APPENDIX 4

Noise Analysis

OCTOBER 2018

NOISE ANALYSIS

Placentia General Plan Update

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NOISE ANALYSIS

for the

Placentia General Plan Update

Placentia, California

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This document is designed for double-sided printing to conserve natural resources.

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SYMBOLS, ABBREVIATIONS, AND ACRONYMS

ADT	Average Daily Traffic
ANSI	American National Standards Institute
AM	Ante Meridiem
APN	Assessor's Parcel Number
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
EPA	United States Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
Ldn	average day/night sound level
Leq	equivalent sound level
Lmax	maximum noise level
Lmin	minimum noise level
Ln	exceedance level
MPH	miles per hour
PM	Post Meridiem
PPV	peak particle velocity
STC	sound transmission class
VdB	velocity decibels

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EXECUTIVE SUMMARY

This Noise Analysis provides background information and technical data to support the Noise Element of the City of Placentia General Plan Update. This analysis examines noise sources in the City to identify and assess the potential for noise conflicts and problems, and to identify ways to reduce existing and potential noise impacts.

Roadway Noise. Roadway noise contours were calculated for the City's primary and major arterials for both existing and proposed General Plan 2040 conditions. Noise generation for each roadway link was calculated and the distance to the 60 A-weighted decibel (dBA) Community Noise Equivalent Level (CNEL), 65 dBA CNEL, and 70 dBA CNEL contours was determined. The existing traffic noise levels range from a low of 51.7 CNEL along Jefferson Street from Alta Vista Street to Garten Drive to a high of 69.2 CNEL along Rose Drive from Alta Vista Street to Palm Drive. The proposed General Plan traffic noise levels range from a low of 52.3 CNEL along Jefferson Street from Alta Vista Street to Garten Drive to a high of 69.6 CNEL along Rose Drive from Alta Vista Street to Palm Drive. Under existing and proposed General Plan conditions, no areas within the City experience traffic noise levels from arterial roadways in excess of 70 dBA CNEL at 100 feet from the roadway centerline.

State Route 57 (SR-57) traverses the City of Placentia and represents a primary source of traffic noise in the southwestern portion of the City. Currently, designated truck routes within the City's limit are along SR-57, Placentia Avenue, Melrose Street, Kraemer Boulevard, Rose Drive, Lakeview Avenue, Imperial Highway, Yorba Linda Boulevard, Chapman Avenue, Crowther Avenue, and Orangethorpe Avenue. As the City grows and traffic levels increase, there is a potential for increased truck noise conflicts with adjacent land uses.

Stationary Nosie Sources. Stationary commercial and industrial land uses located near residential areas currently generate occasional noise impacts due to the operation of delivery trucks, air compressors, generators, outdoor loudspeakers, and gas venting. Residential land uses, and areas identified as noise-sensitive, must be protected from excessive noise from stationary sources including commercial and industrial centers. These impacts are best controlled through effective land use planning and application of the City Noise Ordinance.

Noise Measurements. A noise monitoring survey was conducted to determine ambient noise levels throughout the City. Ambient noise levels throughout the City range from 44.6 dBA in residential areas to 65.0 dBA in commercial areas along the City's busiest roadways.

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1.0 INTRODUCTION

This Noise Analysis provides background information and technical data to support the Noise Element of the City of Placentia General Plan Update. This analysis examines noise sources in the City to identify and assess the potential for noise conflicts and problems, and to identify ways to reduce existing and potential noise impacts. Noise that affects the larger community, rather than noise associated with site-specific conditions is also addressed. Existing and future noise from mobile and stationary sources is considered, as well as the compatibility of land uses and sensitive receptors. The analysis identifies projected noise levels in order to inform the development of General Plan goals and policies to maintain noise levels that are compatible with various types of land uses and prevent high noise levels in sensitive areas.

The proposed Placentia General Plan 2040 scenario has revised housing, commercial square footage, and population estimates, with allowances for mixed-use developments based on the recent land use information provided by the City.

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2.0 EXISTING SETTING

Noise, defined as unwanted sound, is principally caused by the operation of machinery for transportation (automobiles, trucks, trains, and aircraft) and machinery for production (industry and construction). Noise affects the quality of the environment, both at home and work, as well as enjoyment of recreational activity. Excessive amounts of noise may have adverse effects on physical activity and psychological stability. The effect of noise on the individual and the community varies with its duration, intensity, and the tolerance level of the individual.

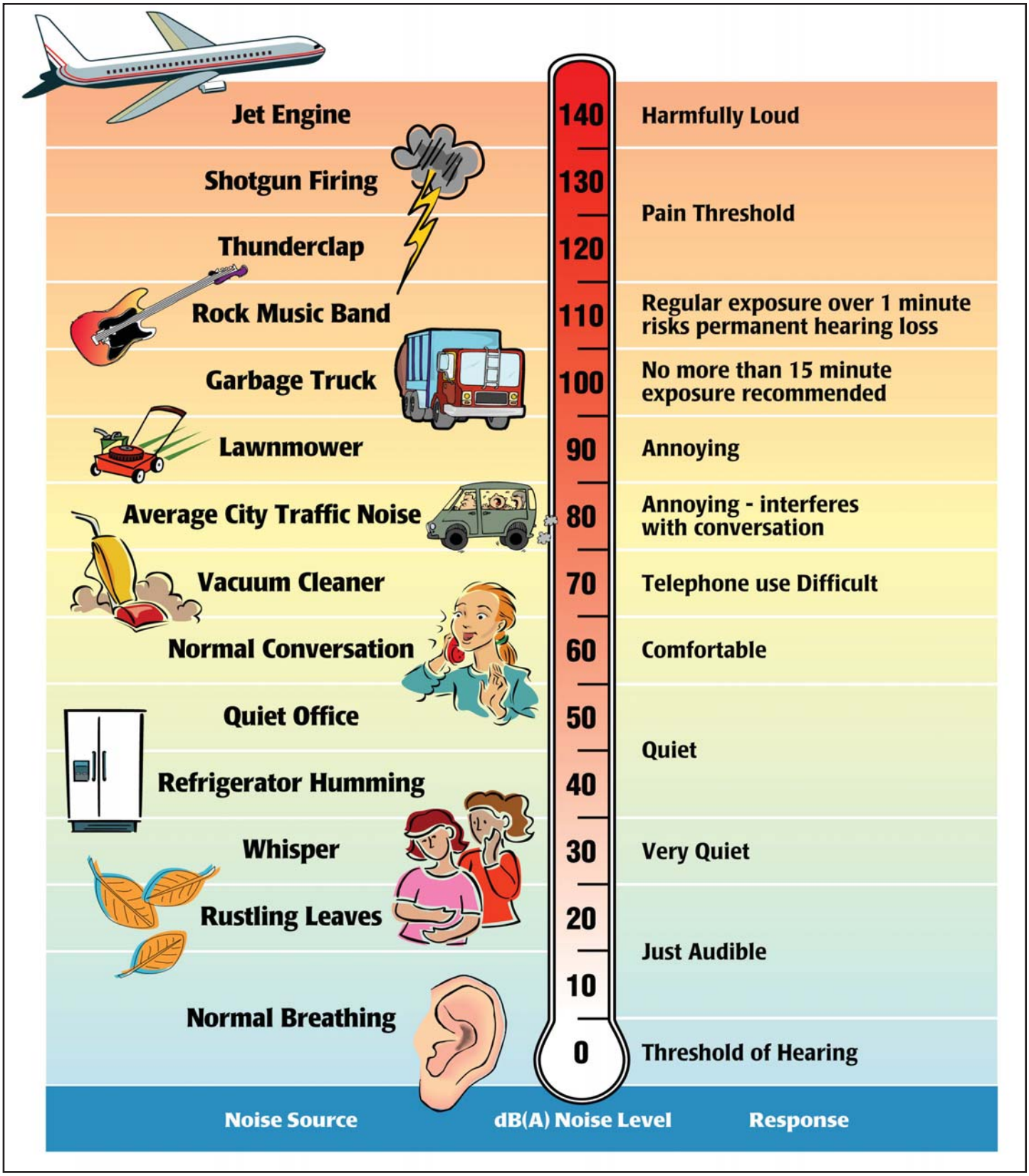
2.1 NOISE DESCRIPTORS

Sound is described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

The perceived loudness of sound is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and should be approximated by the A-weighted sound levels (expressed as dBA) and the way the human ear perceives noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment.

Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), 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 one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is judged to be twice as loud and 20 dBA higher four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples of various sound levels in different environments are illustrated on Exhibit 1, *Sound Levels and Human Response*.



Source: Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA/ONAC 550/9-74-004), March 1974.

CITY OF PLACENTIA
NOISE ANALYSIS

Sound Levels and Human Response

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Exhibit 1

Many methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Numerous methods have been developed to measure sound over a period of time; refer to Table 1, *Noise Descriptors*.

Table 1
Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (L_{eq})	The sound level containing the same total energy as a time varying signal over a given time period. The L_{eq} is the value that expresses the time averaged total energy of a fluctuating sound level.
Maximum Sound Level (L_{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L_{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments are +5 dBA for the evening, 7:00 PM to 10:00 PM, and +10 dBA for the night, 10:00 PM to 7:00 AM.
Day/Night Average (L_{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency (EPA) for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq}. The L_{dn} is calculated by averaging the L_{eq}'s for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 PM to 7:00 AM), by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
Exceedance Level (L_n)	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% (L_{01}, L_{10}, L_{50}, L_{90}, respectively) of the time during the measurement period.
Source: Cyril M. Harris, *Handbook of Noise Control*, dated 1979.	

It is difficult to specify noise levels that are generally acceptable to everyone; what is annoying to one person may be unnoticed by another. Standards may be based on documented complaints in response to documented noise levels or based on studies of the ability of people to sleep, talk, or work under various noise conditions. Regulatory requirements related to environmental noise are typically promulgated at the local level. However, Federal and State agencies provide standards and guidelines to the local jurisdictions.

2.2 HUMAN RESPONSE TO NOISE

Human response to sound is highly individualized. Annoyance is the most common issue regarding community noise. The percentage of people claiming to be annoyed by noise generally increases with the environmental sound level. However, many factors also influence people's response to noise. The factors can include the character of the noise, the variability of the sound level, the presence of tones or impulses, and the time of day of the occurrence. Additionally, non-acoustical factors, such as the person's opinion of the noise source, the ability to adapt to the noise, the attitude towards the source and those associated with it, and the predictability of the noise, all influence people's response. As such, response to noise varies widely from one person to another and with any particular noise, individual responses will range from "not annoyed" to "highly annoyed."

When the noise level of an activity rises above 70 dBA, the chance of receiving a complaint is possible, and as the noise level rises, dissatisfaction among the public steadily increases. However, an individual's reaction to a particular noise depends on many factors, such as the source of the sound, its loudness relative to the background noise, and the time of day. The reaction to noise can also be highly subjective; the perceived effect of a particular noise can vary widely among individuals in a community.

The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on the community can be organized into six broad categories:

1. Noise-Induced Hearing Loss
2. Interference with Communication
3. Effects of Noise on Sleep
4. Effects on Performance and Behavior
5. Extra-Auditory Health Effects
6. Annoyance

Noise-Induced Hearing Loss. Although it often causes discomfort and sometimes pain, noise-induced hearing loss usually takes years to develop. Noise-induced hearing loss can impair the quality of life through a reduction in the ability to hear important sounds and to communicate with family and friends. Hearing loss is one of the most obvious and easily quantified effects of excessive exposure to noise. While the loss may be temporary at first, it could become

permanent after continued exposure. When combined with hearing loss associated with aging, the amount of hearing loss directly caused by the environment is difficult to quantify. Although the major cause of noise-induced hearing loss is occupational, substantial damage can be caused by non-occupational sources. According to the United States Public Health Service, nearly ten million of the estimated 21 million Americans with hearing impairments owe their losses to noise exposure.

Interference with Communication. Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard, depending on the circumstance. Noise can disrupt face-to-face communication and telephone communication, and the enjoyment of music and television in the home. It can also disrupt effective communication between teachers and pupils in schools and can cause fatigue and vocal strain in those who need to communicate despite the noise. Interference with communication has proved to be one of the most important components of noise-related annoyance.

Effects of Noise on Sleep. Noise-induced sleep interference is one of the critical components of community annoyance. Sound level, frequency distribution, duration, repetition, and variability can make it difficult to fall asleep and may cause momentary shifts in the natural sleep pattern, or level of sleep. It can produce short-term adverse effects on mood changes and job performance, with the possibility of more serious effects on health if it continues over long periods. Noise can cause adverse effects on task performance and behavior at work, and non-occupational and social settings. These effects are the subject of some controversy, since the presence and degree of effects depends on a variety of intervening variables. Most research in this area has focused mainly on occupational settings, where noise levels must be sufficiently high and the task sufficiently complex for effects on performance to occur.

Effects on Performance and Behavior. Recent research indicates that more moderate noise levels can produce disruptive after-effects, commonly manifested as a reduced tolerance for frustration, increased anxiety, decreased incidence of "helping" behavior, and increased incidence of "hostile" behavior.

Extra-Auditory Health Effects. Noise has been implicated in the development or exacerbation of a variety of health problems, ranging from hypertension to psychosis. As with other categories, quantifying these effects is difficult due to the number of variables that need to be considered in each situation. As a biological stressor, noise can influence the entire physiological system. Most effects seem to be transitory, but with continued exposure some effects have been shown to be chronic in laboratory animals.

Annoyance. Annoyance can be viewed as the expression of negative feelings resulting from interference with activities, as well as the disruption of one's peace of mind and the enjoyment of one's environment. Field evaluations of community annoyance are useful for predicting the consequences of planned actions involving highways, airports, road traffic, railroads, or other

noise sources. The consequences of noise-induced annoyance are privately held dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects, as discussed above. In a study conducted by the United States Department of Transportation, the effects of annoyance to the community were quantified. In areas where noise levels were consistently above 60 dBA CNEL, approximately nine percent of the community is highly annoyed. When levels exceed 65 dBA CNEL, that percentage rises to 15 percent. Although evidence for the various effects of noise have differing levels of certainty, it is clear that noise can affect human health. Most of the effects are, to a varying degree, stress related.

2.3 MOTOR VEHICLE NOISE

Roadway noise levels throughout the City were projected using the Federal Highway Administration's (FHWA) Highway Noise Prediction Model (FHWA RD-77-108) together with several roadway and site parameters. The FHWA model is based upon reference energy mean emission levels (REMELS) for automobiles, medium trucks (two axles) and heavy trucks (three or more axles), with consideration given to vehicle volume, speed, roadway configuration, distances to the receiver, and the acoustical characteristics of the site. To predict CNEL values, it is necessary to determine the hourly distribution of traffic for a typical day and adjust the traffic volume input data to yield an equivalent hourly distribution of traffic for a typical day and adjust the traffic volume input data to yield an equivalent hourly traffic volume. The California Vehicle Noise (Calveno) traffic noise emission curves are used as recommended by the California Department of Transportation (Caltrans) to more accurately calculate noise levels generated by traffic in California.

Noise projections are based on vehicular traffic as derived from site reconnaissance and the City of Placentia General Plan Mobility Element, *Update Technical Traffic Study Report*, dated August 2018 (Traffic Impact Study). These parameters determine the projected impact of vehicular traffic noise and include the roadway cross-section (i.e., number of lanes), the roadway width, the average daily traffic (ADT), vehicle travel speed, percentages of automobile and truck traffic, roadway grade, angle of view, and site conditions (hard or soft). The model does not account for ambient noise levels (i.e., noise from adjacent land uses) or topographical differences between the roadway and adjacent land uses. Existing noise contours were calculated for the City's primary and major arterials; refer to Table 2, *Existing Traffic Noise Levels*. In addition, a number of secondary and commuter streets were modeled. Noise generation for each roadway link was calculated and the distance to the 60 dBA CNEL, 65 dBA CNEL, and 70 dBA CNEL contours was determined. Exhibit 2, *Existing Roadway Noise Contours*, depicts the approximate location of the existing noise contours within the City.

