Acoustical Assessment
for the proposed
Mockingbird Lane Project
in the City of Sonoma, California

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LIST OF ABBREVIATED TERMS

ADT	Average Daily Traffic
ANSI	American National Standards Institute
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
DNL	day-night average
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
HVAC	heating, ventilation, and air conditioning
Hz	hertz
L_{dn}	day-night average sound level
L_{eq}	Equivalent Sound Level
L_{max}	maximum A-weighted sound level
L_{min}	minimum A-weighted sound level
L_{dn}	day-night average sound level
L_{eq}	Equivalent Sound Level
mm	millimeter
mph	miles per hour

1 INTRODUCTION

The purpose of this Acoustical Assessment is to evaluate potential impacts associated with construction and operations of the proposed Mockingbird Lane Project (project), located in the City of Sonoma, California.

1.1 PROJECT LOCATION

The project site is located on the northwest corner of Fourth Street West and West MacArthur Street at 853 Fourth Street East in the City of Sonoma, California.

1.2 PROJECT DESCRIPTION

The Mockingbird Lane project is a proposed residential community designed to be consistent with the Sonoma Residential land use and zoning guidelines, and the existing character of the surrounding community and the City of Sonoma. The proposed project would include a total of 20 units on 18 lots, including four units in duplexes, together with 12 accessory dwelling units (ADUs), as allowed under the City's Development Code; refer to Exhibit 1: Site Plan.

The proposed project is primarily composed of alley style homes (garages accessed from rear, private alley way) with only two plans having front and rear loaded driveways. The project includes front porch elements to allow for creative/drought tolerant designs that would enhance the streetscape. The proposed ADUs would be on the rear of the residential lots and access their parking from the private alley way that can be accessed from both Hayes Street and 4th Street West.

Exhibit 1: Site Plan

2 FUNDAMENTALS OF SOUND AND ENVIRONMENTAL NOISE

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g., air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or annoying sound. In acoustics, the fundamental model consists of a sound (or noise) source, a receptor, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receptor determine the sound level and characteristics of the noise perceived by the receptor. Acoustics deals primarily with the propagation and control of sound. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness. Table 1: Typical Noise Levels, provides typical noise levels associated with common activities.

Table 1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	– 80 –	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	**– 70 –**	Vacuum cleaner at 10 feet
Commercial area		Normal Speech at 3 feet
Heavy traffic at 300 feet	**– 60 –**	
		Large business office
Quiet urban daytime	**– 50 –**	Dishwasher in next room
Quiet urban nighttime	**– 40 –**	Theater, large conference room (background)
Quiet suburban nighttime		
	– 30 –	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	– 20 –	
		Broadcast/recording studio
	– 10 –	
Lowest threshold of human hearing	**– 0 –**	Lowest threshold of human hearing

dBA = A-weighted decibels; mph = miles per hour

Source: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

Noise Descriptors

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The equivalent noise level (L_{eq}) is a measure of the average noise level averaged over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Most commonly, environmental sounds are described in terms of an average level (L_{eq}) that has the same acoustical energy as the summation of all the time-varying events. Each is applicable to this analysis and defined in Table 2: Definitions of Acoustical Terms.

Table 2: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micropascals (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micropascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	A 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level, CNEL	A 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

The A-weighted decibel sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Type 1 sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA.[1] Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source.

A-Weighted Decibels

The perceived loudness of sounds is dependent on 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 can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The decibel scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound and twice as loud as a 60 dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

Sound Propagation and Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed

[1] California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in A-weighted noise levels (dBA), the following relationships should be noted:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference.
- A change in level of at least 5 dBA is required before any noticeable change in community response would be expected. An increase of 5 dBA is typically considered substantial.
- A 10 dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the state of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise.

3.1 STATE OF CALIFORNIA

California Government Code

California Government Code Section 65302 (f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Title 24 – Building Code

The state's noise insulation standards are codified in the California Code of Regulations, Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for the purpose of interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new multi-family residential buildings, the acceptable interior noise limit for new construction is 45 dBA CNEL.

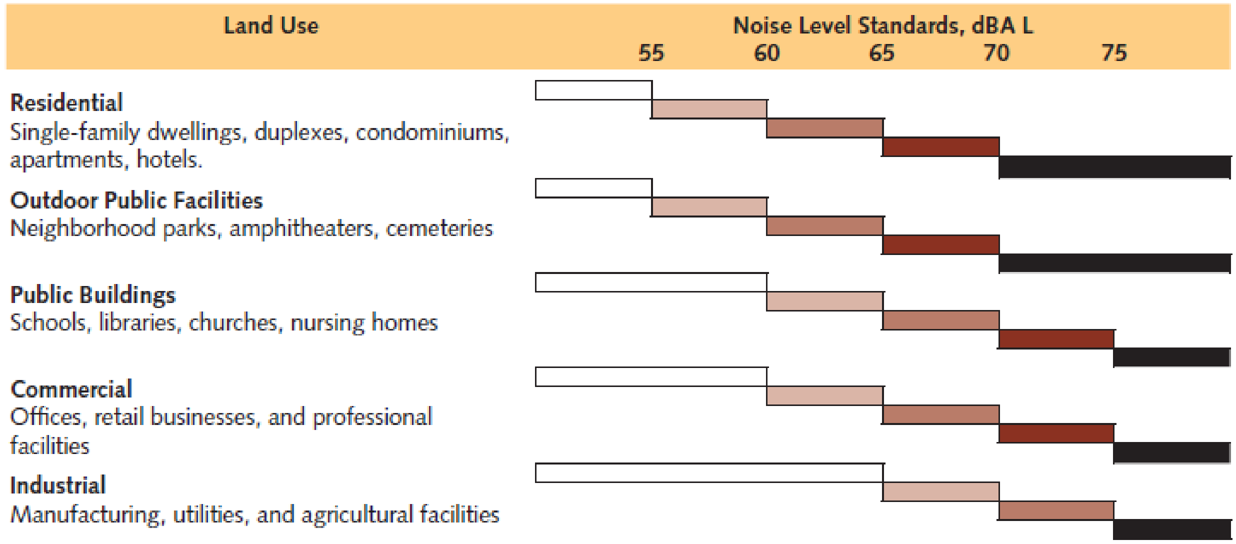
3.2 CITY OF SONOMA

City of Sonoma General Plan Noise Element

The City of Sonoma General Plan contains policies related to noise in its Noise Element; refer to Table 3: Sonoma General Plan Goal, Policies, and Implementation Measures. The City also discusses how ambient noise should influence land use and development decisions and includes a table of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable uses at different noise levels expressed in CNEL. These land use compatibility guidelines are shown in Exhibit 2: Acceptable Outdoor Noise Levels.

Table 3: Sonoma General Plan Goal, Policies, and Implementation Measures	
Goal PS-1: Achieve noise compatibility between existing and new development to preserve the quiet atmosphere of Sonoma and quality of life.	
Policies	**Implementation Measures**
1.1 Apply the following standards for maximum Ldn levels to citywide development: *45 Ldn*: For indoor environments in all residential units. *60 Ldn*: For outdoor environments around all residential developments and outdoor public facilities (e.g., parks). *65 Ldn*: For outdoor environments around commercial and public buildings (libraries and churches). *70 Ldn*: For outdoor environments around industrial buildings.	1.1.1 Require all acoustical analyses necessary to demonstrate project compliance with City standards to contain: a. A summary of noise data collected, including identification of noise sources and their characteristics, a description of the methodology used to determine noise levels, and quantification of existing and future Ldn on the site. b. Figures illustrating the spatial relationship of noise sources and the project site. c. A description of project-related impacts on noise levels in the surrounding area, based on the standards adopted in this element. d. Specifications for noise mitigation measures and an analysis of their effectiveness in mitigating noise levels to accepted standards.
1.2 Consider imposing more restrictive standards in locations that may be especially sensitive to noise.	1.2.1 Monitor noise complaint reports annually to determine if existing regulations are maintaining acceptable community-wide noise levels and/or sensitivity thresholds.
1.3 Require adequate mitigation of potential noise from all proposed development.	1.3.1 Require project design modifications as necessary to adequately mitigate potential noise impacts, including: a. Locating usable outdoor areas (yards, patios, balconies) and noise-sensitive indoor areas (bedrooms, living rooms, windows) where noise levels will be lowest. b. Locating noise-compatible uses (open space, parking garages, other buildings) to shield noise-sensitive uses (e.g., residences, hospitals, convalescent homes) from major noise sources. c. Using berms, walls, fences, setbacks, dense plantings and other buffers to shield projects from noise sources.
Policy 1.4 Evaluate proposed development using the Noise Assessment Guide and require an acoustical study when it is not certain that a proposed project can adequately mitigate potential noise impacts.	Implemented through the project review process and the Noise Assessment Guide.
1.5 Encourage all development to minimize noise intrusions through project design.	See measure 1.3.1, above.
1.6 Minimize noise impacts of vehicle idling.	1.6.1 Require buses and trucks parked anywhere in the city for longer than five minutes to shut off their engines, except when they are actively unloading or loading passengers or goods.
City of Sonoma, *2020 General Plan*, October 2006.	

