

NOISE IMPACT ANALYSIS

**SHOPPES AT THE LAKES - MISTER CAR WASH AND DAY CARE PROJECT
MENIFEE, CALIFORNIA**

LSA

April 2024

NOISE IMPACT ANALYSIS

SHOPPES AT THE LAKES - MISTER CAR WASH AND DAY CARE PROJECT MENIFEE, CALIFORNIA

Submitted to:

Adriana Wright
Mister Car Wash
222 East 5th Street
Tucson, Arizona 85705

Prepared by:

LSA
157 Park Place
Pt. Richmond, California 94801
(510) 236-6810

Project No. CWP2205



April 2024

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LIST OF ABBREVIATIONS AND ACRONYMS

City	City of Menifee
dB	decibel(s)
dBA	A-weighted decibel(s)
ft	foot/feet
L _{eq}	equivalent continuous sound level
L _{max}	maximum instantaneous noise level
proposed project	Shoppes at the Lakes - Mister Car Wash and Day Care Project

INTRODUCTION

This noise impact analysis has been prepared to evaluate the potential noise impacts and noise reduction measures associated with the proposed Shoppes at the Lakes - Mister Car Wash and Day Care Project (proposed project) in Menifee, California. This report is intended to satisfy the City of Menifee's (City) requirements for a project-specific noise impact analysis by examining the impacts of the proposed uses on the project site and identifying whether any noise reduction measures to reduce project noise impacts would be necessary.

PROJECT LOCATION AND DESCRIPTION

The proposed project is located at 29249 Newport Road, Menifee, California. The proposed project would construct a 5,434-square-foot express car wash and an 11,992-square-foot day care with a 21,300-square-foot play area. The proposed car wash would include 12 vacuum stalls, three parking spaces, and a three-lane drive-thru queue. The drive-thru queue would also include an employee kiosk and a traffic arm barrier to control vehicle traffic within the drive-thru lane. The proposed day care would provide 49 parking spaces, including eight electric vehicle spaces. The proposed project would incorporate landscaping into the parking lots and areas surrounding each building. The proposed project location map and site plan are presented in Figures 1 and 2, respectively.

EXISTING LAND USES IN THE PROJECT AREA

The project site is surrounded by commercial developments and residential uses. The areas adjacent to the project site include the following uses:

- **North:** Existing commercial uses;
- **East:** Existing residential uses opposite Laguna Vista Drive;
- **South:** Existing residential uses opposite Rockport Road; and
- **West:** Existing commercial uses.

