

NOISE IMPACT ANALYSIS
WAKERIDER BEACH RESORT
CITY OF LAKE ELSINORE, CALIFORNIA

Prepared for:

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NOISE SETTING

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is generally considered to be unwanted sound. Sound is characterized by various parameters that describe the rate of oscillation of sound waves, the distance between successive troughs or crests, the speed of propagation, and the pressure level or energy content of a given sound. In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level.

The decibel (dB) scale is used to quantify sound pressure levels. Although decibels are most commonly associated with sound, "dB" is a generic descriptor that is equal to ten times the logarithmic ratio of any physical parameter versus some reference quantity. For sound, the reference level is the faintest sound detectable by a young person with good auditory acuity.

Since the human ear is not equally sensitive to all sound frequencies within the entire auditory spectrum, human response is factored into sound descriptions by weighting sounds within the range of maximum human sensitivity more heavily in a process called "A-weighting," written as dB(A). Any further reference in this discussion to decibels written as "dB" should be understood to be A-weighted.

Time variations in noise exposure are typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called LEQ), or alternately, as a statistical description of the sound pressure level that is exceeded over some fraction of a given observation period. Finally, because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Ldn (day-night) or the Community Noise Equivalent Level (CNEL). The CNEL metric has gradually replaced the Ldn factor, but the two descriptors are essentially identical.

CNEL-based standards are generally applied to transportation-related sources because local jurisdictions are pre-empted from exercising direct noise control over vehicles on public streets, aircraft, trains, etc. The City of Lake Elsinore therefore regulates the traffic noise exposure of the receiving property through land use controls.

Noise/land use compatibility standards for various classes of land uses are generally expressed in the Noise Element of the General Plan to insure that noise exposure is considered in any development decisions. The City of Lake Elsinore has guidelines for noise exposure standards which are shown in Table 1. However, in order to reduce the potential ambiguity of conditional acceptability, Lake Elsinore developed a more clear-cut matrix of acceptable noise levels summarized in Table 2.

Table 1 City of Lake Elsinore Land Use Compatibility Matrix

Land Use Categories		Community Noise Equivalent Level dBA CNEL						
Categories	Uses	<55	60	65	70	75	80	>
RESIDENTIAL	Single Family, Duplex, Multiple Family	A	A	B	B	C	D	D
RESIDENTIAL	Mobile Home	A	A	B	C	C	D	D
COMMERCIAL Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theatre	A	A	A	A	B	B	C
COMMERCIAL, INDUSTRIAL INSTITUTIONAL	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
COMMERCIAL Recreation INSTITUTIONAL Civic Center	Amphitheater, Concert Hall Auditorium, Meeting Hall	B	B	C	C	D	D	D
COMMERCIAL Recreation	Children’s Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club	A	A	A	B	B	D	D
COMMERCIAL General, Special INDUSTRIAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL General	Hospital, Church, Library, Schools Classroom	A	A	B	C	C	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf Course, Cemeteries, Nature Centers Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
AGRICULTURE	Agriculture	A	A	A	A	A	A	A

Interpretation:

- Zone A: Clearly Compatible Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
- Zone B: Normally Compatible New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
- Zone C: Normally Incompatible New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.
- Zone D: Clearly Incompatible New construction or development should generally not be undertaken.

Table 2
Interior and Exterior Noise Standards
Ldn/CNEL

Category	Uses	Noise Level Ldn	
		Interior	Exterior
Residential	Single Family, Duplex, Multi Family	45	60
	Mobile Homes	-	60
Commercial, Institutional	Hotel, Motel, Transient Lodging	45	-
	Hospital, School Classrooms	45	-
	Church, Library	45	-

For new residential uses, Lake Elsinore recommends an exterior noise level of up to 60 dB Ldn/CNEL and an interior noise level of 45 dB Ldn/CNEL. The exterior level applies to outdoor recreational uses such as back yards, patios, spas, etc. However, noise levels of up to 70 dB Ldn/CNEL are permissible after a detailed analysis of noise reduction features is made. Although noise levels up to 70 dB CNEL/Ldn are considered “normally compatible” with residential uses, levels exceeding 65 dB CNEL/Ldn are typically found to be intrusive into normal conservation. The General Plan Program EIR (2011) thus states that:

“residential uses are generally incompatible within the 65 dB Ldn contour” (page 3.5-44, 2011)

For residential uses, 60 dB Ldn is thus the preferred noise exposure for usable outdoor space. If ambient noise levels preclude achieving the 60 dB Ldn target, any inability to mitigate levels below 65 dB Ldn using reasonably available control measures would be considered a significant impact.