Table 2
Existing Traffic Noise Levels

Roadway Segment	Existing Conditions				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Golden Avenue					
Valencia Avenue to East City Limit	3,400	57.0	59	19	6
Kraemer Boulevard to Valencia Avenue	5,400	59.0	93	29	9
Bastanchury Road					
West City Limits to Kraemer Boulevard	25,100	68.2	780	247	78
Kraemer Boulevard to Valencia Avenue	20,400	67.3	634	201	63
Valencia Avenue to East City Limit	16,800	66.6	522	165	52
Yorba Linda Boulevard					
Bradford Avenue to Kraemer Boulevard	34,300	68.1	803	254	80
Kraemer Boulevard to Valencia Avenue	26,300	67.2	617	195	62
Valencia Avenue to Rose Drive	23,400	66.7	548	173	55
Rose Drive to Eastern City Limit	25,700	67.1	603	191	60
Palm Drive					
Yorba Linda Boulevard to Valencia Avenue	8,400	62.3	197	62	20
Valencia Avenue to Rose Drive	11,000	65.9	444	140	44
Madison Avenue					
West City Limits to Bradford Avenue	6,200	59.6	107	34	11
Bradford Avenue to Kraemer Boulevard	8,600	61.2	148	47	15
Buena Vista Avenue					
Rose Drive to East City Limit	13,100	65.4	407	129	41
Alta Vista Street					
Angelina Drive to Kraemer Boulevard	4,100	55.0	35	11	4
Kraemer Boulevard to Rose Drive	15,000	66.1	466	147	47
Rose Drive to Van Buren Street	10,000	64.3	311	98	31
Chapman Avenue					
Placentia Avenue to Bradford Avenue	21,700	65.1	374	118	37
Bradford Avenue to Kraemer Boulevard	19,300	64.6	333	105	33
Kraemer Boulevard to Orangethorpe Avenue	8,000	62.0	188	59	19
Crowther Avenue					
Placentia Avenue to Melrose Street	5,200	60.3	122	39	12
Melrose Street to East City Limit	4,000	59.2	94	30	9
Orangethorpe Avenue					
Placentia Avenue to Melrose Street	23,900	66.6	560	177	56
Melrose Street to Kraemer Boulevard	17,600	65.5	413	130	41
City Limit w/o Chapman Avenue to Chapman Avenue	7,300	62.8	227	72	23
Chapman Avenue to Rose Drive	13,300	65.3	413	131	41
Rose Drive to East City Limit	13,800	65.7	429	136	43
Miraloma Avenue					
Van Buren Street to Richfield Road	5,000	58.9	86	27	9
Richfield Road to Lakeview Avenue	5,000	58.9	86	27	9
Placentia Avenue					
South City Limit to Orangethrope Avenue	11,500	63.7	270	85	27
Orangethrope Avenue to Crowther Avenue	17,400	65.4	407	129	41
Crowther Avenue to Chapman Avenue	17,700	65.5	415	131	41
Chapman Avenue to n/o Primrose Avenue	22,300	66.6	523	165	52
Macadamia Lane to Bastanchury Road	20,300	66.1	476	151	48
Bastanchury Road to Rolling Hills Drive	11,500	63.7	269	85	27

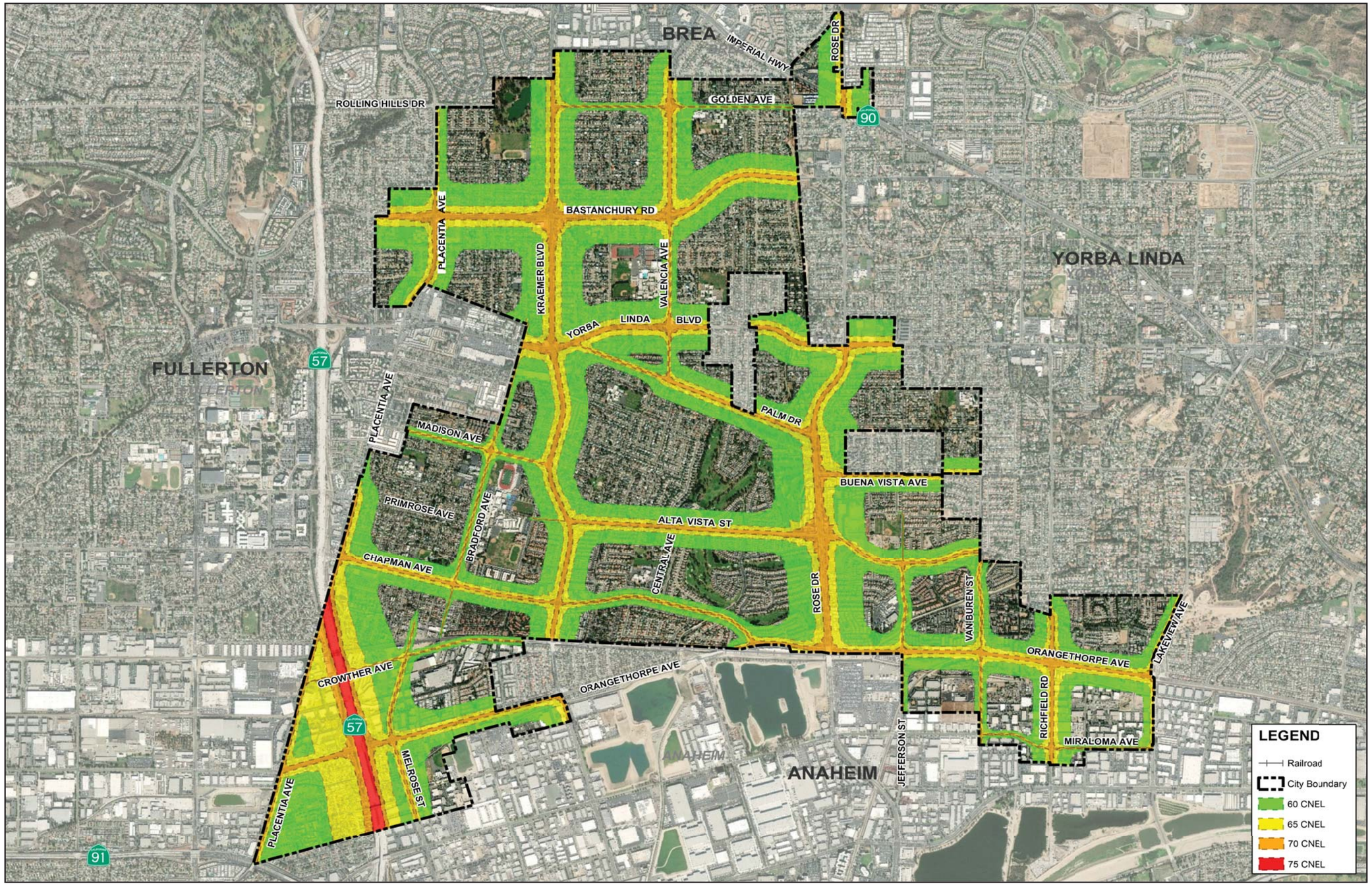
Table 2 [continued]
Existing Traffic Noise Levels

Roadway Segment	Existing Conditions				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Melrose Street					
South City Limit to Orangethorpe Avenue	15,500	63.7	267	85	27
Orangethorpe Avenue to Crowther Avenue	9,000	62.6	211	67	21
Crowther Avenue to Santa Fe Avenue	7,500	59.1	93	29	9
Bradford Avenue					
Santa Fe Avenue to Chapman Avenue	4,300	55.2	37	12	4
Chapman Avenue to Madison Avenue	9,400	60.0	116	37	12
Madison Avenue to North City Limit	11,500	60.8	142	45	14
Kraemer Boulevard					
South City Limits to Orangethorpe Avenue	23,500	66.7	551	174	55
Crowther Avenue to Chapman Avenue	21,700	66.4	509	161	51
Chapman Avenue to Madison Avenue	21,500	66.3	503	159	50
Madison Avenue to Yorba Linda Boulevard	24,600	66.9	577	182	58
Yorba Linda Boulevard to Bastanchury Road	21,800	67.6	678	214	68
Bastanchury Road to North City Limit	20,800	66.2	488	154	49
Valencia Avenue					
Palm Drive to Yorba Linda Boulevard	5,700	60.7	134	42	13
Yorba Linda Boulevard to Bastanchury Road	9,800	61.7	169	53	17
Bastanchury Road to Northern City Limit	8,300	66.3	488	154	49
Rose Drive					
Orangethorpe Avenue to Alta Vista Street	26,700	68.5	829	262	83
Alta Vista Street to Palm Drive	31,500	69.2	980	310	98
Palm Drive to Yorba Linda Boulevard	22,700	66.5	532	168	53
City Limit s/o Golden Avenue to North City Limit	24,000	66.7	563	178	56
Jefferson Street					
South City Limits to Orangethorpe Avenue	5,300	60.2	124	39	12
Orangethorpe Avenue to Alta Vista Street	4,800	61.1	149	47	15
Alta Vista Street to Garten Drive	1,900	51.7	16	5	2
Van Buren Street					
South City Limits to Orangethorpe Avenue	5,700	60.8	134	42	13
Orangethorpe Avenue to North City Limit	7,300	61.9	171	54	17
Richfield Road					
South City Limits to Orangethorpe Avenue	13,700	65.7	426	135	43
Orangethorpe Avenue to North City Limit	12,700	65.4	395	125	39
Lakeview Avenue					
South City Limit to North City Limit	7,300	63.0	227	72	23

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level
"-" = contour is located within the roadway right-of-way

Source: Traffic noise modeling is based on traffic data provided in the City of Placentia General Plan Mobility Element, *Update Technical Traffic Study*, August 2018.

