	339		
9	5th Street	Driveway 6	59.3	54.1	58.7	62.7	16	35	75	162	350		
10	5th Street	Driveway 6	58.4	53.1	57.8	61.7	14	30	65	141	303		
11	5th Street	Q Street	58.6	53.4	58.0	62.0	15	31	67	145	313		
12	P Street	4th Street	59.9	54.7	59.3	63.3	18	39	83	179	385		
13	P Street	6th Street	60.1	54.8	59.5	63.4	18	39	85	182	393		
14	6th Street	Q Street	52.4	47.2	51.8	55.8	6	12	26	56	122		
15	P Street	Driveway 5	59.6	54.4	59.0	63.0	17	37	79	171	368		
16	6th Street	R Street	53.9	48.6	53.3	57.2	7	15	33	70	152		
17	Q Street	7th Street	59.1	53.8	58.4	62.4	16	34	72	156	336		
18	Q Street	5th Street	59.3	54.1	58.7	62.7	16	35	75	162	349		
19	6th Street	R Street	54.1	48.8	53.5	57.4	7	16	34	73	156		
20	R Street	7th Street	48.5	43.3	47.9	51.8	3	7	14	31	66		

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Model Input Sheet**



**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** 2035 Project 1  
**Ground Type :** Soft  
**Metric (L<sub>eq</sub>, L<sub>din</sub>, CNEq) :** Ldn

**K Factor :** N/A  
**Traffic Desc. (Peak or ADT) :** ADT

Input Form

Clear Traff Vol.

Clear Data

Clear All

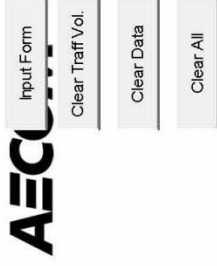
Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	% MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	R Street	6th Street	5th Street		1,110	25	50	97	2	1	87	0	13	
2	7th Street	N Street	Capitol Mall		10,120	25	50	97	2	1	87	0	13	
3	7th Street	N Street	Driveway 2		10,570	25	50	97	2	1	87	0	13	
4	N Street	7th Street	8th Street		5,490	25	50	97	2	1	87	0	13	
5	N Street	7th Street	Driveway 1		6,015	25	50	97	2	1	87	0	13	
6	7th Street	O Street	Driveway 2		10,615	25	50	97	2	1	87	0	13	
7	7th Street	O Street	Driveway 3		10,325	25	50	97	2	1	87	0	13	
8	O Street	7th Street	8th Street		305	25	50	97	2	1	87	0	13	
9	7th Street	P Street	Driveway 4		10,090	25	50	97	2	1	87	0	13	
10	7th Street	P Street	Q Street		8,360	25	50	97	2	1	87	0	13	
11	P Street	7th Street	8th Street		11,230	25	50	97	2	1	87	0	13	
12	P Street	7th Street	Driveway 5		13,535	25	50	97	2	1	87	0	13	
13	7th Street	Q Street	R Street		7,165	25	50	97	2	1	87	0	13	
14	Q Street	7th Street	8th Street		12,905	25	50	97	2	1	87	0	13	
15	7th Street	R Street	S Street		5,870	25	50	97	2	1	87	0	13	
16	R Street	7th Street	8th Street		1,095	25	50	97	2	1	87	0	13	
17	8th Street	O Street	N Street		6,460	25	50	97	2	1	87	0	13	
18	8th Street	O Street	P Street		6,720	25	50	97	2	1	87	0	13	
19	O Street	8th Street	9th Street		565	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)  
Predicted Noise Levels**

Project Name : Sacramento Commons  
 Project Number : 60310303  
 Modeling Condition : 2035 Project 1  
 Metric (Leq, Ldn, CNEL) : Ldn