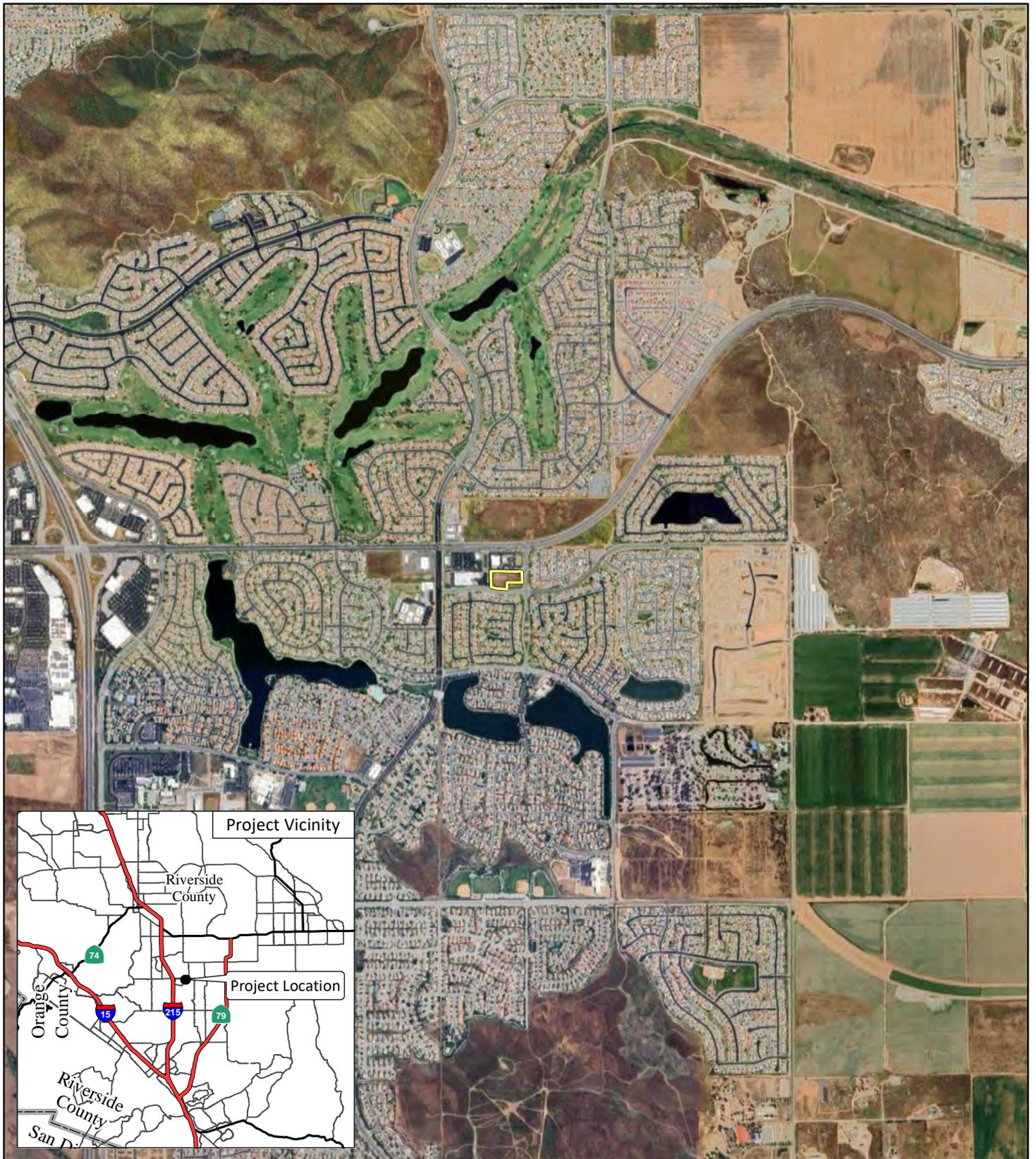


FIGURE 1

LSA

LEGEND

 Project Location



0 1000 2000
FEET

SOURCE: Google Maps (2021)

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SHOPPES AT THE LAKES - MISTER CAR WASH AND DAY CARE PROJECT

Regional Project Location

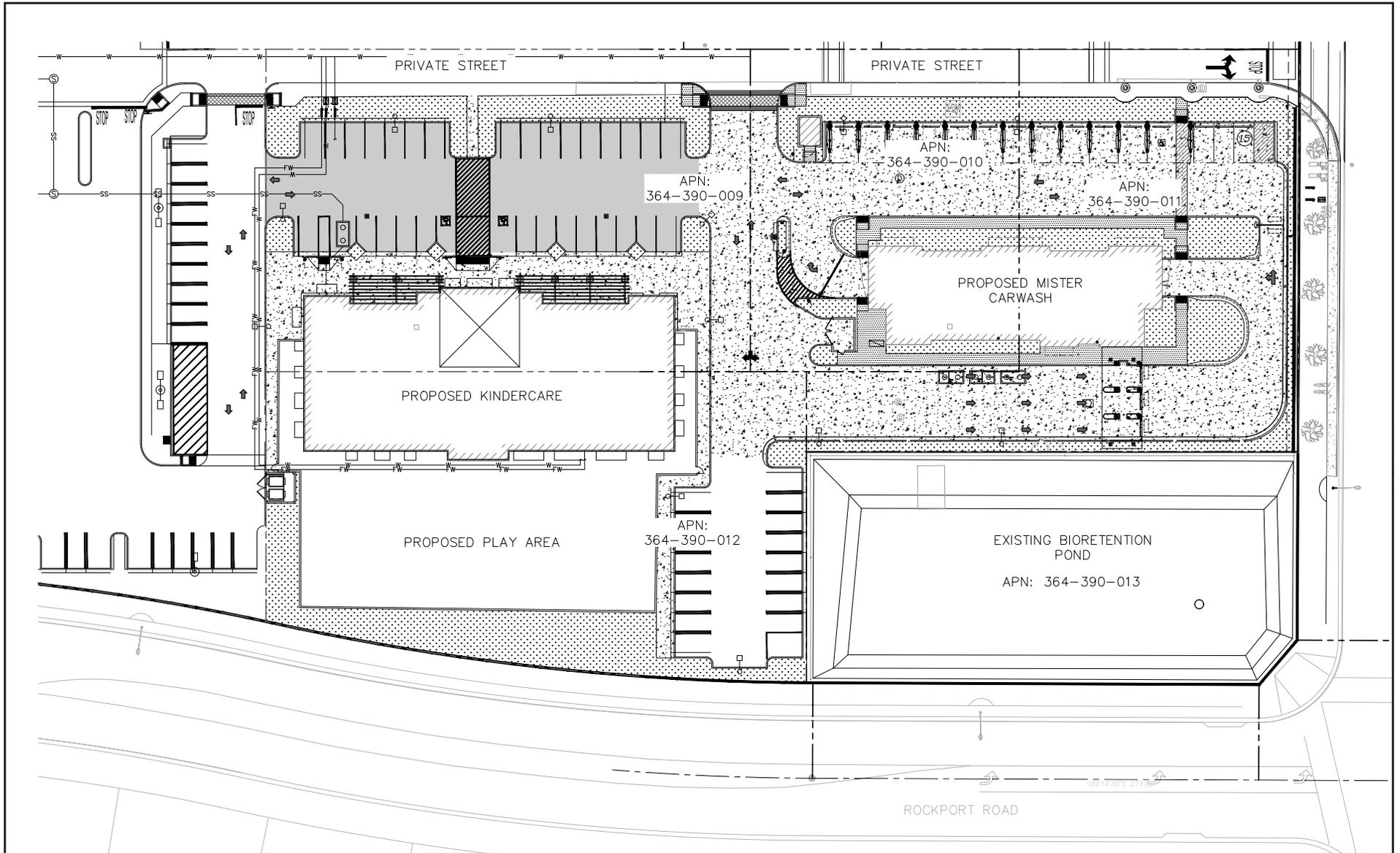


FIGURE 2

LSA



NOT TO SCALE

SOURCE: Kimley Horn

I:\CWP2205\G\Site_Plan.ai (3/29/2024)

SHOPPES AT THE LAKES - MISTER CAR WASH AND DAY CARE PROJECT

Site Plan

NOISE FUNDAMENTALS

CHARACTERISTICS OF SOUND

Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, and sleep. To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations, or cycles per second, of a sound wave, which results in the tone's range from high to low. Loudness is the strength of a sound, and it describes a noisy or quiet environment; it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound wave combined with the reception characteristics of the human ear. Sound intensity refers to the power carried by sound waves per unit area in a direction perpendicular to that area. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound pressure level and its effect on adjacent sensitive land uses.