Exhibit 2: Acceptable Outdoor Noise Levels



Clearly Acceptable

The activities associated with the specified use can be carried out with virtually no interference from noise.

Normally Acceptable

Occasional slight interference with outdoor activities may occur. Conventional structures will ensure that interior noise levels are compatible with indoor activities and with indoor activities if windows are open. New construction should only be undertaken following a noise study and subject to implementation of noise reduction measures to upgrade conditions to normally acceptable levels.

Conditionally Acceptable

The indicated noise levels will cause moderate interference with outdoor activities and with indoor activities if windows are open. New construction should only be undertaken following a noise study and subject to the implementation of noise reduction measures to upgrade conditions to normally acceptable levels.

Normally Unacceptable

Noise will create substantial interference with indoor and outdoor activities. New construction should be discouraged. If construction does occur, noise mitigation should be required to bring exterior levels up to normally acceptable levels and interior levels in compliance with state law.

Clearly Unacceptable

Unacceptable noise intrusion upon land use activities will occur. Adequate structural insulation will be impractical under most circumstances. New construction is generally not recommended.

Source: City of Sonoma, *2020 General Plan, Chapter 6, Noise Element*, October 2006.

City of Sonoma Municipal Code

Chapter 9.56 of the City's Municipal Code provides additional provision for restrictions and regulations for noise within the City of Sonoma. The regulations shown on Table 4: City of Sonoma General Noise Limits, are provided in the City's Municipal Code which addresses construction and stationary operational noise.

Table 4: City of Sonoma General Noise Limits

Property Type or Zone	Daytime Limits	Nighttime Limits
Residential	60 dBA Intermittent 50 dBA Constant	50 dBA Intermittent 40 dBA Constant
Commercial/Mixed Use	65 dBA Intermittent 55 dBA Constant	65 dBA Intermittent 55 dBA Constant
Public Property	Most restrictive noise limit applicable to adjoining private property	

Source: City of Sonoma Municipal Code Chapter 9.56

Section 9.56.050 of the City of Sonoma Municipal Code provides the following exceptions to general noise limits:

The following standard exceptions to the provisions of the Sonoma Municipal Code Section 9.56.040 shall be allowed as of right, to the extent and during the hours specified.

A. *Construction. Except as otherwise provided in subsection (B) of this section, or by the planning commission or city council as part of the development review for the Project, on any construction project on property within the city, construction, alteration, demolition, maintenance of construction equipment, deliveries of materials or equipment, or repair activities otherwise allowed under applicable law shall be allowed as follows: (1) between 8:00 a.m. and 6:00 p.m., Monday through Friday, (2) between 9:00 a.m. and 6:00 p.m. on Saturday, and (3) between 10:00 a.m. and 6:00 p.m. on Sundays and holidays; however, the noise level at any point outside of the property plane of the Project shall not exceed 90 dBA.*

9.56.060 Exceptions allowed with permit.

A. *In addition to the standard exceptions permitted pursuant to SMC 9.56.050, the city planner or his designee may grant a permit allowing an exception from any or all provisions of this chapter where the applicant can show that a diligent investigation of available noise abatement techniques indicates that compliance with the requirements of this chapter would be impractical or unreasonable. Any such permit shall be issued with appropriate conditions to minimize the public detriment caused by the permitted exceptions. Any such permit shall be of such duration as approved by the city planner or his designee, up to a maximum period of three months, but shall be renewable upon a showing of good cause, and shall be conditioned by a schedule for compliance and details of methods thereof in appropriate cases. In the discretion of the city planner or his designee, an exception permit may be issued and reissued for successive short periods of time in order to allow monitoring of the adverse noise impacts of the excepted activity, and additional conditions may be imposed upon reissuance of the permit, if the city planner or his designee determines that* *such additional conditions are necessary to mitigate noise impacts from the excepted activity to a level he deems acceptable under all the circumstances.*

B. *Any application for an exception permit under this section shall be accompanied by a fee to be set by resolution of the city council.*

C. *Any person aggrieved with the decision of the city planner or his designee may appeal to the city council, by writing filed with the city clerk within 10 business days after the date of such decision, however, such appeal shall not stay the effective date of the permit. (Ord. 03-2006 § 2, 2006).*

4 EXISTING CONDITIONS

4.1 NOISE MEASUREMENTS

To determine ambient noise levels in the project area, four 10-minute noise measurements were taken using a 3M SoundPro DL-1 Type I integrating sound level meter between 10:53 a.m. and 11:55 a.m. on October 17, 2018; refer to Appendix A: Noise Data for existing noise measurement data. The primary noise sources during all three measurements was traffic on the surrounding roadways. Table 5: Noise Measurements, provides the ambient noise levels measured at these locations.

Table 5: Noise Measurements

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Time
1	Surface parking lot north of project site	42.8	37.9	61.3	11:56 a.m.
2	Eastern terminus of Nicoli Lane	43.6	33.8	63.5	12:16 p.m.
3	Northwest corner of the Hayes Street and MacArthur Street intersection	55.2	39.8	66.9	12:33 p.m.
Source: Noise measurements taken by Kimley-Horn on October 17, 2018.					

4.2 SENSITIVE RECEPTORS

Noise exposure standards and guidelines for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Residences, hospitals, schools, guest lodging, libraries, and churches are treated as the most sensitive to noise intrusion and therefore have more stringent noise exposure targets than do other uses, such as manufacturing or agricultural uses that are not subject to impacts such as sleep disturbance. Sensitive receptors near the project site primarily consist of residences adjacent to the east and west. Residences are also located to the south across West MacArthur Street and to the north across the adjacent parking lot.

4.3 EXISTING NOISE LEVELS

Mobile Sources

The project site is surrounded by residential uses. The majority of the existing mobile noise in the project area is generated from vehicle sources along MacArthur Street and 5th Street West.

Stationary Sources

The primary sources of stationary noise in the project vicinity are those associated with the operations of adjacent residential uses to the north, south, east, and west. The noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term/continuous noise.

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA THRESHOLDS

The proposed project qualifies for exemption from CEQA in accordance with Section 15332 of the State CEQA Guidelines for in-fill development projects. The exemption applies because the project is in an urbanized area.

The environmental analysis in this memorandum is patterned after the Initial Study Checklist recommended by the *CEQA Guidelines*, as amended to support the CEQA exemption and demonstrate that the project would not result in noise impacts. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this section. Accordingly, a project may have a significant adverse impact related to noise and vibration if it would do any of the following:

- Expose persons to, or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Expose persons to or generate excessive ground borne vibration or ground borne noise levels;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; and
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

6 POTENTIAL IMPACTS AND MITIGATION

6.1 ACOUSTICAL IMPACTS

Threshold 6.1 Would the project expose persons to, or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Threshold 6.3 Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Threshold 6.4 Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Construction

There are two types of short-term noise impacts associated with construction, noise generated from equipment and increase in traffic flow on local streets.

Equipment Noise

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Noise levels typically attenuate (or drop off) at a rate of 6 dB per doubling of distance from point sources, such as industrial machinery.

Construction of the proposed project involves site preparation, grading, paving, building construction, and architectural coating. Groundborne noise and other types of construction-related noise impacts would typically occur during excavation activities of the grading phase. This phase of construction has the potential to create the highest levels of noise. It should be noted that only a limited amount of equipment can operate near a given location at a particular time. Equipment typically used during this stage includes heavy-duty trucks, backhoes, bulldozers, excavators, front-end loaders, and scrapers.