Interior standards apply to habitable rooms. Typical noise attenuation with closed, double-paned windows in modern frame and stucco construction is about 20-30 dB. Noise attenuation with partially open windows is 10-15 dB Ldn/CNEL. Interior standards can therefore be readily met without any “extra” mitigation if exterior levels are 55-60 dB Ldn/CNEL with open windows. With closed dual-paned windows, exterior levels of 65-75 dB Ldn/CNEL can be accommodated while still meeting interior standards.

For “stationary” noise sources such as mechanical equipment (pool pumps, air conditioners, etc.) the City does have legal authority to establish noise performance standards designed to not adversely impact adjoining residential uses. These standards are articulated in the jurisdictional Municipal Code. These standards recognize the varying noise sensitivity of both transmitting and receiving land uses. The property line noise performance standards are normally structured according to land use and time-of-day.

CITY OF LAKE ELSINORE NOISE STANDARDS

The City Noise Ordinance of the Lake Elsinore Municipal Code, is designed to protect people from non-transportation (stationary) noise. The Noise Ordinance sets limits on the level and the duration of time a stationary noise source may impact an adjoining residential use.

Ordinance limits generally apply to “stationary” sources such as mechanical equipment, or vehicles operating on private property. The City’s noise ordinance limits are stated in terms of a 30-minute limit with allowable deviations from this 50th percentile standard. The louder the level becomes, the shorter the time becomes that it is allowed to occur. Table 3 lists the property line noise limits and the maximum cumulative period of time that the noise level may occur during a 1-hour period.

Table 3
Municipal Code Exterior Noise Limits

RECEIVING LAND USE	TIME	Noise level that may not be exceeded for more than a cumulative period of:				
		30 MIN/HR	15 MIN/HR	5 MIN/HR	1 MIN/HR	ANYTIME
Single-Family Residential	10:00 p.m. – 7:00 a.m.	40	45	50	55	60
	7:00 a.m. – 10:00 p.m.	50	55	60	65	70
Multiple Dwelling Residential	10:00 p.m. – 7:00 a.m.	45	50	65	70	65
	7:00 a.m. – 10:00 p.m.	50	55	60	65	70
Public Space Office	7:00 a.m. – 10:00 p.m.	60	65	70	75	80
General Commercial	10:00 p.m. – 7:00 a.m.	60	65	70	75	80
	7:00 a.m. – 10:00 p.m.	65	70	75	80	85
Light Industrial	Anytime	70	75	80	85	90
Heavy Industrial	Anytime	75	80	85	90	95

[Ord. 772 § 17.78.060, 1986. Code 1987 § 17.78.060].

BASELINE NOISE LEVELS

Short term on-site noise measurements were made in order to document existing baseline levels in the project area. These help to serve as a basis for projecting future noise exposure from the project upon the surrounding community. Noise monitoring was conducted on Wednesday, January 5, 2012, from 1:00 p.m. – 2:30 p.m., at two on-site locations.

Measurement locations are shown in **Figure 1** and summarized below.

Measured Noise Levels (dBA)

Site No.	Leq	Lmax	Lmin	L10	L33	L50	L90
1	55.1	79.5	37.0	47.5	41.5	40.0	38.0
2	59.9	72.0	42.0	62.5	59.0	58.0	51.5

Monitoring experience shows that 24-hour weighted CNELs can be reasonably well estimated from mid-afternoon noise readings. CNELs are approximately equal to mid-afternoon Leq plus 3 dB (Caltrans Technical Noise Supplement, 2009). Existing noise levels in the nearby residential area show Leqs in the high 55-60 dB range. This would equate to existing CNELs in the 58-63 dB levels at the closest homes.

Meter location 1 is representative of noise levels along the northern portion of the site, nearest the lake. Meter 2 is representative of traffic noise closer to Grand Avenue. On-site CNELs may be higher than the 60 dB CNEL “clearly compatible” guidelines proposed by the Lake Elsinore residential use noise compatibility guidelines. Existing Leqs are higher than the Lake Elsinore noise standards (50 dB Leq daytime).