As shown in Table 2, the existing traffic noise levels range from a low of 51.7 CNEL along Jefferson Street from Alta Vista Street to Garten Drive to a high of 69.2 CNEL along Rose Drive from Alta Vista Street to Palm Drive when measured at 100 feet from the centerline.



Source: City of Placentia, August 2018, ESRI.

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Existing Roadway Noise Contours

Exhibit 2

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In addition, the Proposed 2040 General Plan noise contours were calculated for the City's primary and major arterials; refer to Table 3, *Proposed 2040 General Plan Traffic Noise Levels*. Noise generation for each roadway link was calculated and the distance to the 60 dBA CNEL, 65 dBA CNEL, and 70 dBA CNEL contours was determined. Exhibit 3, *Proposed 2040 General Plan Roadway Noise Contours*, depicts the approximate location of the proposed General Plan noise contours within the City.

Table 3
Proposed 2040 General Plan Traffic Noise Levels

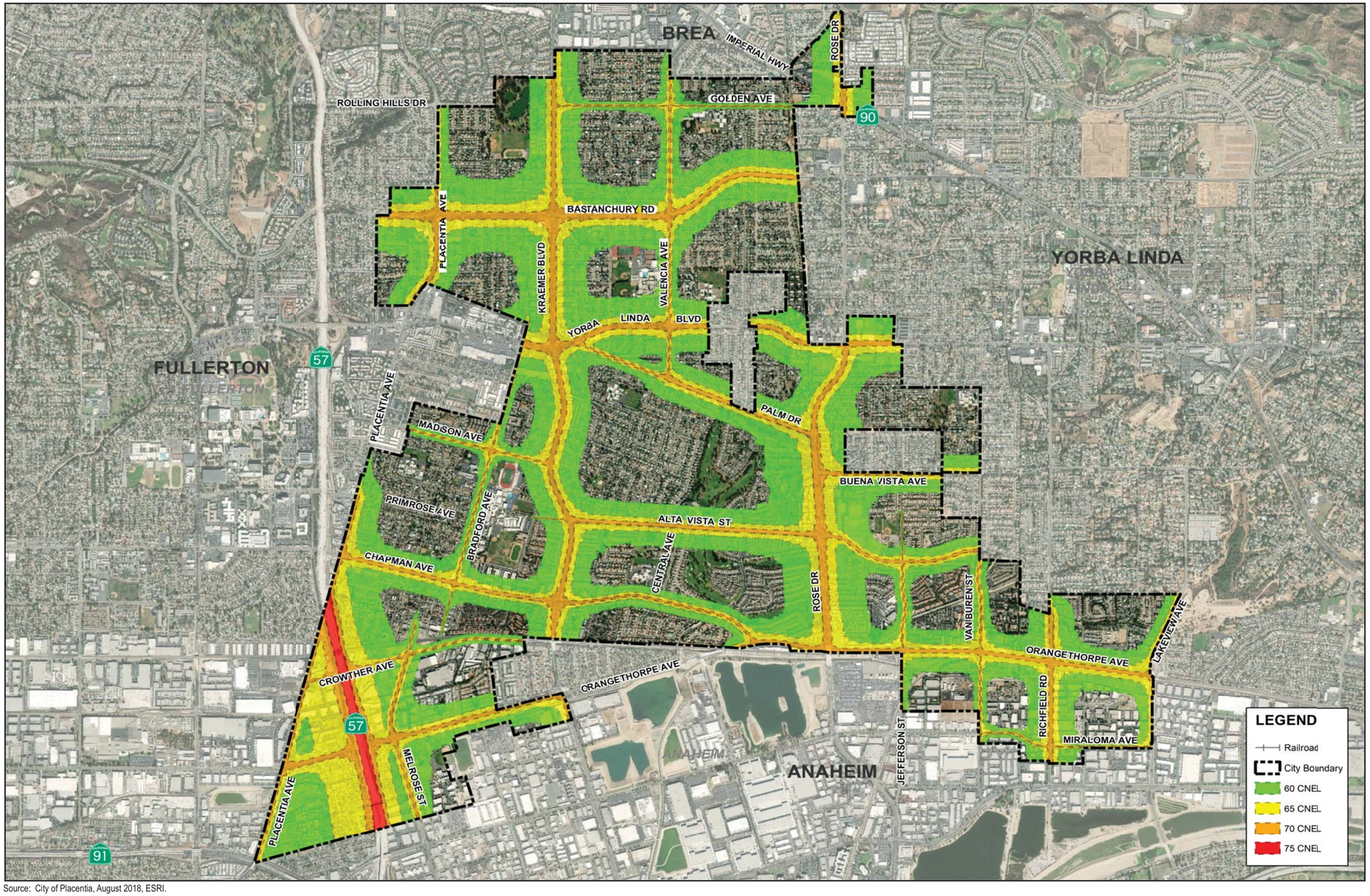
Roadway Segment	Proposed 2040 General Plan Conditions				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Golden Avenue					
Valencia Avenue to East City Limit	3,980	57.7	69	22	7
Kraemer Boulevard to Valencia Avenue	5,930	59.4	102	32	10
Bastanchury Road					
West City Limits to Kraemer Boulevard	27,910	68.7	867	274	87
Kraemer Boulevard to Valencia Avenue	22,430	67.1	697	220	70
Valencia Avenue to East City Limit	19,250	67.2	598	189	60
Yorba Linda Boulevard					
Bradford Avenue to Kraemer Boulevard	37,690	68.5	883	279	88
Kraemer Boulevard to Valencia Avenue	28,990	67.6	679	215	68
Valencia Avenue to Rose Drive	25,720	67.1	602	190	60
Rose Drive to Eastern City Limit	28,310	67.5	664	210	66
Palm Drive					
Yorba Linda Boulevard to Valencia Avenue	9,200	62.7	215	68	22
Valencia Avenue to Rose Drive	11,740	66.2	473	150	47
Madison Avenue					
West City Limits to Bradford Avenue	7,020	60.2	121	38	12
Bradford Avenue to Kraemer Boulevard	9,510	61.7	164	52	16
Buena Vista Avenue					
Rose Drive to East City Limit	14,400	65.8	447	142	45
Alta Vista Street					
Angelina Drive to Kraemer Boulevard	4,530	55.4	39	12	4
Kraemer Boulevard to Rose Drive	16,240	66.4	505	160	50
Rose Drive to Van Buren Street	10,640	64.6	331	105	33
Chapman Avenue					
Placentia Avenue to Bradford Avenue	26,790	66.0	462	146	46
Bradford Avenue to Kraemer Boulevard	22,000	65.2	379	120	38
Kraemer Boulevard to Orangethorpe Avenue	10,900	63.3	255	81	26
Crowther Avenue					
Placentia Avenue to Melrose Street	7,960	62.1	186	59	19
Melrose Street to East City Limit	5,100	60.3	119	38	12
Orangethorpe Avenue					
Placentia Avenue to Melrose Street	27,280	67.2	640	202	64
Melrose Street to Kraemer Boulevard	19,950	66.1	467	148	47
City Limit w/o Chapman Avenue to Chapman Avenue	8,870	63.7	275	87	28
Chapman Avenue to Rose Drive	17,140	66.4	533	169	53
Rose Drive to East City Limit	16,180	66.4	503	159	50