Maximum noise levels generated by construction equipment are shown in Table 6: Maximum Noise Levels Generated by Construction Equipment. It should be noted that the noise levels identified in Table 6 are maximum sound levels (L_{max}), which are the highest individual sound occurring at an individual time period. Operating cycles for these types of construction equipment may involve one or two minutes of full-power operation followed by three to four minutes at lower power settings. Other primary sources of noise would be shorter-duration incidents, such as dropping large pieces of equipment or the hydraulic movement of machinery lifts, which would last less than one minute. No pile-driving will be used during construction for the proposed project.

Sensitive receptors surrounding the project site include residences located approximately 50 feet to the east and west of the project site. These sensitive receptors may be exposed to elevated noise levels during project construction. However, construction noise would be acoustically dispersed throughout the project site and not concentrated in one area near surrounding sensitive uses. The majority of construction equipment would be located 75-100 feet or more away from the project boundaries, within the interior of the project site.

Table 6: Maximum Noise Levels Generated by Construction Equipment

Type of Equipment	Typical Noise Level (dBA L_{max}) at 50 Feet from Source	Typical Noise Level (dBA L_{max}) at 75 Feet from Source	Typical Noise Level (dBA L_{max}) at 100 Feet from Source
Air Compressor	91	87	85
Backhoe	80	76	74
Compactor	82	78	76
Concrete Mixer	85	81	79
Concrete Vibrator	76	72	70
Crane, Mobile	83	79	77
Dozer	85	81	79
Generator	81	77	75
Grader	85	81	79
Impact Wrench	85	81	79
Jackhammer	88	84	82
Loader	85	81	79
Truck	88	84	82
Paver	89	85	83
Pneumatic Tool	85	81	79
Roller	74	70	68
Saw	76	72	70

Source: Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054),* January 2006.

The City's Noise Ordinance does not establish quantitative construction noise standards. Instead, the Noise Ordinance has established allowable hours of construction. Section 9.56.050 of the City's Municipal Code exempts noise associated with construction, repair, remodeling, or grading of any real property from the noise limitations of the municipal code, provided that construction activities take place between the hours of 8:00 a.m. and 6:00 p.m. on weekdays, between 9:00 a.m. and 6:00 p.m. on Saturday, and between 10:00 a.m. and 6:00 p.m. on Sundays and holidays. Additionally, the Municipal Code specifies that the noise level at any point outside of the property plane of the project shall not exceed 90 dBA. As shown in Table 6, maximum noise levels would not exceed 90 dBA at 75 feet away. This is a conservative estimate of the closest that equipment would be from a sensitive receptor. Thus, a less than significant noise impact would result from construction activities.

Operations

Traffic Noise

Implementation of the project would generate increased traffic volumes along study roadway segments. According to the transportation analysis memorandum, the project would result in a net total of 1,988 average daily weekday trips, which would result in noise increases on project area roadways. In general, a traffic noise increase of less than 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable.[2] Generally, traffic volumes on project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3 dBA. Therefore, permanent increases in ambient noise levels of less than 3 dBA are considered to be less than significant.

Future development generated by the proposed project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise in the vicinity of existing and proposed land uses. Based on the project Traffic Impact Study, the proposed project would result in approximately 268 net new daily trips. This increase in daily trips (268) along would be nominal compared to the allowed traffic volume on the surrounding roadways; therefore, traffic noise associated with the proposed project on off-site roadways would be minimal.[3] Traffic associated with the proposed project would not result in noise levels that would be measurable or perceptible compared to existing conditions based on the existing noise levels. Therefore, a less than significant impact would occur in this regard.

Stationary Noise Sources

Implementation of the proposed project would create new sources of noise in the project vicinity. Noise that is typical of residential areas includes group conversations, pet noise, and general maintenance activities. Noise from residential stationary sources would primarily occur during the "daytime" activity hours of 7:00 a.m. to 9:00 p.m. Furthermore, the residences would be required to comply with the noise standards set forth in the City's General Plan and Municipal Code.

Mechanical Equipment

The proposed project would generate stationary-source noise associated with heating, ventilation, and air conditioning (HVAC) units. HVAC units typically generate noise levels of approximately 55 dBA at a reference distance of 50 feet from the operating units during maximum heating or air conditioning operations. The nearest existing sensitive receptors are located approximately 50 feet from the project site property line. The mechanical equipment associated with the proposed residences would be similar to the existing uses and would also be buffered by the surrounding roadways, the adjacent parking lot, and proposed setbacks and would be approximately 100 feet away from the closest residences. At this distance HVAC noise would attenuate to 49 dBA or less, which is below the City's 50 dBA noise standard. Given that existing and project-related sensitive receptors would be located beyond 100 feet from on-site HVAC units, noise generated by HVAC units would not result in a significant impact.

Landscape Maintenance Activities

Development and operation of the proposed project would introduce new landscaping requiring periodic maintenance. Noise generated by a gasoline-powered lawnmower is estimated to be approximately 70 dBA at a distance of five feet. However, maintenance activities would operate during daytime hours for brief periods of time as allowed by the Chapter 9.60 of the City Municipal Code and would not permanently increase ambient noise levels in the project vicinity. Therefore, with adherence to the City's Municipal Code, impacts associated with landscape maintenance would be less than significant.

[2] California Department of Transportation, *Technical Noise Supplement to Traffic Noise Analysis Protocol*, September 2013.
[3] According to the California Department of Transportation, *Technical Noise Supplement to Traffic Noise Analysis Protocol* (September 2013), it takes a doubling of traffic to create a noticeable (i.e., 3 dBA) noise increase.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact with mitigation.

Threshold 6.2 Would the project expose persons to or generate excessive ground borne vibration or ground borne noise levels?

Construction

Increases in groundborne vibration levels attributable to the proposed project would be primarily associated with construction-related activities. Construction on the project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, depending on the building category of the nearest buildings adjacent to the potential pile driving area, the potential construction vibration damage criteria vary. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.50 inch per second (in/sec) peak particle velocity (PPV) is considered safe and would not result in any construction vibration damage. The FTA architectural damage criterion for continuous vibrations for non-engineered timber and masonry buildings (i.e., 0.20 inch/second) appears to be conservative. The types of construction vibration impact include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment.

Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. Project construction would not require the use of pile drivers. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Since there are no established vibration standards in the City of Sonoma, this evaluation uses the Federal Transit Administration (2006) recommended standard of 0.2 inches per second peak particle velocity with respect to the prevention of structural damage for normal buildings. This measurement is also the level at which vibrations may begin to annoy people inside buildings.[4]

Table 7: Typical Construction Equipment Vibration Levels, identifies vibration levels feet for typical construction equipment. Based on FTA data, vibration velocities from typical heavy construction

[4] California Department of Transportation, *Construction Vibration Guidance Manual*, September 2013.

equipment operations that would be used during project construction would range from 0.003 to 0.210 inch/second PPV at 25 feet from the source of activity. It is also acknowledged that construction activities would occur throughout the project site and would not be concentrated at the point closest to the nearest structure.

Table 7: Typical Construction Equipment Vibration Levels

Equipment Type	Peak Particle Velocity at 25 Feet (inches per second)	Peak Particle Velocity at 50 Feet (inches per second)
Large Bulldozer	0.089	0.031
Caisson Drilling	0.089	0.031
Loaded Trucks	0.076	0.027
Rock Breaker	0.059	0.021
Jackhammer	0.035	0.012
Small Bulldozer/Tractor	0.003	0.001

Notes:
1. Calculated using the following formula:
$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$
where: PPV (equip) = the peak particle velocity in inch per second of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in inch per second from Table 12-2 of the FTA Transit Noise and Vibration Impact Assessment Guidelines
D = the distance from the equipment to the receiver

Source: Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment,* 2006. FTA-VA-90-1003-06.

The nearest sensitive receptors would be approximately 50 feet to the east and west. Based on typical vibration levels, ground vibration generated by heavy-duty equipment could reach levels of 0.031 inches per second peak particle velocity at 50 feet. The use of construction equipment would not result in a groundborne vibration velocity level above the established threshold of 0.2 inches per second PPV. As a result, impacts associated with excessive groundborne vibration during construction would be less than significant.

Operational

The proposed project would not generate groundborne vibration that could be felt at surrounding uses. The project would not involve railroads or substantial heavy truck operations. As a result, impacts from vibration associated with project operation would be less than significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.5 For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Threshold 6.6 For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

The nearest public airport is the Sonoma Skypark located approximately 2.3 miles southeast of the project site. The next closest airport near the project site is the Sonoma Valley Airport, approximately 4.3 miles to the south. As such, the project is not located within an airport land use plan nor is it located within two miles of a public airport. Therefore, no impacts would occur. Additionally, there are no private airstrips or airports near the project site. Therefore, no impacts would occur.