According to the Lake Elsinore Municipal Code:

If the measured ambient level differs from that permissible within any of the noise limit categories above, the allowable noise exposure standard shall be adjusted upward in five dB increments for each category as appropriate to reflect said ambient noise level.

There is a substantial variation in baseline noise levels across the site close to Grand Avenue. Baseline noise levels exceed the 50 dB (L₅₀) standard by a substantial amount closest to Grand Avenue. Applicable noise ordinance standards at the property lines near the proposed fast food restaurant would be relaxed from the most stringent performance standard. Conversely, background levels near the proposed lakefront restaurant are relatively quiet. No relaxation of the applicable noise standard is considered appropriate given the low existing baseline noise levels.

Figure 1
Noise Meter Locations



Meter 1: Northern terminus of Serena Way / at intersection with Mark Ave

Meter 2: Southwest corner of 32985 Serena Way / closest point to Site & Grand Ave

NOISE IMPACTS

IMPACT SIGNIFICANCE CRITERIA

Noise impacts are considered significant if:

1. They create violations of noise standards, or,
2. They substantially worsen an already excessive noise environment, or,
3. They substantially increase an existing quiet environment even if noise standards are not violated by the proposed action.

Three characteristic noise sources are typically identified with land use intensification such as that proposed for the development of the Wake Rider Beach Resort project. Construction activities, especially heavy equipment, will create short-term noise increases near the project site. Such impacts would be important for any nearby noise-sensitive receptors, such as any existing residential uses. Upon completion, project-related traffic will cause an incremental increase in area-wide noise levels throughout the project area. Traffic noise impacts are generally analyzed both to insure that the project does not adversely impact the acoustic environment of the surrounding community, as well as to insure that the project site is not exposed to an unacceptable level of noise resulting from the ambient noise environment acting on the project. Finally, the project analysis needs to examine noise from the proposed commercial uses upon adjacent existing residential uses. Because of the close proximity of the adjacent residences, the possible conflict of on-site noise generation to off-site existing residences is possibly the most critical noise issue.

According to the current CEQA Appendix G guidelines, noise impacts are considered potentially significant if they cause:

- a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. Noise levels exceeding the City of Lake Elsinore Noise Standards would be considered significant.
- b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
- c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

CEQA Guidelines also identify potential impact significance due to aircraft noise. There are no airports in very close proximity to the site where aircraft noise would be an issue.

The term "substantial increase" is not defined by any responsible agency. The limits of perceptibility by ambient grade instrumentation (sound meters) or by humans in a laboratory environment is around 1.5 dB. Under ambient conditions, people generally do not perceive that noise has clearly changed until there is a 3 dB difference. A threshold of 3 dB is commonly used to define "substantial increase." An increase of +3 dBA CNEL in traffic noise would be consistent a significant impact. Similarly, noise generation possibly exceeding City of Lake Elsinore noise ordinance standards would also be considered as a potentially significant impact.

CONSTRUCTION NOISE STANDARDS

Construction noise is typically governed by ordinance limits on allowable times of equipment operations. CEQA Appendix G guidelines state that if an impact is regulated by a rule or regulation specifically designed to control a given type of impact (such as construction noise), and if the rule meets certain criteria about promulgation and applicability, then compliance with that rule may be used in support of a finding that the impact is less-than-significant. The Lake Elsinore Municipal Code restricts and regulates hours of construction operation and levels of construction noise. In Chapter 17.78, Section 17.78.080 (F), construction noise is restricted from 7:00 p.m. to 7:00 a.m. weekdays and at any time on weekends or holidays when it creates a noise disturbance across a residential or commercial property line. Section 17.78.080 (F) (2) regulates construction activity noise levels as follows:

B. Noise Restrictions at Affected Structures. When technically and economically feasible, the contractor shall conduct construction activities in such a manner that the maximum noise levels at the affected buildings will not exceed those listed in the following schedule:

1. At Residential Structures.

a. Mobile Equipment. Maximum noise levels for non-scheduled, intermittent, and short-term operation (less than 10 days) of mobile equipment:

	Single-family Residential (dBA)	Multi-family Residential (dBA)	Semi-residential/ Commercial (dBA)
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75	80	85
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays.	60	65	70

b. Stationary Equipment Maximum noise level for repetitively scheduled and relatively long-term operation (period of 10 days or more) of stationary equipment:

	Single-family Residential (dBA)	Multi-family Residential (dBA)	Semi-residential/ Commercial (dBA)
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60	65	70
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays.	50	55	60

2. At Business Structures.

- a. Mobile equipment. Maximum noise levels for non-scheduled, intermittent, short-term operation of mobile equipment: Daily, including Sunday and legal holidays, all hours: maximum of 85 dBA.