Segment	Roadway		Segment		Noise Levels, dB Ldn			Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB	
1	R Street	6th Street	48.8	43.5	48.1	52.1	3	7	15	32	69	
2	7th Street	N Street	58.3	53.1	57.7	61.7	14	30	65	140	302	
3	7th Street	N Street	58.5	53.3	57.9	61.9	14	31	67	144	310	
4	N Street	7th Street	55.7	50.5	55.1	59.1	9	20	43	93	201	
5	N Street	7th Street	56.1	50.9	55.5	59.4	10	21	46	99	213	
6	7th Street	O Street	58.6	53.3	57.9	61.9	14	31	67	145	311	
7	7th Street	O Street	58.4	53.2	57.8	61.8	14	31	66	142	306	
8	O Street	7th Street	43.1	37.9	42.5	46.5	1	3	6	14	29	
9	7th Street	P Street	58.3	53.1	57.7	61.7	14	30	65	140	301	
10	7th Street	P Street	57.5	52.3	56.9	60.9	12	27	57	123	266	
11	P Street	7th Street	58.8	53.6	58.2	62.2	15	32	70	150	323	
12	P Street	7th Street	59.6	54.4	59.0	63.0	17	37	79	170	366	
13	7th Street	Q Street	56.8	51.6	56.2	60.2	11	24	52	111	240	
14	Q Street	7th Street	59.4	54.2	58.8	62.8	16	35	76	165	355	
15	7th Street	R Street	56.0	50.7	55.4	59.3	10	21	45	97	210	
16	R Street	7th Street	48.7	43.5	48.1	52.0	3	7	15	32	68	
17	8th Street	O Street	56.4	51.2	55.8	59.8	10	22	48	104	224	
18	8th Street	O Street	56.6	51.3	56.0	59.9	11	23	49	107	230	
19	O Street	8th Street	45.8	40.6	45.2	49.2	2	4	9	20	44	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Model Input Sheet**



**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** 2035 Project 2  
**Ground Type :** Soft  
**Metric (L<sub>eq</sub>, L<sub>dn</sub>, CNEq) :** Ldn

**K Factor :** N/A  
**Traffic Desc. (Peak or ADT) :** ADT

Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	% MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	4th Street	O Street	N Street		2,585	25	50	97	2	1	87	0	13	
2	4th Street	O Street	P Street		2,650	25	50	97	2	1	87	0	13	
3	O Street	5th Street	4th Street		2,195	25	50	97	2	1	87	0	13	
4	5th Street	N Street	Capitol Mall		12,305	25	50	97	2	1	87	0	13	
5	5th Street	N Street	Driveway 7		12,020	25	50	97	2	1	87	0	13	
6	N Street	5th Street	4th Street		7,285	25	50	97	2	1	87	0	13	
7	N Street	5th Street	Driveway 1		7,000	25	50	97	2	1	87	0	13	
8	5th Street	O Street	Driveway 7		11,730	25	50	97	2	1	87	0	13	
9	5th Street	O Street	Driveway 6		12,325	25	50	97	2	1	87	0	13	
10	5th Street	P Street	Driveway 6		9,960	25	50	97	2	1	87	0	13	
11	5th Street	P Street	Q Street		10,525	25	50	97	2	1	87	0	13	
12	P Street	5th Street	4th Street		14,540	25	50	97	2	1	87	0	13	
13	P Street	5th Street	6th Street		14,755	25	50	97	2	1	87	0	13	
14	6th Street	P Street	Q Street		2,590	25	50	97	2	1	87	0	13	
15	P Street	6th Street	Driveway 5		13,635	25	50	97	2	1	87	0	13	
16	6th Street	Q Street	R Street		3,615	25	50	97	2	1	87	0	13	
17	Q Street	6th Street	7th Street		11,910	25	50	97	2	1	87	0	13	
18	Q Street	6th Street	5th Street		12,575	25	50	97	2	1	87	0	13	
19	6th Street	R Street	S Street		3,770	25	50	97	2	1	87	0	13	
20	R Street	6th Street	7th Street		1,040	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
**Predicted Noise Levels**