Mitigation Measures: No mitigation is required.

Level of Significance: No impact.

CUMULATIVE NOISE IMPACTS

The project's construction activities would not result in a substantial temporary increase in ambient noise levels. As discussed in Threshold 6.4, these temporary noise levels would not exceed 90 dBA for the surrounding residential units. There would be periodic, temporary, noise impacts that would cease upon completion of construction activities. The project would contribute to and construction noise impacts should other development proximate to the project site occur concurrent with the proposed project.

However, based on the noise analysis above, impacts from the project's noise would be less than significant with mitigation. Based on the fact that noise dissipates as it travels away from its source, noise impacts from on-site activities and other stationary sources would be limited to the project site and vicinity. Thus, cumulative operational noise impacts from related projects, in conjunction with project-specific noise impacts, would not be cumulatively significant.

CONCLUSION

Project implementation would result in less than significant short- and long-term noise impacts. No mitigation measures would be required. Therefore, the proposed project would not result in significant effects related to Section 15332(d) of the State CEQA Guidelines.

7 REFERENCES

1. California Department of Transportation, *Construction Vibration Guidance Manual*, September 2013.
2. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.
3. City of Sonoma, *2020 General Plan*, October 2006.
4. City of Sonoma, *Sonoma Municipal Code*, March 2018.
5. Cyril Harris, *Handbook of Noise Control, Second Edition*, 1979.
6. Cyril M. Harris, *Noise Control in Buildings – A Practical Guide for Architects and Engineers*, 1994.
7. Federal Highway Administration (FHWA), *Roadway Construction Noise Model (RCNM) User's Guide,* 2006 FHWA-HEP-05-054.
8. Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment,* 2006. FTA-VA-90-1003-06.
9. U.S. Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, November 1979.
10. William Hezmalhalch Architects, Inc. (WHA), *Mockingbird Lane Site Plan,* September 18, 2018.
11. W-Trans, *Traffic Impact Study for the 853 Fourth Street West Project,* June 15, 2018.

Appendix A

Existing Ambient Noise Measurements

Noise Measurement Field Data

Project:	Mockingbird Lane Sonoma	**Job Number:**	
Site No.:	#1	**Date:**	10/17/2018
Analyst:	Noemi Wyss	**Time:**	11:56 AM
Location:	surface parking lot		
Noise Sources:	birds, airplanes, parking lot noise (cars, doors slamming, talking)		
Comments:			

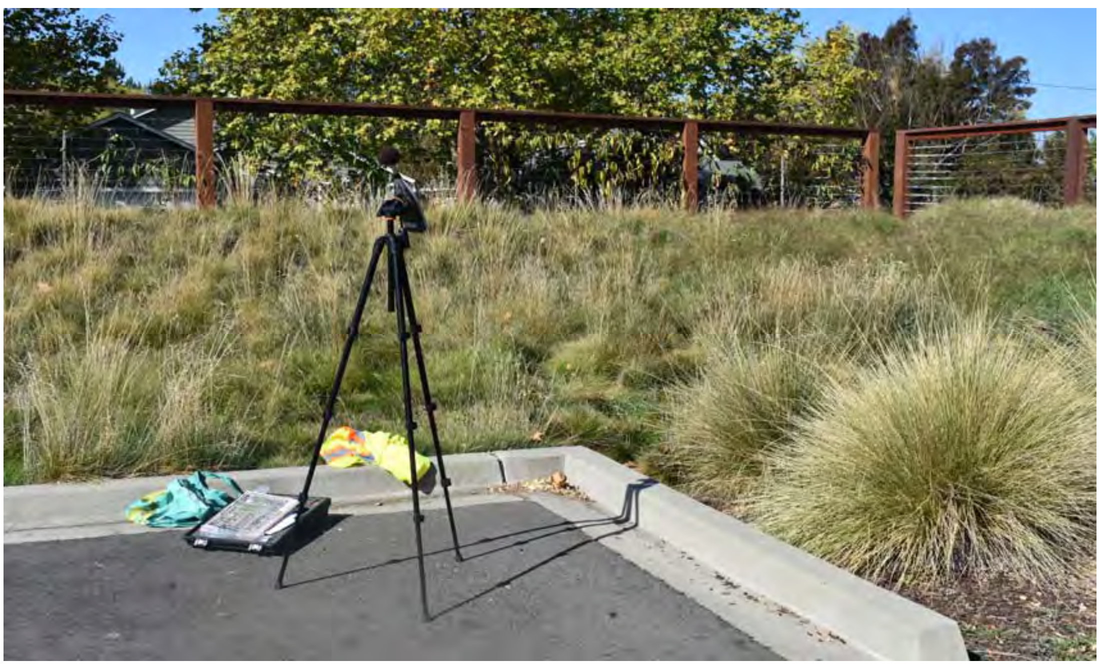
Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
42.8	37.9	61.3	91.1

Equipment	
Sound Level Meter:	SoundPro DL
Calibrator:	QC-10
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	62
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30
Humidity:	67%

Photo:



Kimley»Horn

Session Report

10/18/2018

Information Panel

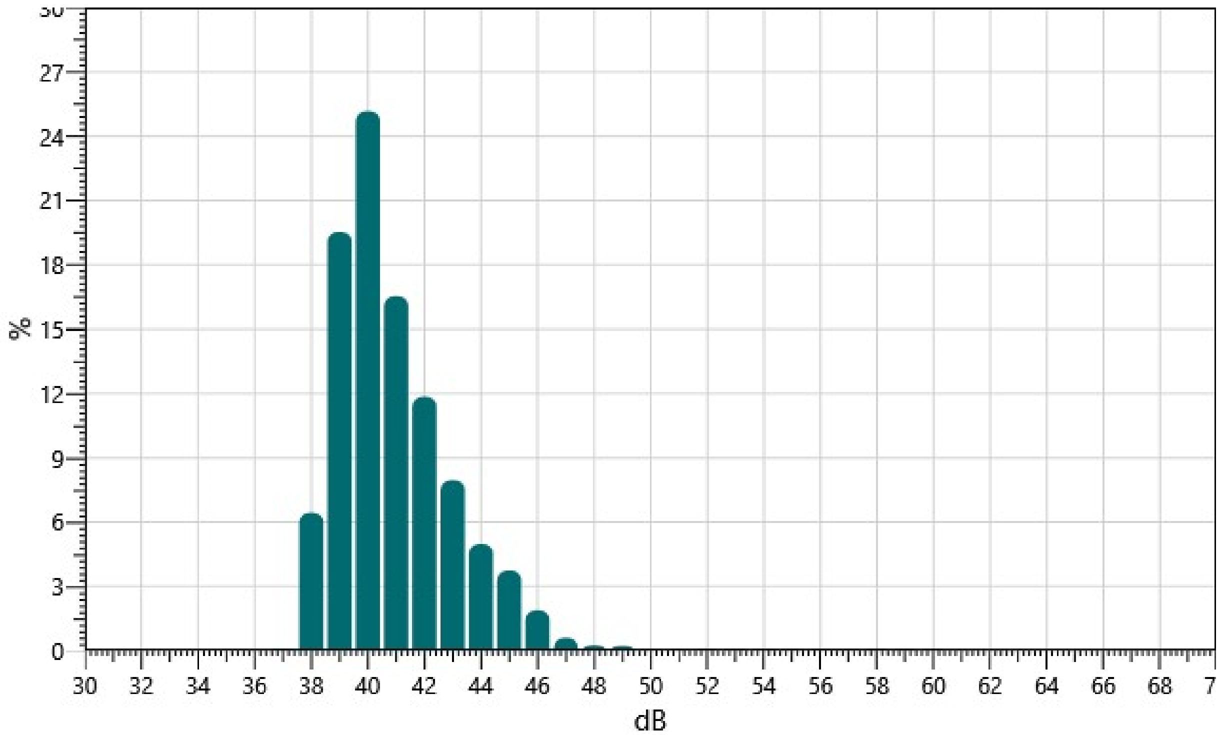
Name	Mockingbird #1
Start Time	10/17/2018 1:57:29 PM
Stop Time	10/17/2018 2:11:33 PM
Device Name	BLM090002
Model Type	SoundPro DL
Device Firmware Rev	R.13E
Comments	