CONSTRUCTION NOISE IMPACTS

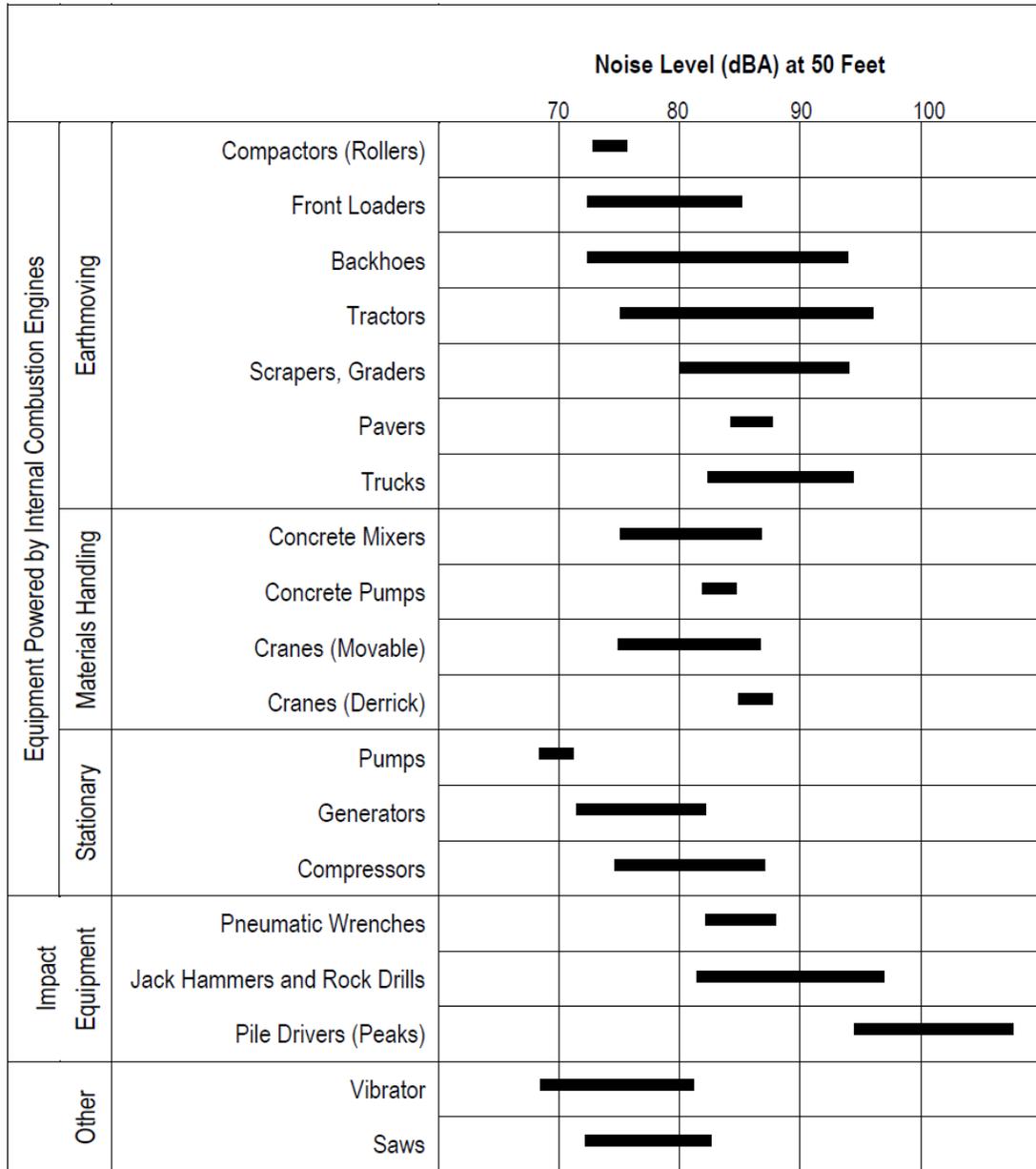
Temporary construction noise impacts vary markedly because the noise strength of construction equipment ranges widely as a function of the equipment used and its activity level. Short-term construction noise impacts tend to occur in discrete phases dominated initially by earth-moving sources, then by foundation and parking area construction, and finally for finish construction.