Table 3 [continued]
Proposed General Plan Traffic Noise Levels

Roadway Segment	Proposed 2040 General Plan Conditions				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Miraloma Avenue					
Van Buren Street to Richfield Road	6,530	60.1	113	36	11
Richfield Road to Lakeview Avenue	5,610	59.4	97	31	10
Placentia Avenue					
South City Limit to Orangethrope Avenue	14,240	64.6	334	106	33
Orangethrope Avenue to Crowther Avenue	22,000	66.4	515	163	52
Crowther Avenue to Chapman Avenue	19,820	66.0	464	147	46
Chapman Avenue to n/o Primrose Avenue	24,640	67.0	577	183	58
Macadamia Lane to Bastanchury Road	22,370	66.5	525	166	52
Bastanchury Road to Rolling Hills Drive	12,600	64.1	295	93	30
Melrose Street					
South City Limit to Orangethorpe Avenue	18,290	64.4	315	100	31
Orangethorpe Avenue to Crowther Avenue	12,670	64.1	297	94	30
Crowther Avenue to Santa Fe Avenue	8,620	59.7	107	34	11
Bradford Avenue					
Santa Fe Avenue to Chapman Avenue	4,690	55.6	40	13	4
Chapman Avenue to Madison Avenue	10,350	60.4	128	40	13
Madison Avenue to North City Limit	12,600	61.2	156	49	16
Kraemer Boulevard					
South City Limits to Orangethorpe Avenue	25,840	67.2	605	191	61
Crowther Avenue to Chapman Avenue	24,180	66.9	567	179	57
Chapman Avenue to Madison Avenue	24,150	66.8	566	179	57
Madison Avenue to Yorba Linda Boulevard	27,200	67.3	637	201	64
Yorba Linda Boulevard to Bastanchury Road	24,130	68.0	750	237	75
Bastanchury Road to North City Limit	22,980	66.6	538	170	54
Valencia Avenue					
Palm Drive to Yorba Linda Boulevard	6,250	61.1	147	46	15
Yorba Linda Boulevard to Bastanchury Road	10,740	62.1	185	59	19
Bastanchury Road to Northern City Limit	9,140	62.7	214	68	21
Rose Drive					
Orangethorpe Avenue to Alta Vista Street	29,460	69.0	916	290	92
Alta Vista Street to Palm Drive	34,760	69.6	1082	342	108
Palm Drive to Yorba Linda Boulevard	25,380	67.0	594	188	59
City Limit s/o Golden Avenue to North City Limit	29,680	67.6	695	220	70
Jefferson Street					
South City Limits to Orangethorpe Avenue	6,260	60.9	147	46	15
Orangethorpe Avenue to Alta Vista Street	5,530	61.8	172	54	17
Alta Vista Street to Garten Drive	2,220	52.3	19	6	2
Van Buren Street					
South City Limits to Orangethorpe Avenue	6,350	61.3	149	47	15
Orangethorpe Avenue to North City Limit	8,040	62.3	188	60	19
Richfield Road					
South City Limits to Orangethorpe Avenue	16,710	66.6	519	164	52
Orangethorpe Avenue to North City Limit	16,480	66.5	512	162	51
Lakeview Avenue					
South City Limit to North City Limit	9,570	64.1	297	94	30

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level
"-" = contour is located within the roadway right-of-way

Source: Traffic noise modeling is based on traffic data provided in the City of Placentia General Plan Mobility Element, *Update Technical Traffic Study*, August 2018.



Source: City of Placentia, August 2018, ESRI.

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CITY OF PLACENTIA
NOISE ANALYSIS

Proposed 2040 General Plan Roadway Noise Contours

Exhibit 3

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As shown in Table 3, the proposed General Plan traffic noise levels range from a low of 52.3 CNEL along Jefferson Street from Alta Vista Street to Garten Drive to a high of 69.6 CNEL along Rose Drive from Alta Vista Street to Palm Drive.

Freeways typically result in greater noise levels than other roadways due to higher traffic volumes and vehicle speeds. As shown on Exhibit 2 and Exhibit 3, SR-57 traverses the City of Placentia and represents a primary source of traffic noise in the southwestern portion of the City. The following describes the traffic volumes and general characteristics of the freeway within the City of Placentia.

- ***State Route 57.*** SR-57 is a major north-south freeway that traverses through the southwestern portion of the City of Placentia. Based on data from Caltrans, average daily traffic along the segments of SR-57 that pass through Placentia ranges from 278,400 vehicles to 279,300 vehicles for both northbound and southbound traffic.[1]

Under existing and proposed General Plan conditions, no areas within the City experience traffic noise levels in excess of 70 dBA CNEL at 100 feet from the roadway centerline. Moreover, it should be noted that the FHWA RD-77-108 models do not account for variations in topography, intervening structures, or soundwalls. However, many of the City's commercial areas experience noise levels in excess of 65 CNEL adjacent to major arterial roadways and freeway rights-of-way. Residences located within this area may experience unacceptable noise levels. It should be noted that these are modeled traffic noise levels and are not based upon actual site measurements.

2.4 TRUCK ROUTES, RAIL, AIRCRAFT/AIRPORT NOISE

TRUCK ROUTES

Truck routes direct large trucks onto roadways that are designed to accommodate them. Truck routes are typically distant from sensitive receptor locations or noise levels have been appropriately mitigated to acceptable levels. Currently, designated truck routes within the City's limit are along SR-57, Placentia Avenue, Melrose Street, Kraemer Boulevard, Rose Drive, Lakeview Avenue, Imperial Highway, Yorba Linda Boulevard, Chapman Avenue, Crowther Avenue, and Orangethorpe Avenue. Trucks must use the shortest possible route to arrive at their destination through these designated truck routes. As the City grows and traffic levels increase, there is a potential for increased truck noise conflicts with adjacent land uses.

[1] California Department of Transportation, *2016 Traffic Volumes on California State Highways*, http://www.dot.ca.gov/trafficops/census/docs/2016_aadt_volumes.pdf, accessed October 22, 2018.

RAIL NOISE

One of the primary noise sources in the City of Placentia is the BNSF Railway Company (BNSF) line located in the southern portion of the City. This rail line traverses the City in an east-west direction, generally parallel to Crowther Avenue and Orangethorpe Avenue. The railroad easement passes through residential, commercial, and industrial areas along its transect through the City. The BNSF operates a major double-track freight rail line known as the Orange County Gateway along the Orangethorpe Corridor. This rail line connects the Port of Los Angeles with the Inland Empire and Midwest United States. The track serves BNSF freight trains as well as the Metrolink 91 Line. The line supports the freight transportation needs of local industry and freight train frequency changes according to local market demand. Currently more than 70 freight trains and 12 passenger trains per day use this rail line. By Year 2030 it is forecast that over 150 trains per day will use this line.

Plans are underway to begin construction of a Metrolink commuter train station in 2019, to be located at the intersection of Melrose Avenue and Crowther Avenue.[2] Currently 10 Metrolink trains per day use this line. Metrolink train frequency is expected to increase to 13 trains per day by the time the Placentia Metrolink station is completed.

AIRCRAFT AND AIRPORT NOISE

Noise exposure contours around airports are determined from the number and type of aircraft using the airport, the magnitude and duration of each fly over, flight paths, and the time of day when flights occur. The Airport Noise Standards contained in Title 4 of the *California Administrative Code* specify that airports shall not permit noise exposures of 65 dB CNEL or greater to extend into residential or school areas. The State Aeronautics Act specifies 65 dB CNEL as the criterion which airports must meet to protect existing residential communities from unacceptable exterior exposures to aircraft noise. The exterior maximum of 65 dB CNEL is given as the level deemed acceptable to a reasonable person residing in urban residential areas where houses are of typical California construction and may have windows partially open.

There are no airports within the City of Placentia. The Fullerton Municipal Airport, approximately five miles to the west of the City, is the nearest airport to the City. The Orange County Airport Land Use Commission (ALUC) is an advisory body that ensures airport land use compatibility and reviews local agency land use actions and airport plans. Lead agencies are required to use the *Airport Land Use Planning Handbook* as a technical resource when assessing the airport related noise and safety impacts of airport vicinity projects. According to the ALUC, the City of Placentia is located outside of Fullerton Municipal Airport Impact Zone. Therefore, airport noise does not currently present annoyance within the City.

[2] KOA Corporation, *City of Placentia General Plan Mobility Element Update Technical Traffic Study*, August 2018.