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	42.8 dB	CNEL	1	42.8 dB
Dose	1	0 %	Dose8	1	0 %
Exp Hrs	1	0 Pa^2-Hours	Exp Sec	1	0 Pa^2-Sec
L1	1	48.9 dB	L10	1	44.3 dB
L50	1	40.8 dB	L90	1	39 dB
LDN	1	42.8 dB	Lmax	1	61.3 dB
Lmin	1	37.9 dB	Lpk	1	91.1 dB
Mntime	1	10/17/2018 2:04:12 PM	Mxtime	1	10/17/2018 2:00:29 PM
OL%	1	0 %	Pdose (8:00)	1	0 %
PKtime	1	10/17/2018 2:11:23 PM	ProjectedTWA (8:00)	1	42.8 dB
Rtime	1	00:14:04	SEL	1	72 dB
Takt	1	44.7 dB	TWA	1	27.4 dB
UL Time	1	00:00:00	UR%	1	0 %
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	OFF
Exchange Rate	2	5 dB	Weighting	2	C
Response	2	FAST			

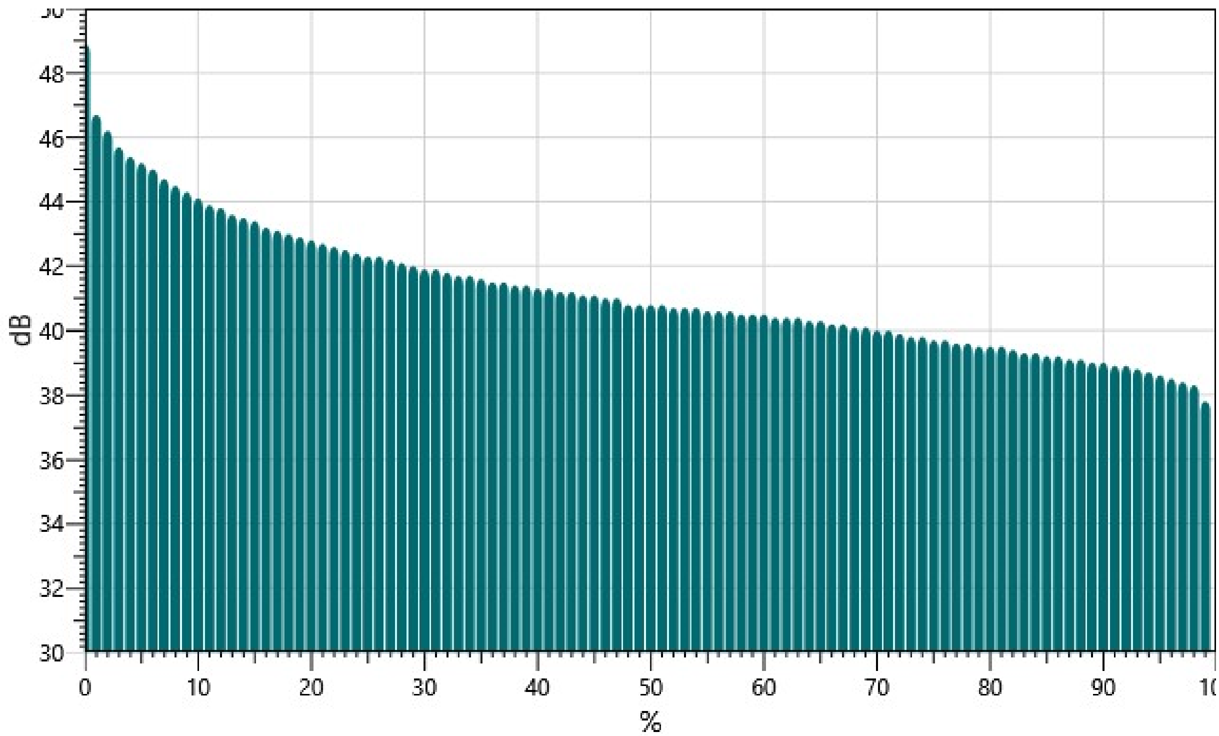
Statistics Chart

Mockingbird #1: Statistics Chart



Exceedance Chart

Mockingbird #1: Exceedance Chart



Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
30:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
38:	0.11	0.34	0.21	0.24	0.62	0.74	0.92	1.13	1.05	1.07	6.43
39:	1.78	2.33	2.09	1.61	1.70	1.92	2.30	2.12	1.94	1.74	19.53
40:	1.65	1.64	1.70	2.22	2.29	3.18	2.77	3.07	3.32	3.32	25.16
41:	0.00	2.35	2.14	2.05	1.98	1.84	1.53	1.60	1.51	1.53	16.53
42:	1.30	1.26	1.42	1.27	1.17	1.23	1.25	1.07	1.03	0.83	11.84
43:	0.94	0.94	0.83	0.84	0.71	0.70	0.67	0.80	0.83	0.69	7.95
44:	0.68	0.60	0.40	0.58	0.53	0.45	0.51	0.49	0.36	0.38	4.98
45:	0.47	0.50	0.44	0.37	0.51	0.43	0.31	0.26	0.21	0.23	3.74
46:	0.31	0.19	0.19	0.17	0.19	0.19	0.24	0.18	0.14	0.08	1.88
47:	0.08	0.10	0.06	0.07	0.05	0.07	0.08	0.03	0.02	0.04	0.59
48:	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.03	0.02	0.25
49:	0.04	0.03	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.23
50:	0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.06
51:	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.07
52:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.08
53:	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.07
54:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.08
55:	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.07
56:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.06
57:	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.06
58:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.09
59:	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.07
60:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.06
61:	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
62:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
63:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
64:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

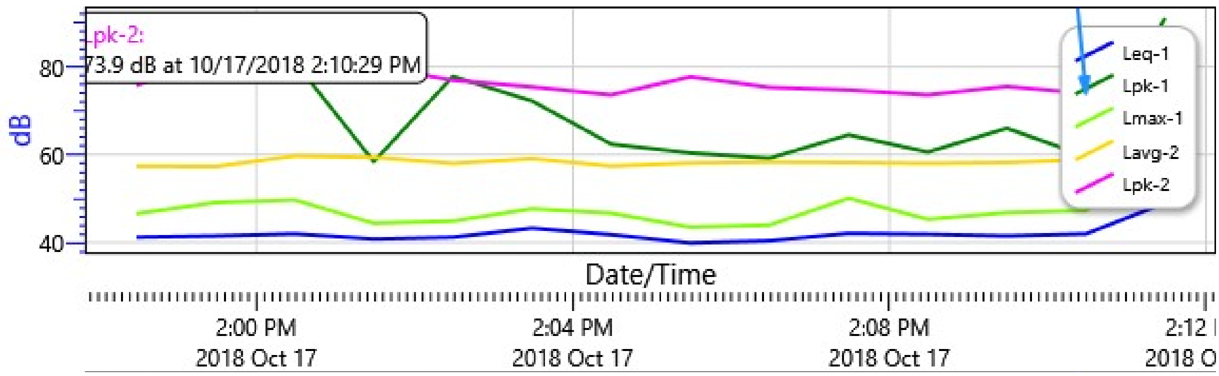
65:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
66:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
68:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
69:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9
0%:		48.9	46.7	46.2	45.7	45.4	45.2	45.0	44.7	44.5
10%:	44.3	44.1	43.9	43.8	43.6	43.5	43.4	43.2	43.1	43.0
20%:	42.9	42.8	42.7	42.6	42.5	42.4	42.3	42.3	42.2	42.1
30%:	42.0	41.9	41.9	41.8	41.7	41.7	41.6	41.5	41.5	41.4
40%:	41.4	41.3	41.3	41.2	41.2	41.1	41.1	41.0	41.0	40.8
50%:	40.8	40.8	40.8	40.7	40.7	40.7	40.6	40.6	40.6	40.5
60%:	40.5	40.5	40.4	40.4	40.4	40.3	40.3	40.2	40.2	40.1
70%:	40.1	40.0	40.0	39.9	39.8	39.8	39.7	39.7	39.6	39.6
80%:	39.5	39.5	39.5	39.4	39.3	39.3	39.2	39.2	39.1	39.1
90%:	39.0	39.0	38.9	38.9	38.8	38.7	38.6	38.5	38.4	38.3
100%:	37.8									