**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** 2035 Project 2  
**Metric (Leq, Ldn, CNEqL) :** Ldn

Segment	Roadway		Segment		Noise Levels, dB Ldn			Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB	
1	4th Street	N Street	52.4	47.2	51.8	55.8	6	12	26	56	121	
2	4th Street	P Street	52.5	47.3	51.9	55.9	6	12	27	57	123	
3	O Street	4th Street	51.7	46.5	51.1	55.1	5	11	23	51	109	
4	5th Street	N Street	59.2	54.0	58.6	62.6	16	34	74	159	344	
5	5th Street	N Street	59.1	53.9	58.5	62.5	16	34	73	157	338	
6	N Street	4th Street	56.9	51.7	56.3	60.3	11	24	52	112	242	
7	N Street	Driveway 1	56.7	51.5	56.1	60.1	11	24	51	109	236	
8	5th Street	Driveway 7	59.0	53.8	58.4	62.3	15	33	72	154	333	
9	5th Street	Driveway 6	59.2	54.0	58.6	62.6	16	34	74	160	344	
10	5th Street	Driveway 6	58.3	53.0	57.7	61.6	14	30	64	139	298	
11	5th Street	P Street	58.5	53.3	57.9	61.9	14	31	67	144	310	
12	P Street	5th Street	59.9	54.7	59.3	63.3	18	38	83	178	384	
13	P Street	5th Street	60.0	54.7	59.4	63.3	18	39	84	180	388	
14	6th Street	Q Street	52.4	47.2	51.8	55.8	6	12	26	56	122	
15	P Street	6th Street	59.6	54.4	59.0	63.0	17	37	79	171	368	
16	6th Street	Q Street	53.9	48.6	53.3	57.2	7	15	33	70	152	
17	Q Street	6th Street	59.1	53.8	58.4	62.4	16	34	72	156	336	
18	Q Street	6th Street	59.3	54.1	58.7	62.7	16	35	75	162	349	
19	6th Street	R Street	54.1	48.8	53.4	57.4	7	16	34	72	156	
20	R Street	7th Street	48.5	43.2	47.9	51.8	3	7	14	31	66	



**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
Model Input Sheet

**Project Name :** Sacramento Common  
**Project Number :** 60310303  
**Modeling Condition :** 2035 Project 2  
**Ground Type :** Soft  
**Metric (L<sub>eq</sub>, L<sub>din</sub>, CNEq) :** Ldn

**K Factor :** N/A  
**Traffic Desc. (Peak or ADT) :** ADT

Segment	Roadway	From	To	Segment	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	% MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	R Street	6th Street	5th Street		1,105	25	50	97	2	1	87	0	13	
2	7th Street	N Street	Capitol Mall Driveway 2		9,980	25	50	97	2	1	87	0	13	
3	7th Street	N Street	8th Street		10,420	25	50	97	2	1	87	0	13	
4	N Street	7th Street	Driveway 1		5,445	25	50	97	2	1	87	0	13	
5	N Street	7th Street	Driveway 2		5,910	25	50	97	2	1	87	0	13	
6	7th Street	O Street	Driveway 3		10,400	25	50	97	2	1	87	0	13	
7	7th Street	O Street	8th Street		10,120	25	50	97	2	1	87	0	13	
8	O Street	7th Street	Driveway 4		305	25	50	97	2	1	87	0	13	
9	7th Street	P Street	Q Street		9,880	25	50	97	2	1	87	0	13	
10	7th Street	P Street	8th Street		8,320	25	50	97	2	1	87	0	13	
11	P Street	7th Street	Driveway 5		11,235	25	50	97	2	1	87	0	13	
12	P Street	7th Street	R Street		13,535	25	50	97	2	1	87	0	13	
13	7th Street	Q Street	8th Street		7,020	25	50	97	2	1	87	0	13	
14	Q Street	7th Street	S Street		13,010	25	50	97	2	1	87	0	13	
15	7th Street	R Street	8th Street		5,770	25	50	97	2	1	87	0	13	
16	R Street	7th Street	N Street		1,095	25	50	97	2	1	87	0	13	
17	8th Street	O Street	P Street		6,460	25	50	97	2	1	87	0	13	
18	8th Street	O Street	9th Street		6,720	25	50	97	2	1	87	0	13	
19	O Street	8th Street			565	25	50	97	2	1	87	0	13	