2.5 STATIONARY NOISE SOURCES

Commercial and industrial land uses located near residential areas currently generate occasional noise impacts. The primary noise sources associated with these facilities are caused by delivery trucks, air compressors, generators, outdoor loudspeakers, and gas venting. Other significant stationary noise sources in the City may include noise from construction activities and landscaping equipment. Residential land uses and areas identified as noise-sensitive must be protected from excessive noise from stationary sources including commercial and industrial centers. These impacts are best controlled through effective land use planning and application of the City Noise Ordinance.

CONSTRUCTION NOISE

Construction noise is one of the most common stationary noise sources in the City. The use of pile drivers, drills, trucks, pavers, graders, and a variety of other equipment can result in short, sporadic elevated noise levels. Although construction noise impacts are generally short-term in nature, it can often disturb nearby sensitive uses.

COMMERCIAL NOISE

Commercial development covers a broad spectrum of uses including retail, office, and service commercial. Existing and future buildout of the 2040 General Plan would consist of approximately 137 acres of commercial uses, or approximately 4.1 percent of the City's total acreage. Commercial uses are primarily concentrated along major arterials in the eastern and western portions of the City, serving Placentia residents and the surrounding region. Commercial uses in the City of Placentia include Town Center, Neighborhood and Community Commercial, Commercial-Manufacturing, and Office uses.

A variety of stationary noise sources associated with commercial activities exist throughout the City of Placentia. Commercial noise sources may include mechanical equipment and engines in non-moving motors such as power tools. Additional stationary noise sources include animals, stereos, musical instruments, sporting events, and horns. These noise sources have the potential to temporarily disrupt the quietness of an area.

INDUSTRIAL NOISE

Industrial noise sources are located in industrial zoned properties throughout the City. In general, industrial noise sources are not creating large-scale problems, but some localized noise problems related to industrial sources do exist. The existing industrial designation encompasses approximately 326 acres, or eight percent of the City's total acreage. Under the proposed 2040 General Plan, future industrial uses encompass approximately 311 acres, or seven percent of the City's total acreage. Industrial developments are generally located in the southern portion of the City, adjacent to the Santa Fe Railroad. The City's Zoning Ordinance

establishes three types of districts dedicated to industrial uses, Manufacturing, Commercial Manufacturing, and Combining Planned Manufacturing districts.

Industrial land uses have the potential to generate noise that can be considered intrusive to sensitive land uses. Depending on the type of industrial operation, noise sources could involve mechanical equipment, loading and unloading of vehicles and trucks, as well as amplified or un-amplified communications. The level and intrusiveness of the noise generated also vary depending on the size and type of the facility, type of business, hours of operation, and location relative to sensitive land uses.

2.6 SENSITIVE RECEPTORS

Sensitive populations are more susceptible to the effects of noise and air pollution than are the general population. Land uses considered sensitive by the State of California include schools, playgrounds, athletic facilities, hospitals, rest homes, rehabilitation centers, long-term care, and mental care facilities. Some jurisdictions also consider day care centers, single-family dwellings, mobile home parks, churches, and libraries to be sensitive to noise and air pollutants. Generally, a sensitive receptor is identified as a location where human populations (especially children, senior citizens, and sick persons) are present, and where there is a reasonable expectation of continuous human exposure to noise.

Land uses less sensitive to noise are business, commercial, and professional developments. Noise receptors categorized as being least sensitive to noise include industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, motorcycle parks, rifle ranges, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals. These types of land uses often generate high noise levels. Moderately sensitive land uses typically include: multi-family dwellings, hotels, motels, dormitories, and outpatient clinics. Current land uses located within the City of Placentia that are sensitive to intrusive noise include residential uses, schools, libraries, hospitals, churches, and parks.

2.7 AMBIENT NOISE

Placentia's noise environment is dominated by vehicular traffic, including vehicular generated noise along SR-57 as well as major and primary arterials. The major arterials that serve the City are Imperial Highway and Orangethorpe Avenue. Additionally, Bastanchury Road between the West City Limit and Valencia Avenue, Yorba Linda Boulevard, Kraemer Boulevard, and Rose Drive within the City are designated as Modified Major Arterials. Chapman Avenue from Kraemer Boulevard to Orangethorpe Avenue and Lakeview Avenue are classified as Primary Arterials. The modified primary arterials within the City are Bastanchury Road east of Valencia Avenue and Chapman Avenue west of Kraemer Boulevard. These roadways have been designed to specifically carry large volumes, although long-established land use patterns have placed residential uses along some portions of these roadways.

NOISE MEASUREMENT SITES

Noise measurements were taken throughout the City of Placentia at 11 locations as illustrated in Exhibit 4, *Noise Measurement Locations*. Based upon the research conducted for the City's development patterns, the City was divided into Acoustical Analysis Zones (AAZ) to identify areas of homogenous acoustical conditions. Aerial imagery with a one-foot pixel resolution was utilized for a visual representation of the City's roadway and land use layout. In addition, the City's existing General Plan land use map and Zoning map were utilized to determine the City's existing and proposed patterns of development.

The noise measurement locations were selected as a representative sample of the more urbanized portions of the City in order to identify ambient baseline levels. Noise measurements were conducted during non-peak traffic hours because free flowing traffic conditions yield higher noise levels, as opposed to rush hour traffic during peak hours when vehicle speeds and heavy truck volumes are low. The noise measurements described in Table 4, *Existing Noise Levels*, were taken adjacent to major roadways in the City to determine peak noise levels at worst-case sensitive receptor locations.

Table 4
Existing Noise Levels

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Peak (dBA)	Date and Time
1	Nancita Circle cul-de-sac	61.0	50.5	73.8	91.8	June 5, 2014 8:58 a.m. – 9:08 a.m.
2	East Corbett Drive cul-de-sac; off of Buena Vista Avenue	50.1	39.6	71.0	91.8	June 5, 2014 9:23 a.m. – 9:33 a.m.
3	Wagner Park	51.0	40.4	73.8	92.6	June 5, 2014 9:46 a.m. – 9:56 a.m.
4	Koch Park	53.8	44.3	72.0	92.3	June 5, 2014 10:09 a.m. – 10:19 a.m.
5	Tri-City Park	49.7	41.1	67.5	92.8	June 5, 2014 10:32 a.m. – 10:42 a.m.
6	Beal Avenue/Stanley Avenue cul-de-sac	51.0	41.7	71.6	92.8	June 5, 2014 10:51 a.m. – 11:01 a.m.
7	Bradford Park	52.3	45.7	65.2	88.9	June 5, 2014 11:10 a.m. – 11:20 a.m.
8	Southeast corner of Kraemer Boulevard and Chapman Avenue intersection (next to apartment complex)	65.0	50.4	87.8	109.1	June 5, 2014 11:39 a.m. – 11:49 a.m.
9	Northernmost portion of Moonbeam Street, east of Placentia Avenue	44.6	52.8	48.2	71.7	June 5, 2014 1:04 p.m. – 1:14 p.m.
10	Monterey Way cul-de-sac, to the north of existing railroad	64.7	52.1	85.7	109.1	June 5, 2014 1:21 p.m. – 1:31 p.m.
11	Northernmost portion of Arnold Drive, east of Placentia Avenue	57.5	45.8	78.1	92.3	June 5, 2014 1:43 p.m. – 1:53 p.m.

L_{eq} = equivalent sound level; dBA = A-weighted decibel.
Source: Michael Baker International, *Noise Monitoring Survey*, June 5, 2014.

Noise levels at the selected sensitive receptor sites were measured by Michael Baker International on June 5, 2014, using a Brüel & Kjær model 2250 sound level meter (SLM) equipped with Brüel & Kjær pre-polarized freefield microphone, which meets standards of the American National Standards Institute (ANSI) for general environmental noise measurement instrumentation. Each measurement was for 10 minutes, and the sound meter was calibrated before each measurement was taken.

Measurement Site 1 was located within an industrial area, at the Nancita Circle cul-de-sac, to the east of Richfield Road. Sources of peak noise included a beeping sound and mechanical equipment from the adjacent industrial use, a leaf blower, two cars and one heavy truck driving along Nancita Circle. The noise level monitored at Site 1 was 61.0 dBA.