Logged Data Chart

Mockingbird #1: Logged Data Chart



Noise Measurement Field Data

Project:	Mockingbird Lane Sonoma	**Job Number:**	
Site No.:	#2	**Date:**	10/17/2018
Analyst:	Noemi Wyss	**Time:**	12:16 PM
Location:	End of Nicoli Lane		
Noise Sources:	dogs, ducks, birds, airplanes, one car, people talking		
Comments:	quiet residential street		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
43.6	33.8	63.5	89.9

Equipment	
Sound Level Meter:	SoundPro DL
Calibrator:	QC-10
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	62
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30
Humidity:	67%

Photo:

Kimley»Horn

Session Report

10/18/2018

Information Panel

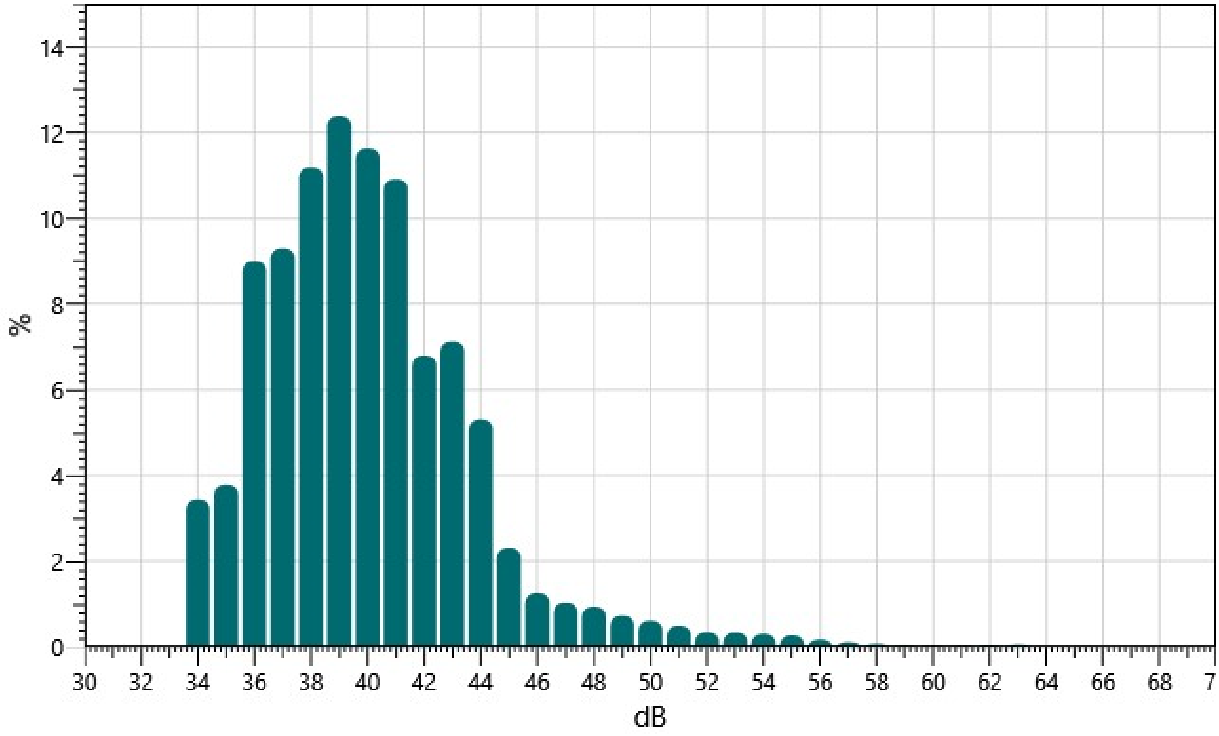
Name	Mockingbird #2
Start Time	10/17/2018 2:18:17 PM
Stop Time	10/17/2018 2:29:28 PM
Device Name	BLM090002
Model Type	SoundPro DL
Device Firmware Rev	R.13E
Comments	

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	43.6 dB	CNEL	1	43.6 dB
Dose	1	0 %	Dose8	1	0 %
Exp Hrs	1	0 Pa^2-Hours	Exp Sec	1	0 Pa^2-Sec
L1	1	54.3 dB	L10	1	44.7 dB
L50	1	39.9 dB	L90	1	36.3 dB
LDN	1	43.6 dB	Lmax	1	63.5 dB
Lmin	1	33.8 dB	Lpk	1	89.9 dB
Mntime	1	10/17/2018 2:25:25 PM	Mxtime	1	10/17/2018 2:20:39 PM
OL%	1	0 %	Pdose (8:00)	1	0 %
PKtime	1	10/17/2018 2:28:56 PM	ProjectedTWA (8:00)	1	43.6 dB
Rtime	1	00:11:11	SEL	1	71.9 dB
Takt	1	47.1 dB	TWA	1	27.3 dB
UL Time	1	00:00:00	UR%	1	3.4 %
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	OFF
Exchange Rate	2	5 dB	Weighting	2	C
Response	2	FAST			