Figure 2 shows the typical range of construction activity noise generation as a function of equipment used in various building phases. Because of the limited earthworks on this relatively flat site, there will be limited use of heavy grading equipment.

The earth-moving sources are seen to be the noisiest with equipment noise ranging up to about 90 dB(A) at 50 feet from the source. The noise ordinance standard for mobile equipment to be used during grading is 75 dBA at the nearest residence. There is no feasible alternative equipment that can move earth in economical quantity without creating peak noise levels near 90 dBA. Spherically radiating point sources of noise emissions are atmospherically attenuated by a factor of 6 dB per doubling of distance, or about 20 dB in 500 feet of propagation. The loudest earth-moving noise sources will therefore sometimes be detectable above the local background beyond 1,000 feet from the construction area. An impact radius of 1,000 feet or more pre-supposes a clear line-of-sight and no other machinery or equipment noise that would mask project construction noise. With buildings and other barriers to interrupt line-of-sight conditions, the potential “noise envelope” around individual construction sites is reduced.

Figure 2

Typical Construction Equipment Noise Generation Levels



Source: EPA PB 206717, Environmental Protection Agency, December 31, 1971, "Noise from Construction Equipment and Operations."

Construction noise impacts are, therefore, somewhat less than that predicted under idealized input conditions. However, because of distance separation to the site, construction noise impacts are likely to provide a temporary annoyance for site adjacent sensitive receptors since the closest residences are only 50 feet from the project boundary. Construction noise impacts may temporarily exceed the City of Lake Elsinore construction noise standards. Because of the small construction site, noise mitigation through berms or temporary noise walls is not considered feasible. Short-term construction activity noise generation impacts are considered temporarily significant.

CONSTRUCTION ACTIVITY VIBRATION

Construction activities generate ground-borne vibration when heavy equipment travels over unpaved surfaces or when it is engaged in soil movement. The effects of ground-borne vibration include discernable movement of building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. Within the “soft” sedimentary surfaces of much of Southern California, ground vibration is quickly damped out. Because vibration is typically not an issue, very few jurisdictions have adopted vibration significance thresholds. Vibration thresholds have been adopted for major public works construction projects, but these relate mostly to structural protection (cracking foundations or stucco) rather than to human annoyance.

Vibration is most commonly expressed in terms of the root mean square (RMS) velocity of a vibrating object. RMS velocities are expressed in units of vibration decibels. The range of vibration decibels (VdB) is as follows:

- 65 VdB - threshold of human perception
- 72 VdB - annoyance due to frequent events
- 80 VdB - annoyance due to infrequent events
- 100 VdB - minor cosmetic damage

To determine potential impacts of the project’s construction activities, estimates of vibration levels induced by the construction equipment at various distances are presented below:

Equipment	Approximate Vibration Levels (VdB)*			
	25 feet	50 feet	100 feet	200 feet
Large Bulldozer	87	81	75	69
Loaded Truck	86	80	74	68
Jackhammer	79	73	67	61
Small Bulldozer	58	52	46	40

* (FTA Transit Noise & Vibration Assessment, Chapter 12, Construction, 1995)

The on-site construction equipment that will create the maximum potential vibration is a large bulldozer. The stated vibration source level in the FTA Handbook for such equipment is 87 VdB at 25 feet from the source. By 50 feet the vibration level dissipates to 81VdB.

The nearest residential structures to the project site, are approximately 50 feet from occasional heavy equipment activity. Vibration levels from heavy equipment could thus occasionally be at the 80 VdB annoyance threshold for infrequent/temporary events at the nearest off-site homes.

However, vibration levels will not exceed the building damage threshold and will be perceived as being “barely perceptible”. Construction activity vibration impacts are judged as less-than-significant.

OFF-SITE PROJECT-RELATED VEHICULAR NOISE IMPACTS

Long-term noise concerns from the increase of commercial uses at the project site are primarily based on vehicular operations on project area roadways. These concerns were addressed using the California specific vehicle noise curves (CALVENO) in the federal roadway noise model (the FHWA Highway Traffic Noise Prediction Model, FHWA-RD-77-108). The model calculates the Leq noise level for a reference set of input conditions, and then makes a series of adjustments for site-specific traffic volumes, distances, speeds, or noise barriers.