**Traffic Noise Prediction Model, (FHWA RD-77-108)**  
 Predicted Noise Levels

Project Name : Sacramento Common  
 Project Number : 60310303  
 Modeling Condition : 2035 Project 2  
 Metric (Leq, Ldn, CNEL) : Ldn

Segment	Roadway		Segment		Noise Levels, dB Ldn			Distance to Traffic Noise Contours, Feet				
	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB	
1	R Street	6th Street	48.7	43.5	48.1	52.1	3	7	15	32	69	
2	7th Street	N Street	58.3	53.1	57.7	61.6	14	30	64	139	299	
3	7th Street	N Street	58.5	53.2	57.9	61.8	14	31	66	143	308	
4	N Street	7th Street	55.7	50.4	55.0	59.0	9	20	43	93	200	
5	N Street	7th Street	56.0	50.8	55.4	59.4	10	21	45	98	211	
6	7th Street	O Street	58.5	53.2	57.9	61.8	14	31	66	143	307	
7	7th Street	O Street	58.3	53.1	57.7	61.7	14	30	65	140	302	
8	O Street	7th Street	43.1	37.9	42.5	46.5	1	3	6	14	29	
9	7th Street	P Street	58.2	53.0	57.6	61.6	14	30	64	138	297	
10	7th Street	P Street	57.5	52.3	56.9	60.9	12	26	57	123	265	
11	P Street	7th Street	58.8	53.6	58.2	62.2	15	32	70	150	323	
12	P Street	7th Street	59.6	54.4	59.0	63.0	17	37	79	170	366	
13	7th Street	Q Street	56.8	51.5	56.1	60.1	11	24	51	110	236	
14	Q Street	7th Street	59.4	54.2	58.8	62.8	17	36	77	166	357	
15	7th Street	R Street	55.9	50.7	55.3	59.3	10	21	45	96	207	
16	R Street	7th Street	48.7	43.5	48.1	52.0	3	7	15	32	68	
17	8th Street	O Street	56.4	51.2	55.8	59.8	10	22	48	104	224	
18	8th Street	O Street	56.6	51.3	56.0	59.9	11	23	49	107	230	
19	O Street	8th Street	45.8	40.6	45.2	49.2	2	4	9	20	44	



**Project-Generated Construction Source Noise Prediction Model**

Nevada Stateline-to-Stateline Bikeway, South Demonstration Project



Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L <sub>eq</sub> dBA)	Assumptions:	Reference Emission Noise Levels (L <sub>max</sub> ) at 50 feet <sup>1</sup>	Usage Factor <sup>1</sup>								
Threshold*	480	55.0	Dump Truck	84	0.1								
	50	74.6	Cat-Backhoe Loader	73	0.1								
	100	68.6	Quieter Motor Grader	73	0.1								
	150	65.1											
	200	62.6											
			Ground Type	Hard									
			Ground Factor	0.00									
			<table border="1"> <thead> <tr> <th>Predicted Noise Level<sup>2</sup></th> <th>L<sub>eq</sub> dBA at 50 feet<sup>2</sup></th> </tr> </thead> <tbody> <tr> <td>Dump Truck</td> <td>74.0</td> </tr> <tr> <td>Front End Loader</td> <td>63.0</td> </tr> <tr> <td>Grader</td> <td>63.0</td> </tr> </tbody> </table>			Predicted Noise Level <sup>2</sup>	L <sub>eq</sub> dBA at 50 feet <sup>2</sup>	Dump Truck	74.0	Front End Loader	63.0	Grader	63.0
Predicted Noise Level <sup>2</sup>	L <sub>eq</sub> dBA at 50 feet <sup>2</sup>												
Dump Truck	74.0												
Front End Loader	63.0												
Grader	63.0												

**Combined Predicted Noise Level (L<sub>eq</sub> dBA at 50 feet)**  
74.6

**Sources:**

<sup>1</sup> Obtained from the FHWA Roadway Construction Noise Model, January 2006.  
<sup>2</sup> Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.

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

Where: E.L. = Emission Level;

U.F. = Usage Factor;

G = Constant that accounts for topography and ground effects; and

D = Distance from source to receiver.

\*Project specific threshold

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