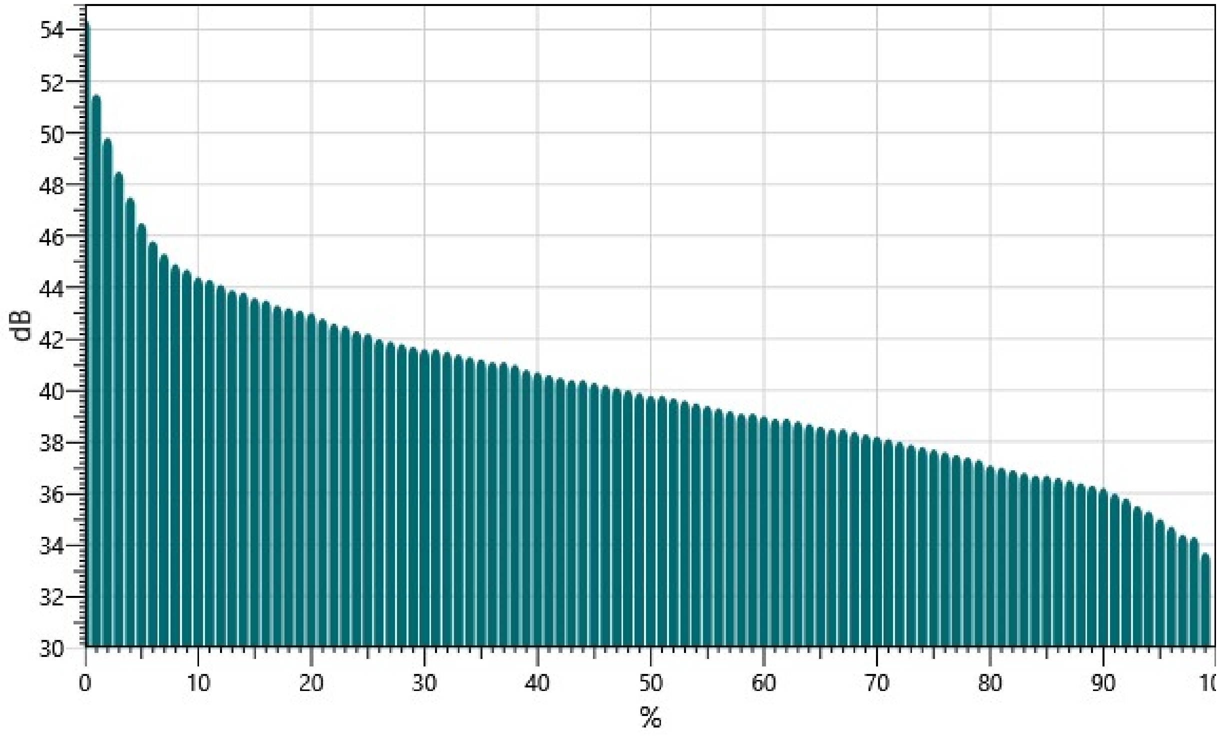
Statistics Chart

Mockingbird #2: Statistics Chart



Exceedance Chart

Mockingbird #2: Exceedance Chart



Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
30:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
34:	0.21	0.17	0.14	0.35	0.70	0.49	0.68	0.00	0.32	0.35	3.43
35:	0.34	0.46	0.24	0.35	0.38	0.48	0.54	0.54	0.00	0.45	3.78
36:	0.45	0.45	0.54	0.68	0.79	1.03	0.96	1.50	1.49	1.10	9.00
37:	1.05	1.04	1.12	0.00	1.06	0.90	0.97	1.27	0.88	1.00	9.29
38:	0.70	1.23	0.95	1.12	1.16	1.28	1.26	1.30	1.05	1.11	11.18
39:	1.39	1.58	1.36	1.32	1.16	1.11	0.98	1.07	1.26	1.16	12.38
40:	1.44	1.05	0.98	1.20	1.19	1.10	1.00	1.15	1.19	1.32	11.62
41:	0.00	1.22	1.15	1.17	1.24	1.29	1.21	1.49	1.18	0.95	10.91
42:	0.82	0.82	0.75	0.58	0.59	0.63	0.64	0.61	0.69	0.66	6.79
43:	0.56	0.71	0.93	0.85	0.79	0.69	0.67	0.68	0.63	0.62	7.12
44:	0.71	0.61	0.52	0.58	0.51	0.59	0.49	0.45	0.51	0.32	5.30
45:	0.31	0.23	0.24	0.24	0.21	0.23	0.24	0.24	0.19	0.18	2.31
46:	0.15	0.15	0.15	0.14	0.11	0.10	0.11	0.12	0.12	0.11	1.25
47:	0.12	0.11	0.08	0.11	0.10	0.10	0.10	0.10	0.10	0.11	1.03
48:	0.10	0.10	0.09	0.09	0.09	0.11	0.09	0.10	0.08	0.08	0.94
49:	0.09	0.06	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.07	0.73
50:	0.07	0.07	0.05	0.07	0.07	0.06	0.06	0.05	0.06	0.06	0.61
51:	0.05	0.05	0.05	0.06	0.06	0.06	0.04	0.05	0.04	0.04	0.49
52:	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.03	0.34
53:	0.04	0.04	0.02	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.34
54:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.02	0.30
55:	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.27
56:	0.02	0.02	0.01	0.02	0.03	0.01	0.03	0.01	0.01	0.01	0.17
57:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.11
58:	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.07
59:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
60:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
61:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
62:	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.05
63:	0.02	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.06
64:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

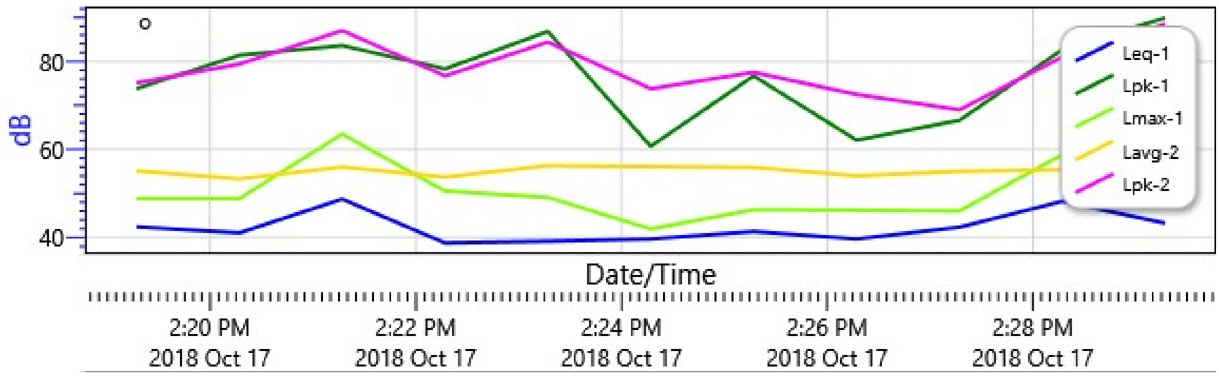
65:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
66:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
67:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
68:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
69:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9
0%:		54.4	51.5	49.8	48.5	47.5	46.5	45.8	45.3	44.9
10%:	44.7	44.4	44.3	44.1	43.9	43.8	43.6	43.5	43.3	43.2
20%:	43.1	43.0	42.8	42.6	42.5	42.3	42.2	42.0	41.9	41.8
30%:	41.7	41.6	41.6	41.5	41.4	41.3	41.2	41.1	41.1	41.0
40%:	40.8	40.7	40.6	40.5	40.4	40.4	40.3	40.2	40.1	40.0
50%:	39.9	39.8	39.8	39.7	39.6	39.5	39.4	39.3	39.2	39.1
60%:	39.1	39.0	38.9	38.9	38.8	38.7	38.6	38.5	38.5	38.4
70%:	38.3	38.2	38.1	38.0	37.9	37.8	37.7	37.6	37.5	37.4
80%:	37.3	37.1	37.0	36.9	36.8	36.7	36.7	36.6	36.5	36.4
90%:	36.3	36.2	36.0	35.8	35.5	35.3	35.0	34.7	34.4	34.3
100%:	33.7									

Logged Data Chart

Mockingbird #2: Logged Data Chart



Noise Measurement Field Data

Project:	Mockingbird Lane Sonoma	**Job Number:**	
Site No.:	#3	**Date:**	10/17/2018
Analyst:	Noemi Wyss	**Time:**	12:33 PM
Location:	Hayes and West MacArthur Street		
Noise Sources:	cars on MacArthur, birds, airplanes		
Comments:	placed on sidewalk		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
55.2	39.8	66.9	85.8

Equipment	
Sound Level Meter:	SoundPro DL-1
Calibrator:	QC-10
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	64
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30
Humidity:	58%

Photo:

Kimley»Horn

Session Report

10/18/2018

Information Panel

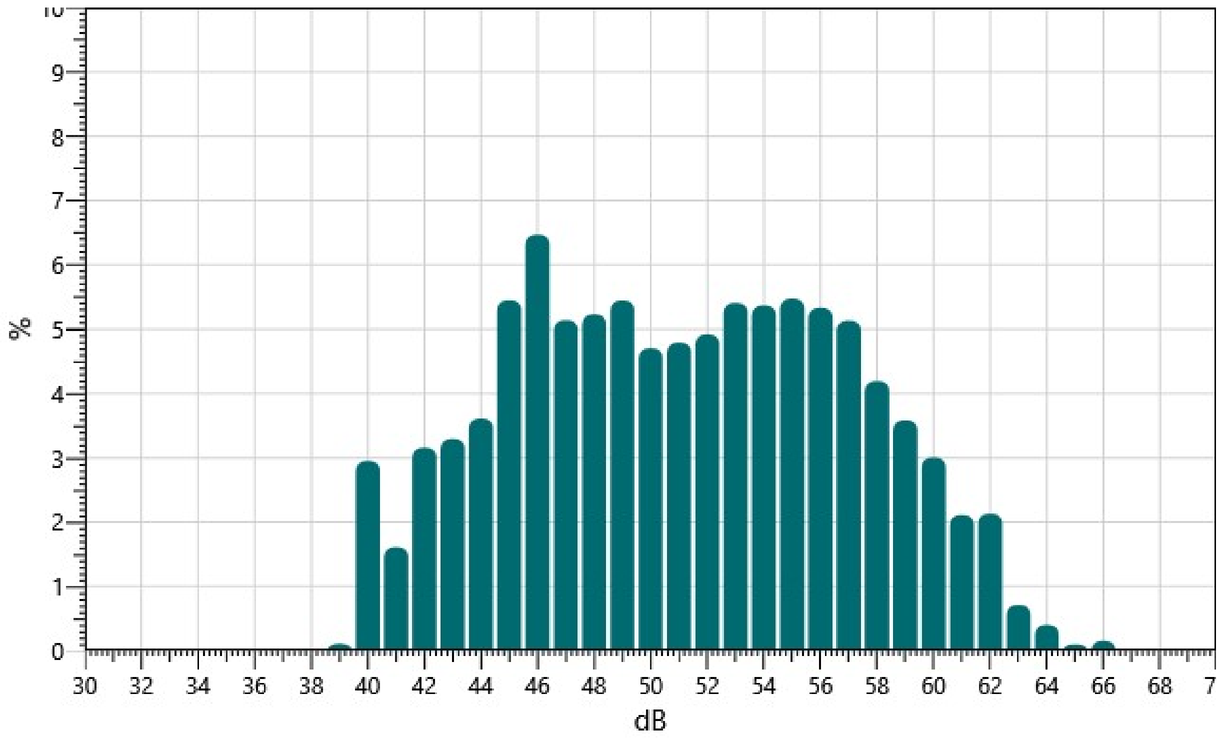
Name	Mockingbird #3
Start Time	10/17/2018 2:34:07 PM
Stop Time	10/17/2018 2:45:24 PM
Device Name	BLM090002
Model Type	SoundPro DL
Device Firmware Rev	R.13E
Comments	