Measurement of Sound

Sound pressure level is measured with the A-weighted decibel (dBA) scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound, similar to the human ear's de-emphasis of these frequencies. Decibels, unlike linear units (e.g., inches or pounds), are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 decibels (dB) is 10 times more intense than 1 dB, 20 dB is 100 times more intense than 1 dB, and 30 dB is 1,000 times more intense than 1 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 1 dB. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the sound's loudness. Ambient sounds generally range from 30 dB (very quiet) to 100 dB (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound levels dissipate exponentially with distance from their noise sources. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source (e.g., highway traffic or railroad operations) the sound decreases 3 dB for each doubling of distance in a hard site environment.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period.

Other noise rating scales of importance when assessing the annoyance factor include the maximum instantaneous noise level (L_{max}), which is the highest exponential time-averaged sound level that

occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by L_{max} , which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to sound levels higher than 85 dBA. Exposure to high sound levels affects the entire system, with prolonged sound exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of sound exposure above 90 dBA would result in permanent cell damage. When the sound level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of sound is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by a feeling of pain in the ear (i.e., the threshold of pain). A sound level of 160–165 dBA will result in dizziness or a loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less-developed areas. Table A lists definitions of acoustical terms, and Table B shows common sound levels and their sources.

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of sound level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in 1 second (i.e., the number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. 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. (All sound levels in this report are A-weighted unless reported otherwise.)
L_{01} , L_{10} , L_{50} , L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1%, 10%, 50%, and 90% of a stated time period, respectively.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound.
L_{max} , L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time. It is usually a composite of sound from many sources from many directions, near and far; no particular sound is dominant.

Source: *Handbook of Acoustical Measurements and Noise Control* (Harris 1991).¹

¹ Harris, Cyril M., ed. 1991. *Handbook of Acoustical Measurements and Noise Control. 3rd Edition.* McGraw-Hill, Inc.

Table B: Common Sound Levels and Their Noise Sources

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

Source: *Technical Noise Supplement*, California Department of Transportation (September 2013).¹

dBA = A-weighted decibels

ft = foot/feet

mph = miles per hour

¹ California Department of Transportation (Caltrans). 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol (TeNS)*. September.

REGULATORY SETTING AND EXISTING NOISE ENVIRONMENT

APPLICABLE NOISE STANDARDS

General Plan Noise Element

The Noise Element of the City’s General Plan (City of Menifee 2013) lists the goals and policies required to meet the City’s noise-related goals. The following lists the applicable goals and policies for the project.

Goal N-1: Noise-sensitive land uses are protected from excessive noise and vibration exposure.

- **Policy N-1.1:** Assess the compatibility of proposed land uses with the noise environment when preparing, revising, or reviewing development project applications.
- **Policy N-1.3:** Require noise abatement measures to enforce compliance with any applicable regulatory mechanisms, including building codes and subdivision and zoning regulations, and ensure that the recommended mitigation measures are implemented.
- **Policy N-1.7:** Mitigate exterior and interior noises to the levels listed in Table C to the extent feasible, for stationary sources adjacent to sensitive receptors:

Table C: Stationary Source Noise Standards

Land Use	Period	Interior	Exterior
Residential	10:00 PM to 7:00 AM	40 dBA L_{eq} (10-minute)	45 dBA L_{eq} (10-minute)
	7:00 AM to 10:00 PM	55 dBA L_{eq} (10-minute)	65 dBA L_{eq} (10-minute)

Source: General Plan Noise Element (City of Menifee 2013) and Development Code (City of Menifee 2022a).

dBA = A-weighted decibel

L_{eq} = equivalent continuous sound level

- **Policy N-1.8:** Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state, and city noise standards and guidelines as a part of new development review.

Development Code

Section 9.210.060(B)(10) of the City’s Development Code (City of Menifee 2022a) exempts sound emanating from heating and air conditioning equipment in proper repair.

Section 9.215.060(D) of the City’s Development Code (City of Menifee 2022a) prohibits the creation of any sound on any property that causes the exterior and interior sound level on any other occupied property to exceed the noise standards shown in Table C (Stationary Source Noise Standards) above.

AMBIENT NOISE ENVIRONMENT

Existing noise levels in the project area are predominantly the result of traffic along Laguna Vista Drive and Rockport Road. Parking lot activities from adjacent commercial uses are a secondary contributor to the ambient noise environment.

Airport-related noise levels are primarily associated with aircraft engine noise made while aircraft are taking off, landing, or running their engines while still on the ground. The closest source of aircraft noise is the Peris Valley Airport, which is approximately 6.5 miles northwest of the project site.

To assess existing noise levels, LSA conducted three long-term noise measurements at the proposed project site. The long-term noise measurements were recorded from October 13 through October 14, 2022. The long-term noise measurements captured data to calculate the hourly L_{eq} at each location. Noise measurement data collected during long-term noise monitoring are summarized in Table D and shown in Figure 3. Noise measurement sheets are provided in Appendix A.