Measurement Site 2 was located within a single-family residential area at the East Corbett Drive cul-de-sac, to the south of Buena Vista Avenue. The monitored noise level was 50.1 dBA, with the majority of noise from birds chirping, traffic on Buena Vista Avenue, and dogs barking.

Measurement Site 3 was located at Wagner Park, south of Trumpet Avenue. The monitored noise level was 51.0 dBA with peak noise from cars on Trumpet Avenue, children playing outside at Wagner Elementary School to the south, and birds chirping.

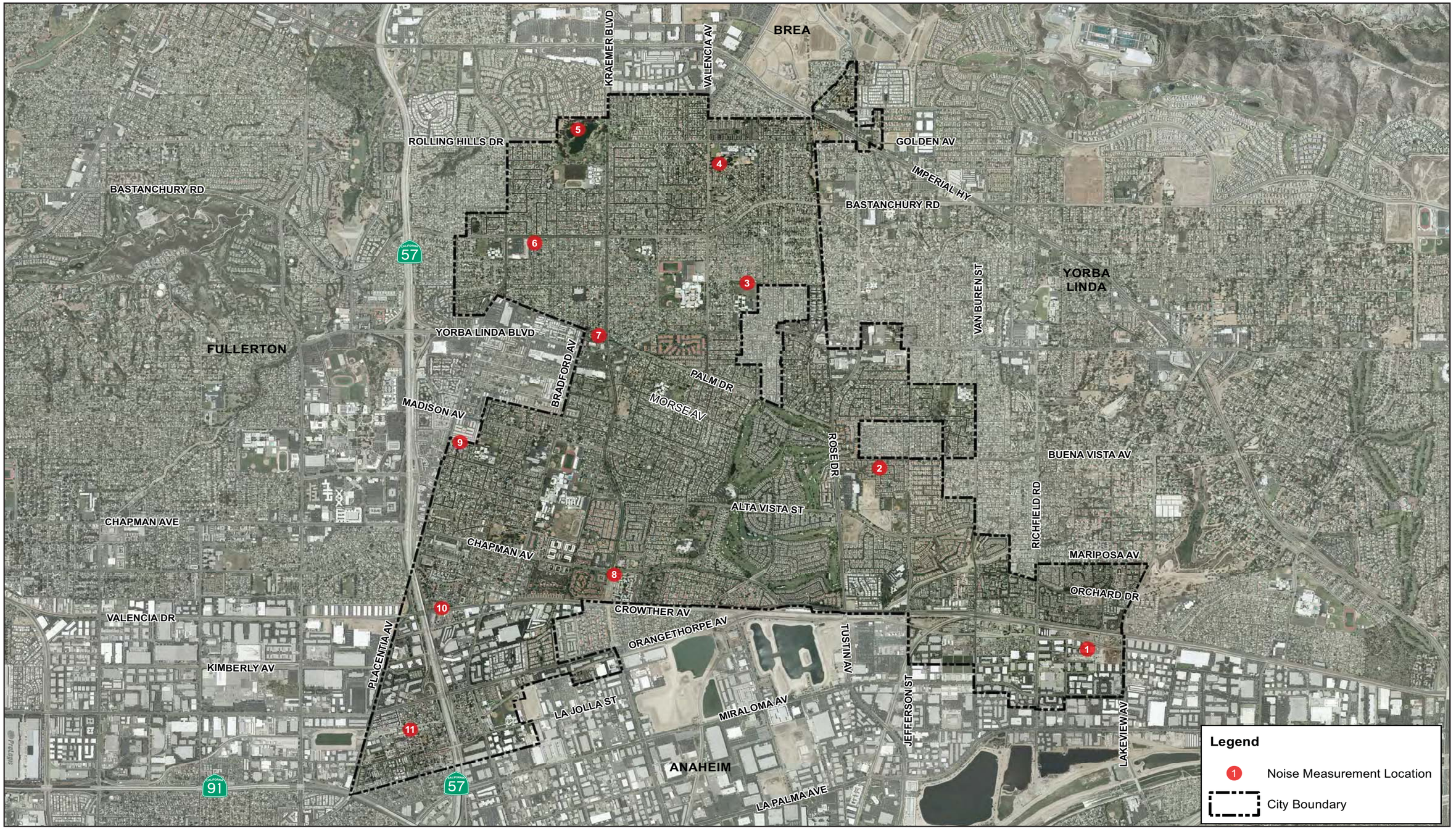
Measurement Site 4 was located at Koch Park, east of Valencia Avenue. Peak noise emanated from a leaf blower, cars driving on nearby roadways, and birds chirping. The monitored noise level was 53.8 dBA.

Measurement Site 5 was located at Tri-City Park. The monitored noise level was 49.7 dBA. The source of peak noise included people walking and talking along the adjacent pedestrian path, traffic on Kraemer Boulevard, and birds chirping.

Measurement Site 6 was located at the Beal Avenue/Stanley Avenue cul-de-sac, to the south of Bastanchury Road. The monitored noise level was 51.0 dBA. Sources of peak noise were from ambient traffic noise on nearby roadways, two cars driving by on Beal Avenue, and birds chirping.

Measurement Site 7 was located at Bradford Park, to the west of Kraemer Boulevard. Sources of peak noise included traffic on Kraemer Boulevard, an airplane flying overhead, and birds chirping. The monitored noise level was 52.3 dBA.

Measurement Site 8 was located at the southeast corner of Kraemer Boulevard and Chapman Avenue intersection, next to an existing apartment complex. Sources of peak noise included traffic on Kraemer Boulevard and Chapman Avenue, wind, and a garbage truck passing by. The monitored noise level was 65.0 dBA.



Source: Eagle Aerial 2013, County of Orange.

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CITY OF PLACENTIA
NOISE ANALYSIS

Noise Measurement Locations

Exhibit 4

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Measurement Site 9 was located within a residential area, at the northernmost portion of Moonbeam Street. Sources of peak noise included ambient traffic noise on nearby roadways, and birds chirping. The monitored noise level was 44.6 dBA.

Measurement Site 10 was located at the Monterey Way cul-de-sac, within a multi-family residential area, to the north of an existing railroad. The monitored noise level was 64.7 dBA and peak noise included traffic noise from SR-57, two trains passing by, three cars driving on Monterey Way, birds chirping, and wind.

Measurement Site 11 was located within a residential area, at the northernmost portion of Arnold Drive. Peak noise included birds chirping, wind, ambient traffic noise on nearby roadways, and two planes flying overhead. The monitored noise level was 57.5 dBA.

3.0 REGULATORY FRAMEWORK

3.1 FEDERAL

The Federal Noise Control Act of 1972 established programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In 1981, the U.S. Environmental Protection Agency (EPA) administrators determined that subjective issues such as noise would be better addressed at more local levels of government, thereby allowing more individualized control for specific issues by designated Federal, State, and local government agencies. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to specific federal agencies, and state and local governments. However, noise control guidelines and regulations contained in the EPA rulings in prior years remain in place.

3.2 STATE

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation. State regulations governing noise levels generated by individual motor vehicles (i.e., the *California Vehicle Code*) and those governing occupational noise control (i.e., Occupational Safety and Health Administration) are not applicable to planning efforts nor are these areas typically subject to CEQA analysis. Thus, these regulatory guidelines are not included in this analysis. The following is State of California and state agency regulation that has been deemed applicable to this project.

TITLE 24

In 1974, the California Commission on Housing and Community Development adopted noise insulation standards for residential buildings (*CCR Title 24*, Part 2, Chapter 12, Section 1207.11.2). *Title 24* establishes standards for interior room noise attributable to outside noise sources. *Title 24* also specifies that acoustical studies should be prepared whenever a residential building or structure is proposed to be located in areas with exterior noise levels 60 dB L_{dn} or greater. The acoustical analysis must show that the building has been designed to limit intruding noise to an interior level not exceeding 45 dB L_{dn} for any habitable room.

GOVERNOR'S OFFICE OF PLANNING AND RESEARCH

The State of California General Plan Guidelines, published by the State Governor's Office of Planning and Research (OPR), provides guidance for the acceptability of specific land use types within areas of specific noise exposure. Table 5, *Land Use Compatibility for Community Noise Environments*, presents guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control

goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. OPR guidelines are advisory in nature. Local jurisdictions, including the City of Placentia, have the responsibility to set specific noise standards based on local conditions.