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	55.2 dB	CNEL	1	55.2 dB
Dose	1	0 %	Dose8	1	0.1 %
Exp Hrs	1	0 Pa²-Hours	Exp Sec	1	0.1 Pa²-Sec
L1	1	63.2 dB	L10	1	59.4 dB
L50	1	51.4 dB	L90	1	43.5 dB
LDN	1	55.2 dB	Lmax	1	66.9 dB
Lmin	1	39.8 dB	Lpk	1	85.8 dB
Mntime	1	10/17/2018 2:44:43 PM	Mxtime	1	10/17/2018 2:39:22 PM
OL%	1	0 %	Pdose (8:00)	1	0.1 %
PKtime	1	10/17/2018 2:35:25 PM	ProjectedTWA (8:00)	1	55.2 dB
Rtime	1	00:11:17	SEL	1	83.5 dB
Takt	1	57.7 dB	TWA	1	38.9 dB
UL Time	1	00:00:00	UR%	1	0 %
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	OFF
Exchange Rate	2	5 dB	Weighting	2	C
Response	2	FAST			

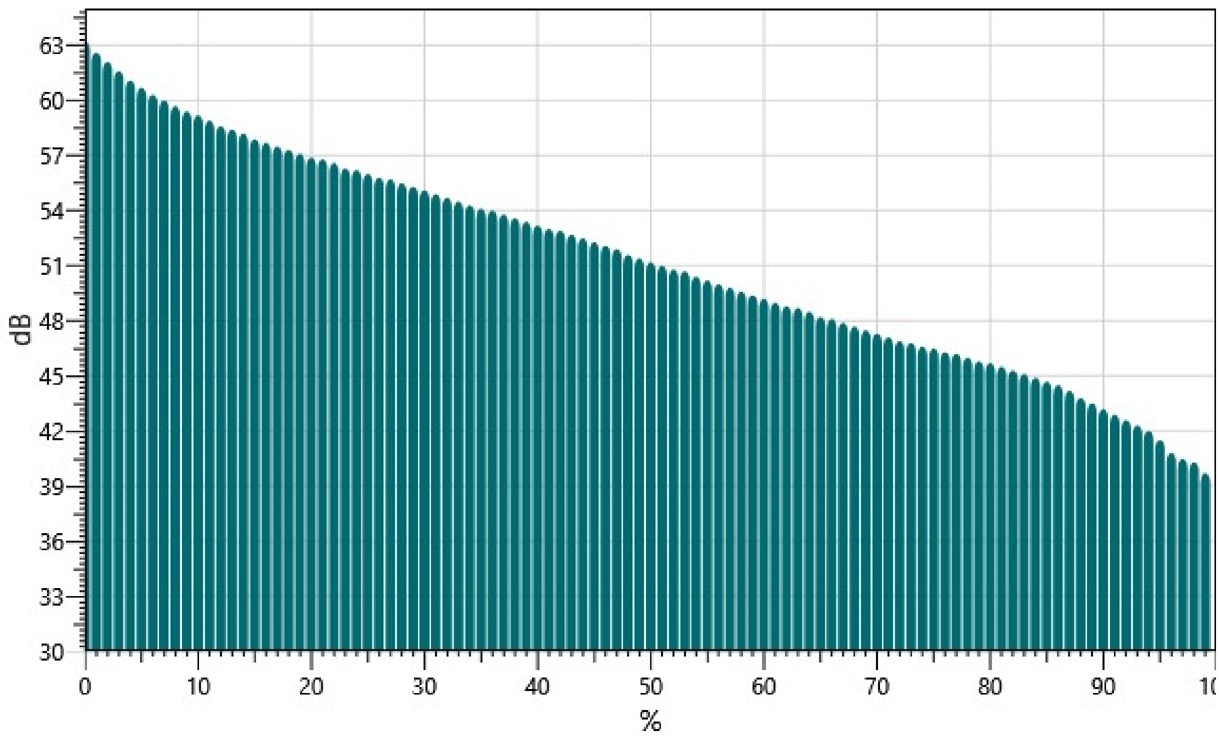
Statistics Chart

Mockingbird #3: Statistics Chart



Exceedance Chart

Mockingbird #3: Exceedance Chart



Statistics Table

dB:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
30:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.03	0.11
40:	0.02	0.16	0.23	0.29	0.54	0.49	0.30	0.20	0.30	0.42	2.95
41:	0.00	0.25	0.18	0.19	0.16	0.15	0.19	0.20	0.15	0.14	1.61
42:	0.19	0.21	0.32	0.31	0.32	0.36	0.47	0.26	0.33	0.38	3.16
43:	0.29	0.34	0.47	0.34	0.31	0.25	0.29	0.29	0.34	0.37	3.29
44:	0.34	0.29	0.22	0.31	0.25	0.32	0.40	0.40	0.60	0.48	3.61
45:	0.43	0.39	0.61	0.67	0.46	0.51	0.65	0.53	0.60	0.60	5.45
46:	0.57	0.53	0.56	0.53	0.66	0.65	0.68	0.76	0.75	0.78	6.47
47:	0.64	0.57	0.33	0.51	0.54	0.47	0.45	0.50	0.55	0.58	5.14
48:	0.54	0.49	0.60	0.60	0.49	0.42	0.44	0.45	0.61	0.60	5.23
49:	0.58	0.52	0.61	0.49	0.53	0.50	0.54	0.57	0.60	0.51	5.45
50:	0.51	0.56	0.33	0.47	0.42	0.41	0.42	0.41	0.62	0.56	4.70
51:	0.47	0.54	0.67	0.54	0.52	0.48	0.40	0.38	0.38	0.42	4.79
52:	0.45	0.43	0.40	0.38	0.40	0.47	0.56	0.55	0.59	0.71	4.92
53:	0.67	0.64	0.43	0.55	0.47	0.52	0.55	0.50	0.51	0.57	5.41
54:	0.55	0.60	0.65	0.54	0.55	0.46	0.46	0.48	0.50	0.57	5.37
55:	0.56	0.56	0.54	0.45	0.56	0.50	0.50	0.62	0.60	0.59	5.47
56:	0.68	0.67	0.44	0.51	0.60	0.47	0.45	0.51	0.49	0.51	5.33
57:	0.58	0.54	0.51	0.52	0.51	0.55	0.48	0.44	0.54	0.44	5.13
58:	0.44	0.53	0.42	0.45	0.42	0.40	0.46	0.37	0.34	0.36	4.19
59:	0.43	0.45	0.27	0.48	0.31	0.29	0.32	0.32	0.33	0.38	3.58
60:	0.38	0.35	0.35	0.29	0.30	0.32	0.29	0.30	0.21	0.21	3.01
61:	0.24	0.25	0.19	0.21	0.17	0.16	0.20	0.26	0.23	0.19	2.11
62:	0.24	0.21	0.18	0.18	0.20	0.22	0.24	0.21	0.28	0.18	2.13
63:	0.10	0.11	0.09	0.10	0.09	0.04	0.05	0.05	0.06	0.03	0.71
64:	0.03	0.04	0.04	0.04	0.05	0.03	0.03	0.06	0.05	0.03	0.40

65:	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.10
66:	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.03	0.16
67:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
68:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
69:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Exceedance Table

.	0%	1%	2%	3%	4%	5%	6%	%7	%8	%9
0%:		63.2	62.6	62.1	61.6	61.1	60.7	60.3	60.0	59.7
10%:	59.4	59.2	58.9	58.6	58.4	58.2	57.9	57.7	57.5	57.3
20%:	57.1	56.9	56.8	56.6	56.3	56.2	56.0	55.8	55.7	55.5
30%:	55.3	55.1	54.9	54.7	54.5	54.3	54.1	54.0	53.8	53.6
40%:	53.4	53.2	53.0	52.9	52.7	52.5	52.3	52.1	51.9	51.6
50%:	51.4	51.2	51.0	50.8	50.7	50.4	50.2	50.0	49.8	49.6
60%:	49.4	49.2	49.0	48.8	48.7	48.5	48.2	48.1	47.9	47.7
70%:	47.5	47.3	47.1	46.9	46.8	46.6	46.5	46.3	46.2	46.0
80%:	45.8	45.7	45.5	45.3	45.1	44.9	44.7	44.5	44.2	43.8
90%:	43.5	43.2	42.9	42.6	42.3	42.0	41.5	40.8	40.5	40.3
100%:	39.7									

Logged Data Chart

Mockingbird #3: Logged Data Chart