Table D: Long-Term Ambient Noise Level Measurements

Location		Daytime Noise Levels ¹ (dBA L_{eq})	Nighttime Noise Levels ² (dBA L_{eq})
LT-1	East of the project site opposite Laguna Vista Drive on a tree. Approximately 10 ft east of the edge of the northbound outside lane.	62.4 – 67.0	52.9 – 65.2
LT-2	South of the project site opposite Rockport Road. On a tree behind 29226 Rockledge Dr., approximately 10 ft south of the eastbound outside lane of Rockport Road.	55.0 – 60.6	44.0 – 56.1
LT-3	Northern edge of project site on a light pole. Approximately 220 ft west of the southbound outside lane of Laguna Vista Drive.	60.4 – 63.8	52.2 – 62.9

Source: Compiled by LSA (2023).

Note: Noise measurements were conducted from October 13 to October 14, 2022.

¹ Daytime Noise Levels = Noise levels during the hours from 7:00 a.m. to 7:00 p.m.

² Nighttime Noise Levels = Noise levels during the hours from 10:00 p.m. to 7:00 a.m.

dBA L_{eq} = A-weighted decibel equivalent continuous sound level

ft = foot/feet

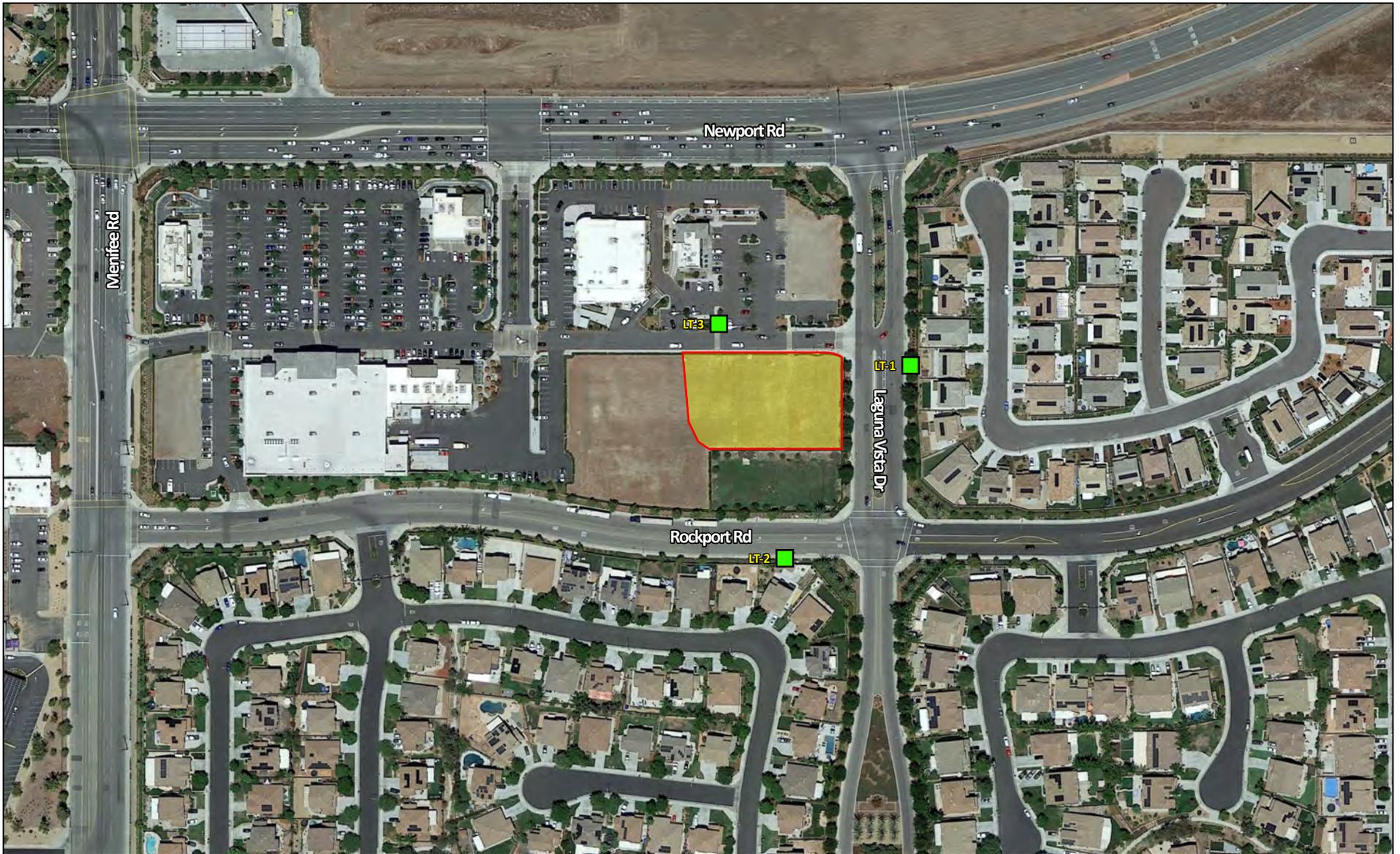
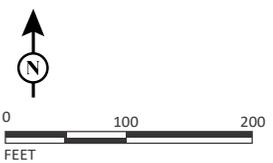


FIGURE 3

LSA

- LEGEND
- Project Site Boundary
 - LT-1 Long-term Noise Monitoring Location



SOURCE: Google Earth

I:\CWP2205\G\Noise_Locs.ai (3/29/2024)

SHOPPES AT THE LAKES - MISTER CAR WASH AND DAY CARE PROJECT
Noise Monitoring Locations

PROJECT IMPACTS

LONG-TERM OPERATIONAL NOISE IMPACTS

The proposed car wash operations could affect the proposed day care use as well as existing off-site commercial and residential land uses. The two main stationary sources of noise include noise generated by the car wash tunnel and vacuum equipment. Operations of the car wash are expected to occur during the daytime hours of 8:00 a.m. to 10:00 p.m. No operations would occur during nighttime hours. The following provides a detailed noise analysis and discussion of each stationary noise source.