Table 5
Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Exposure (CNEL)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential-Low Density, Single-Family, Duplex, Mobile Homes	50 – 60	55 - 70	70 – 75	75 – 85
Residential – Multiple Family	50 – 65	60 – 70	70 – 75	70 – 85
Transient Lodging – Motel, Hotels	50 – 65	60 – 70	70 – 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 70	60 – 70	70 – 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 – 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 – 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 – 70	NA	67.5 – 77.5	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 70	NA	70 – 80	80 – 85
Office Buildings, Business Commercial and Professional	50 – 70	67.5 – 77.5	75 – 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	70 – 80	75 – 85	NA

CNEL = community noise equivalent level; NA = not applicable

NORMALLY ACCEPTABLE: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features have been included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

NORMALLY UNACCEPTABLE: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise-insulation features must be included in the design.

CLEARLY UNACCEPTABLE: New construction or development should generally not be undertaken.

Source: Office of Planning and Research, California, *General Plan Guidelines,* 2017.

As depicted in Table 5, the range of noise exposure levels overlap between the normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable categories. The OPR's *State of California General Plan Guidelines*, note that noise planning policy needs to be rather flexible and dynamic to reflect not only technological advances in noise control, but also economic constraints governing application of noise-control technology and anticipated regional growth and demands of the community. In project specific analyses, each community must decide the level of noise exposure its residents are willing to tolerate within a limited range of values below the known levels of health impairment. Therefore, the City may use their discretion to determine which noise levels are considered acceptable or unacceptable, based on land use, project location, and other project factors.

3.3 LOCAL

CITY OF PLACENTIA GENERAL PLAN

The State of California has mandated that local governments prepare a noise element as part of their general plans. The Noise Element of the proposed General Plan will be the guiding document for the City's noise policy and contains various goals and accompanying policies and objectives designed to protect residents and businesses from excessive and persistent noise intrusions. The Noise Element will describe the existing noise environment, goals and policies, as well as Federal, State and City noise regulations.

CITY OF PLACENTIA MUNICIPAL CODE

The City of Placentia's regulations with respect to noise are included in Chapter 23.76 (Noise Control) of Title 23 (Zoning) of the Municipal Code, also known as the Noise Ordinance. Construction-related and operational noise restrictions are discussed below.

Section 23.76.010 of the Noise Ordinance sets forth the general prohibition:

> *In order to control unnecessary, excessive and annoying sounds emanating from incorporated areas of the city, it is declared to be the policy of the city to prohibit such sounds generated from all sources as specified in this chapter.*
>
> *It is determined that certain noise levels are detrimental to the public health, welfare and safety and contrary to public interest, therefore, the city council declares that creating, maintaining, causing or allowing to create, maintain or cause any noise in a manner prohibited by or not in conformity with the provisions of this chapter is a public nuisance and shall be punishable as such. (Ord. 75-O-105 § 1, 1975)*

Section 23.76.040 assigns three noise zones for the properties within the City of Placentia as follows:

Noise Zone 1:	All Residential Property
Noise Zone 2:	All Commercial Property
Noise Zone 3:	All Industrial Property

Sections 23.76.050 (a) and 23.76.060 (a) define the exterior and interior noise level limits for residential, commercial, and industrial land uses (Noise Zone 1 through 3); refer to Table 6, *City of Placentia Noise Level Limits*. The City does not have specific interior noise level limits for commercial and industrial land uses (Zone 2 and 3).

Table 6
City of Placentia Noise Level Limits

Noise Zone	Noise Level Limits dBA L_{eq}– 1-hour average	Time Period
Exterior Noise Standard		
1	55	7:00 a.m. – 10:00 p.m.
	50	10:00 p.m. – 7:00 a.m.
2	65	Anytime
3	70	Anytime
Interior Noise Standard		
1	55	7:00 a.m. – 10:00 p.m.
	45	10:00 p.m. – 7:00 a.m.
Noise Zone 1: All Residential Property Noise Zone 2: All Commercial Property Noise Zone 3: All Industrial Property		
Source: City of Placentia, City of Placentia Municipal Code Sections 23.76.050 and 23.76.060, March 2018.		

It should be noted that in the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by 5 dBA.

Sections 23.76.050 (b) and 23.76.060 (b) identify how the noise level limits identified in Sections 23.76.050 (a) and 23.76.060 (a), Table 6 above, will be enforced.

Sections 23.76.050 (b) states "It is unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential, commercial, or industrial property, either incorporated or unincorporated to exceed:

1. The noise standards for a cumulative period of time more than 30 minutes in any hour; or

2. The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour; or

3. The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour; or

4. The noise standard plus 15 dBA for a cumulative period of more than one minute in any hour; or

5. The noise standard plus 20 dBA for any period of time."

Section 23.76.050 (c) states "In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level."

Additionally, Section 23.76.050 (d) states "In the event that the noise source and the affected property are within different noise zones, the noise standard applicable to the affected property shall apply." (Ord. 75-O-105 § 5, 1975)

Sections 23.76.060 (b) states "It is unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level when measured within any other dwelling unit on any residential property, either incorporated or unincorporated, to exceed:

1. The interior noise standard for a cumulative period of more than 5 minutes in any hour; or

2. The interior noise standard plus 5 dBA for a cumulative period of more than one minute in any hour; or

3. The interior noise standard plus 10 dBA for any period of time."

Section 23.76.060 (c) states "In the event the ambient noise level exceeds either of the first two noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level." (Ord. 75-O-105 § 6, 1975)

Section 23.76.080 (Schools, hospitals and churches - Special provisions) states "It is unlawful for any person to create any noise which causes the noise level at any school, hospital or church while the same is in use to exceed the noise limits as specified in Section 23.76.050 prescribed for the assigned noise zone in which the school, hospital or church is located, or which noise level unreasonably interferes with the use of such institutions or which unreasonably disturbs or annoys patients in the hospital; provided conspicuous signs are displayed in three separate locations within one-tenth (1/10) of a mile of the institution indicating the presence of a school, church, or hospital. (Ord. 75-O-105 § 8, 1975)."

Construction Noise

Section 23.81.170 (Grading, construction and maintenance of real property) of the Chapter 23.81 (General Regulations and Exceptions) is the relevant ordinance controlling construction noise.

According to the Section 23.81.170, all grading of any real property shall be permitted only between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday, and between the hours of 9:00 a.m. and 6:00 p.m. on Saturday, and shall be prohibited at any time on Sunday and on all federal holidays, unless other hours are approved by the chief building official or city engineer upon receipt of evidence that an emergency exists which would constitute a hazard to persons or property.

Table 7, *Construction, Remodeling, and Maintenance Hours*, depicts permitted time periods for construction activities and the maintenance of real property.

Table 7
Construction, Remodeling, and Maintenance Hours

Activity	Monday – Friday	Saturday	Sunday
Initial Construction	7:00 a.m. – 7:00 p.m.	9:00 a.m. – 6:00 p.m.	Prohibited
Remodeling, Repair work	7:00 a.m. – 7:00 p.m.	9:00 a.m. – 6:00 p.m.	10:00 a.m. – 5:00 p.m.
Maintenance of real property	7:00 a.m. – 7:00 p.m.	9:00 a.m. – 6:00 p.m.	10:00 a.m. – 5:00 p.m.
Source: City of Placentia, City of Placentia Municipal Code Section 23.81.170, March 2018.			

Section 23.81.170 of the Municipal Code also notes the following:

1. Initial construction work includes new residential, commercial, and industrial developments. These are projects constructed on vacant property, which require the approval of the planning commission and, in particular cases, approval by the city council.

2. Remodeling, repair work pertains to construction activity on properties where structures already exist. This includes structural additions, rehabilitation work, miscellaneous projects, re-roofing, the construction of swimming pools, etc. These projects typically require over-the-counter permit approval only.

3. Maintenance of real property including, but not limited to: the mowing of lawns, trimming of trees and shrubs, general landscape maintenance. (Ord. 94-O-143 § 1, 1994)

Vibration

Vibrations caused by construction activities can be interpreted as energy transmitted in waves through the soil mass. These energy waves generally dissipate with distance from the vibration source as a result of spreading of the energy and frictional losses. The energy transmitted through the ground as vibration, if great enough, can result in structural damage. To assess the potential for structural damage associated with vibration from construction activities, the vibratory ground motion in the vicinity of an affected structure is measured in terms of peak particle velocity (PPV), typically in units of inches/second.

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