Table 4 summarizes the 24-hour CNEL level at 50 feet from the roadway centerline along seven roadway segments utilizing data obtained from the Updated Wakerider Beach Resort Traffic Study prepared by RK Engineering, Inc, in June of 2013. Two traffic scenarios were evaluated; existing and existing with project.

As shown in Table 5, project implementation in the opening year does little to change the traffic noise environment. The largest project related impact is +0.4 dB CNEL at 50 feet from the roadway centerline along Grand Avenue at the project access roadway. This increase is much less than the +3 dB significance threshold. Project related traffic noise increases are less-than-significant.

The project traffic noise is comparable to the projections in the Noise Element of the Lake Elsinore General Plan. The General Plan EIR at Section 3.5 (Noise) predicts a traffic noise level of 71 dB Ldn at 100 feet from the centerline of Grand Avenue for a build-out ADT of 60,000 vehicles per day. This projection is consistent with the values in Table 4 based upon a near-term traffic forecast of around 20,000 ADT on Grand Avenue at project build-out.

Commercial retail, as the proposed use closest to Grand Avenue, is considered compatible with baseline noise levels up to 80 dB CNEL. Ambient noise levels of less than 75 dB CNEL are therefore no constraint to development plans. The proposed hotel use is considered compatible up to 70 dB CNEL. With increased set-back and the intervening fast-food structure, traffic noise levels at the closest hotel building façade will be less than 70 dB CNEL. Any proposed outdoor hotel use areas between Buildings C and D will be even farther set-back from Grand Avenue with several intervening structures. With greater distance spreading and structural barriers, noise levels at the hotel outdoor use are or at the marina/park beyond will be less than 60 dB CNEL.

**Table 4
Traffic Noise Impact Analysis
(dBA CNEL at 50 feet from centerline)**

Segment	Existing	Existing w/Project
Grand Ave (SR-74)/ NW of MHP Dwy/	70.9	71.3
MHP Dwy-Project Access	70.9	71.2
Project Access-Serena Way	70.9	71.0
SE of Serena Way	70.8	71.0
Moble Home Pk Dwy/ NE of Grand Ave	50.1	50.1
Project Access/ NE of Grand Ave	NA	60.4
Serena Way/ NE of Grand Ave	54.5	55.0

**Table 5
Project Only Impact
(dBA CNEL at 50 feet from centerline)**

Segment	Project Impact
Grand Ave (SR-74)/ NW of MHP Dwy/	0.4
MHP Dwy-Project Access	0.4
Project Access-Serena Way	0.2
SE of Serena Way	0.2
Moble Home Pk Dwy/ NE of Grand Ave	0.0
Project Access/ NE of Grand Ave	NA
Serena Way/ NE of Grand Ave	0.4

MHP=Mobile Home Park

SITE OPERATIONAL NOISE

Operation of the Wake Rider Resort will generate a variety of potential noise sources. In areas where commercial and residential uses share a common property line, it is often not the overall magnitude of the noise that leads to conflict. It is more typically some unique aspect of the noise event that causes conflicts. Early morning deliveries and back-up alarms are sources that can create noise conflicts in a mixed use environment. Care must be taken to ensure that the residential uses adjacent to the project area are adequately shielded from the on-site commercial noise.

Similarly, late evening commercial activities can create a noise nuisance to adjacent sleeping residences. Drive-through restaurant menu board speakers can be a late-evening nuisance. If sit-down quality restaurant have patio seating, or audible music or voices, they can also create land use conflicts if such activities extend into late evening hours. The largest potential noise conflict from proposed restaurant uses and adjacent residences is from late-evening operation. If the restaurant proposes amplified music or voice, that conflict could occur throughout the evening. Noise conflict from restaurant uses can also occur during clean-up operations late in the evening when trash is dumped, water is sprayed under pressure for removing waste and employees interact with raised voices or “boom box” music. Commercial uses with a potential for noisy activities such food establishments, particularly if an entertainment venue is planned, typically require a conditional use permit (CUP). The CUP contains measures specifically designed to minimize impacts, including noise. Mechanisms, such a permit conditions, are in place to ensure that the project site will maintain compatibility with respect to noise generation. Rescission of a CUP, however, can be a cumbersome process. The most effective noise nuisance control mechanism is to place a relatively short CUP renewal time-table to provide ample opportunity to confirm compliance with intended noise nuisance abatement measures.