Car Wash Operations

The project would construct a drive-through car wash with a total of 13 vacuum stations, which would generate operational noise.

The vacuum stations are powered by equipment located near the northeast corner of the project site as shown on the project Site Plan. Based on reference noise specifications from noise measurements conducted by LSA at a similar Mister Car Wash¹, the turbine used for this project would generate a noise level of 74.9 dBA at 10 ft and each of the vacuum stations would generate a noise level of 74.3 at 2 ft. For the purposes of this noise analysis, both vacuum equipment locations were assumed to be in operation simultaneously. The vacuum turbine is surrounded by a 6 ft tall enclosure.

Based on reference noise level measurements gathered at a similar Mister Car Wash, noise levels at the car wash tunnel exit are 78.7 dBA L_{eq} at a distance of 25 ft. Additionally, noise levels at the car wash tunnel entrance are 75.8 dBA L_{eq} at a distance of 25 ft.

To determine the future noise levels generated by the proposed project to noise-sensitive uses, a 3-D noise model, SoundPLAN, was used to incorporate the site topography, existing property line walls, existing and proposed buildings, and stationary noise sources. Printouts of the SoundPLAN noise model are presented in Appendix B.

Cumulative Impact Assessment

Noise levels generated by the car wash operations would not cause noise levels to exceed 65 dBA L_{eq} at the playground area of the proposed day care to the west. Because noise levels would not exceed the applicable criteria of 65 dBA L_{eq} at the playground area, project operations would not constitute a noise impact.

Noise Reduction Measures

Notwithstanding the absence of a significant noise impact, a noise reduction feature in the form of a sound wall at the exit of the car wash tunnel was evaluated. The printout in Appendix B shows the noise levels from the car wash operations at the surrounding sensitive land uses, with the addition

¹ LSA. 2023. Mister Car Wash Sartell Noise Measurements. January 11.

of an 8-foot-high wall along the car wash tunnel's exit, noise levels for the entire day are center building would be below 65 dBA L_{eq} .

CONCLUSION

The proposed project would not generate on-site stationary noise from car wash operations resulting in noise levels above 65 dBA L_{eq} at the playground area of the day care which is the nearest sensitive use and would comply with the City's noise standards. Notwithstanding, to further reduce the potential for noise, the applicant will construct a 8-foot-high noise wall at the car wash tunnel exit.

APPENDIX A

NOISE MONITORING SHEETS

Noise Measurement Survey – 24 HR

Project Number: CWP2205
Project Name: Newport Mister Car Wash

Test Personnel: Kevin Nguyendo
Equipment: Spark 706RC (SN:905)

Site Number: LT-1 Date: 10/13/22

Time: From 1:00 p.m. To 1:00 p.m.

Site Location: East of the project site opposite of Laguna Vista Drive on a tree.

Primary Noise Sources: Traffic noise from Laguna Vista Drive.

Comments: Approximately 5 feet and 5 inch retaining wall nearby

Photo:



Long-Term (24-Hour) Noise Level Measurement Results at LT-1

Start Time	Date	Noise Level (dBA)		
		L _{eq}	L _{max}	L _{min}
1:00 PM	10/13/22	65.7	81.3	47.1
2:00 PM	10/13/22	65.6	83.0	47.3
3:00 PM	10/13/22	66.8	83.8	46.1
4:00 PM	10/13/22	66.1	80.0	47.7
5:00 PM	10/13/22	66.9	83.7	48.1
6:00 PM	10/13/22	66.8	87.5	47.5
7:00 PM	10/13/22	64.5	84.4	45.4
8:00 PM	10/13/22	64.1	81.4	45.2
9:00 PM	10/13/22	62.4	77.3	43.1
10:00 PM	10/13/22	58.9	79.3	40.1
11:00 PM	10/13/22	58.4	79.4	38.0
12:00 AM	10/14/22	55.3	76.7	38.1
1:00 AM	10/14/22	52.9	70.7	37.1
2:00 AM	10/14/22	55.8	78.1	36.6
3:00 AM	10/14/22	57.7	78.7	37.4
4:00 AM	10/14/22	61.2	77.3	43.5
5:00 AM	10/14/22	63.0	78.5	41.3
6:00 AM	10/14/22	65.2	77.8	46.6
7:00 AM	10/14/22	67.0	84.9	47.3
8:00 AM	10/14/22	66.6	83.5	43.0
9:00 AM	10/14/22	66.4	84.7	45.2
10:00 AM	10/14/22	66.6	87.2	45.7
11:00 AM	10/14/22	66.3	84.1	45.7
12:00 PM	10/14/22	65.8	82.9	46.9

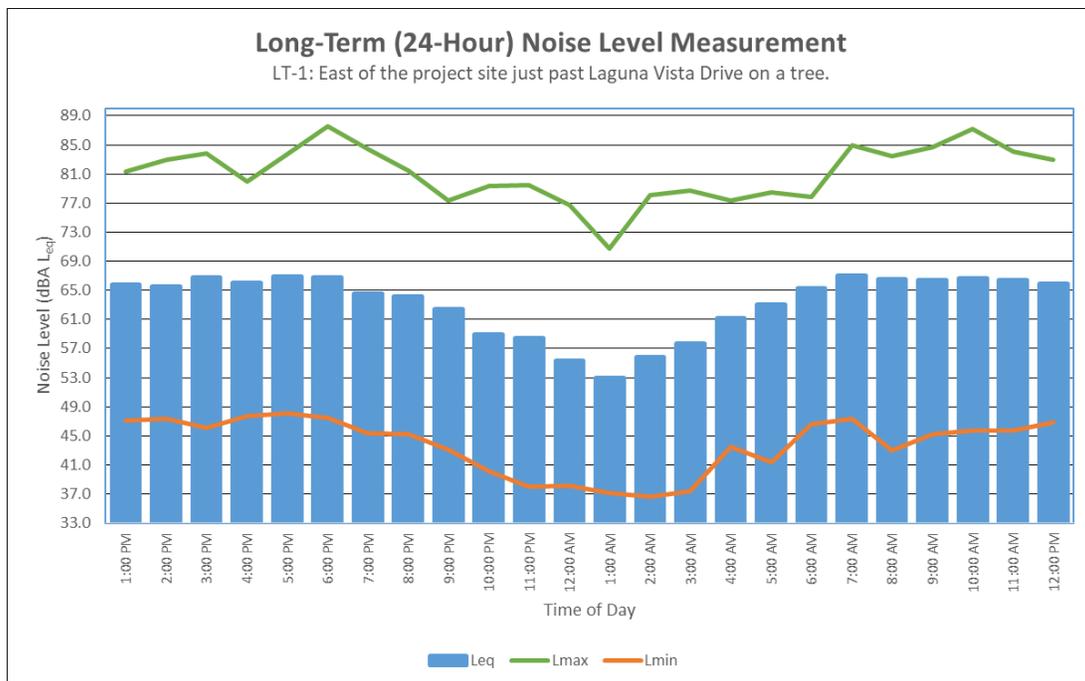
Source: Compiled by LSA Associates, Inc. (2022).

dBA = A-weighted decibel

L_{eq} = equivalent continuous sound level

L_{max} = maximum instantaneous noise level

L_{min} = minimum measured sound level



Noise Measurement Survey – 24 HR

Project Number: CWP2205
Project Name: Newport Mister Car Wash

Test Personnel: Kevin Nguyendo
Equipment: Spark 706RC (SN:906)

Site Number: LT-2 Date: 10/13/22

Time: From 1:00 p.m. To 1:00 p.m.

Site Location: South of the project site opposite of Rockport Road on a tree behind
29226 Rockledge Dr, Menifee, CA 92584.

Primary Noise Sources: Traffic noise from Rockport Road.

Comments: Approximately 5 feet and 5 inch retaining wall surrounding home.

Photo:



Long-Term (24-Hour) Noise Level Measurement Results at LT-2

Start Time	Date	Noise Level (dBA)		
		L _{eq}	L _{max}	L _{min}
1:00 PM	10/13/22	59.8	75.1	44.1
2:00 PM	10/13/22	58.6	78.5	40.2
3:00 PM	10/13/22	59.3	78.1	42.8
4:00 PM	10/13/22	59.7	73.8	43.0
5:00 PM	10/13/22	60.1	76.3	43.5
6:00 PM	10/13/22	60.0	77.3	42.5
7:00 PM	10/13/22	59.3	76.6	40.2
8:00 PM	10/13/22	57.9	75.2	40.7
9:00 PM	10/13/22	55.0	72.7	39.3
10:00 PM	10/13/22	52.8	71.2	36.4
11:00 PM	10/13/22	50.4	71.1	35.3
12:00 AM	10/14/22	48.0	68.6	35.3
1:00 AM	10/14/22	46.7	72.3	34.6
2:00 AM	10/14/22	44.0	66.8	34.6
3:00 AM	10/14/22	46.2	68.6	35.4
4:00 AM	10/14/22	51.4	71.1	37.7
5:00 AM	10/14/22	53.9	73.7	39.9
6:00 AM	10/14/22	56.1	73.9	41.2
7:00 AM	10/14/22	59.0	77.1	42.2
8:00 AM	10/14/22	58.5	73.3	40.9
9:00 AM	10/14/22	58.2	74.6	40.9
10:00 AM	10/14/22	60.6	79.8	41.8
11:00 AM	10/14/22	58.6	73.3	41.4
12:00 PM	10/14/22	59.0	75.0	43.2

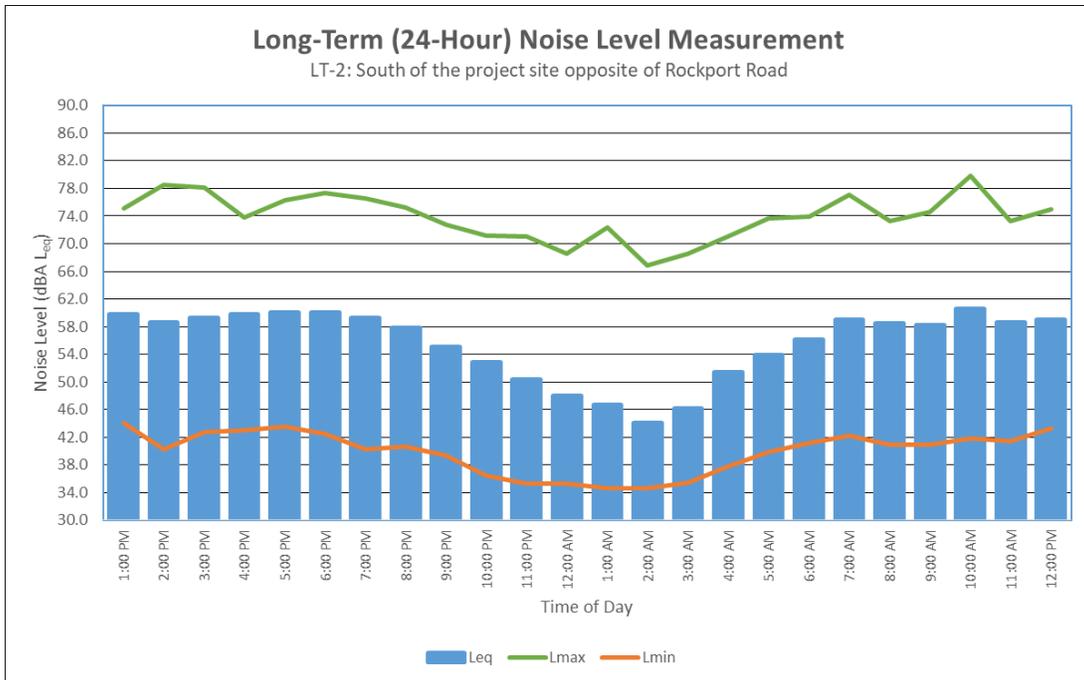
Source: Compiled by LSA Associates, Inc. (2022).

dBA = A-weighted decibel

L_{eq} = equivalent continuous sound level

L_{max} = maximum instantaneous noise level

L_{min} = minimum measured sound level



Noise Measurement Survey – 24 HR

Project Number: CWP2205
Project Name: Newport Mister Car Wash

Test Personnel: Kevin Nguyendo
Equipment: Spark 706RC (SN:907)

Site Number: LT-3 Date: 10/13/22

Time: From 1:00 p.m. To 1:00 p.m.

Site Location: Northern edge of the project site on a light pole.

Primary Noise Sources: Traffic noise from Laguna Vista Drive. Parking lot activity noise such as idling cars, vehicle passing and door opening/closing.

Comments: _____

Photo:



Long-Term (24-Hour) Noise Level Measurement Results at LT-3

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
1:00 PM	10/13/22	62.7	78.9	50.9
2:00 PM	10/13/22	62.1	80.6	49.9
3:00 PM	10/13/22	62.3	76.0	53.6
4:00 PM	10/13/22	63.0	77.6	53.4
5:00 PM	10/13/22	63.7	78.9	52.5
6:00 PM	10/13/22	62.6	76.7	52.4
7:00 PM	10/13/22	61.8	76.6	49.4
8:00 PM	10/13/22	61.4	74.9	48.4
9:00 PM	10/13/22	60.4	79.7	47.9
10:00 PM	10/13/22	57.6	77.1	44.7
11:00 PM	10/13/22	55.2	71.6	44.1
12:00 AM	10/14/22	52.9	69.7	43.8
1:00 AM	10/14/22	54.2	74.2	43.8
2:00 AM	10/14/22	52.2	74.3	43.2
3:00 AM	10/14/22	53.9	73.3	43.6
4:00 AM	10/14/22	62.9	77.0	47.9
5:00 AM	10/14/22	59.4	78.6	48.1
6:00 AM	10/14/22	62.6	81.4	49.8
7:00 AM	10/14/22	63.4	78.9	50.2
8:00 AM	10/14/22	61.8	81.5	48.7
9:00 AM	10/14/22	62.9	86.7	48.7
10:00 AM	10/14/22	63.8	84.3	50.1
11:00 AM	10/14/22	62.6	79.7	48.9
12:00 PM	10/14/22	63.4	75.6	50.4

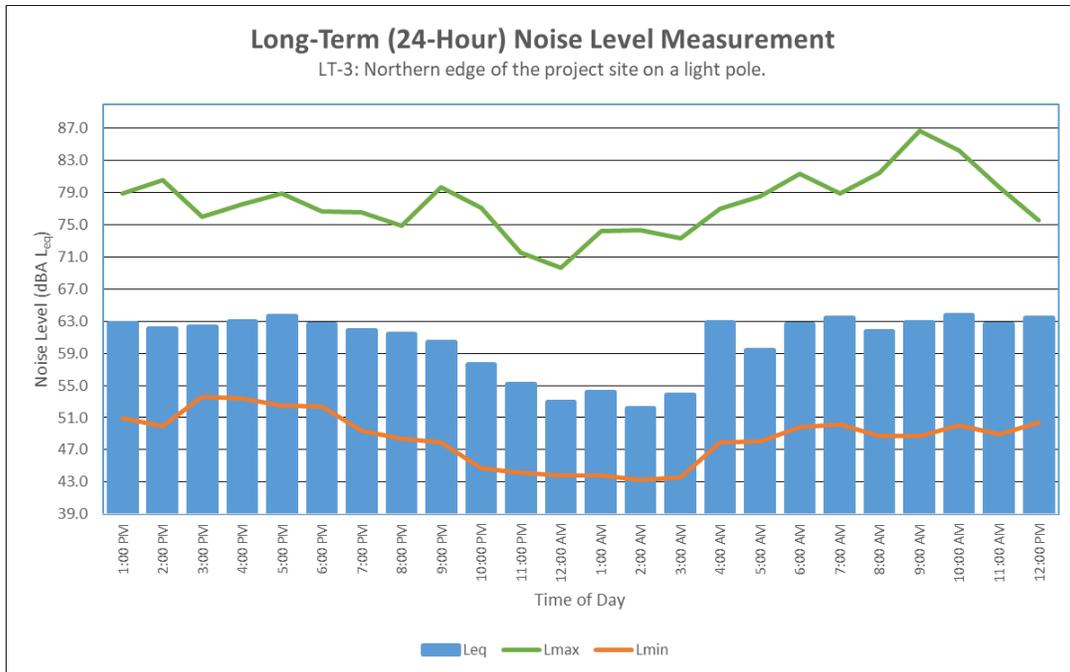
Source: Compiled by LSA Associates, Inc. (2022).

dBA = A-weighted decibel

L_{eq} = equivalent continuous sound level

L_{max} = maximum instantaneous noise level

L_{min} = minimum measured sound level



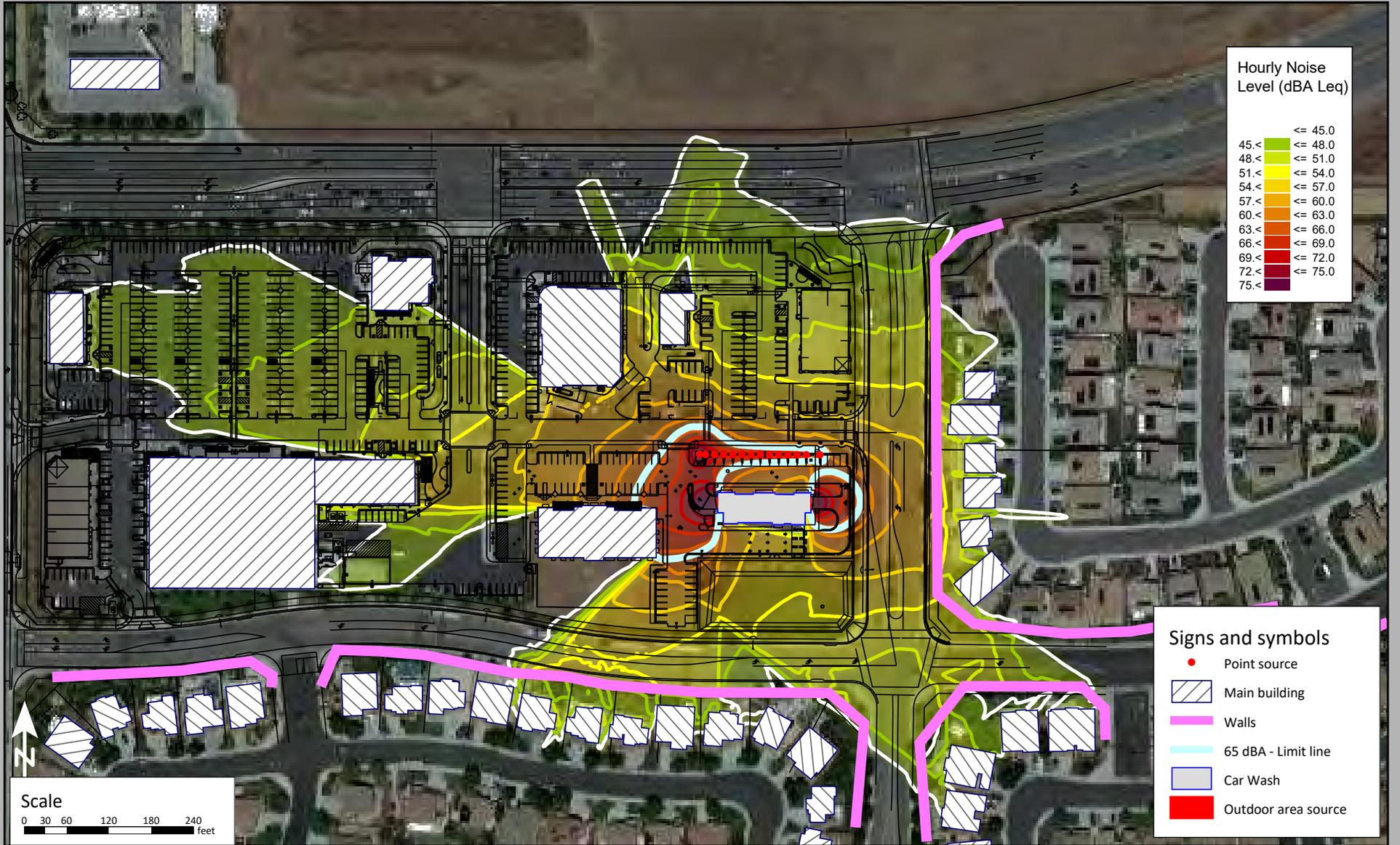
APPENDIX B

SOUNDPLAN NOISE MODEL PRINTOUTS

Newport Rd Menifee

Project No. CWP2205

Project Operational Noise Levels - No Wall



Newport Rd Menifee

Project No. CWP2205

Project Operational Noise Levels - With Tunnel Exit Wall