The City of Lake Elsinore Municipal Code, Chapter 17.176, restricts refuse collection vehicles to between the hours of 7 a.m. and 7 p.m. adjacent to a residential or noise sensitive area. The Municipal Code also regulates loading or boxes, crates and building materials to between the hours of 7 a.m. and 10 p.m. adjacent to a residential property line. Therefore, the Wake Rider Beach Resort shall restrict deliveries to shops and restaurants to these hours.

All residential uses require sufficient distance separation from commercial buildings to prevent HVAC mechanical equipment on building roofs from being a nuisance. If this is not possible, the HVAC equipment will need to be shielded. These details also must be dealt with during the design stage. A typical HVAC equipment noise level is 50 dB at 10 feet from the source. The City’s daytime noise standard is 50 dB. However, the nocturnal residential ordinance standard is 40 dB. That standard is met approximately 30 feet from a single mechanical equipment source. Multiple units may have a larger noise impact “envelope.” The operation of multiple HVAC or other mechanical equipment units could be required to be screened from a direct line-of-sight to any off-site residences.

The City of Lake Elsinore limits noise exposure at the property lines residential uses. Residential noise exposure is limited to a 50 dB L_{50} daytime and 40 dB L_{50} nocturnal maximum. The maximum allowable single-event noise at any residential property line is 70 dB from 7 a.m. to 10 p.m., and 60 dB from 10 p.m. to 7 a.m. On-site commercial uses must be able to demonstrate that these

thresholds are met at the nearest property lines unless levels are shown to exceed the most stringent standards.

PARKING LOT NOISE

Wake Rider parking will be located at the northern project perimeter adjacent to the mobile home park. All mobile homes are single story. A 6-foot block wall built at the project perimeter would provide approximately 6 dB of noise protection for the single story mobile park uses.

The project traffic report estimates that the peak traffic hour will be in the afternoon and that there will be a total of 154 vehicles both entering and leaving the site. The noise level associated with 154 vehicles traveling at a speed of 25 mph is 52 dB Leq at 50 feet from the drive aisle if a single receiver were exposed to all 154 vehicles. The proposed 6-foot wall would provide at least 6 dB of noise protection such that noise levels would be less than the daytime noise standard. Very little traffic would be generated past 10 p.m. at the Wake Rider Beach Resort.

All noise generated in the parking lot would be of short duration. Experience has shown that parking activity noise tends more to be a nuisance rather than causing any violation of standards. Parking lot activities may be audible from time to time but are generally not perceived as being loud. The proposed 6-foot block wall will assist in mitigating any parking lot nuisance noise generated by the project.

DRIVE THRU MENU BOARD

The most significant noise generator at a commercial use facility such as the proposed fast food restaurant is the menu board. The menu board will be located on the northern side of the restaurant along Grand Avenue. The nearest single family use to the east is approximately 91 feet from the order board and the nearest mobile home to the west is approximately 115 feet. However, few homes will have direct line-of-sight to the order board. Intervening buildings will reduce the direct noise for all but a few residences.

Data was obtained from a representative menu board manufacturer, HM Electronics though this vendor has not been selected for use at this project site. The data is presented in terms of Sound Pressure Levels (SPL). SPL is the noise generated when the menu sound board is operating.

An option offered by the manufacturer incorporates automatic volume control (AVC). AVC will adjust the outbound volume based on the outdoor ambient noise level. When ambient noise levels naturally decrease at night, AVC will reduce the outbound volume on the system. The following data are provided by the manufacturer for different distances from the speaker post, with and without AVC:

Distance from Speaker	Decibel Level of Standard System with 45 dB of outside noise without AVC	Decibel Level of Standard System with 45 dB of outside noise with AVC
1 foot	84 dBA	60 dBA
2 feet	78 dBA	54 dBA
4 feet	72 dBA	48 dBA
8 feet	66 dBA	42 dBA
16 feet	60 dBA	36 dBA
32 feet	54 dBA	-
50 feet	50 dBA	-

The vendor data assumes that the menu board is operating continuously and is therefore higher than actual noise levels from typical use. In reality, the speaker operates for a short time and then there is a delay while the cars queue.

Utilizing the vendor data, soundboard noise decays to 45 dB Leq at 91 and to 43 dB at 115 feet (distances to the closest sensitive uses). Although the single family homes to the east are closer than the mobile homes, in reality, the menu board would face away from the homes and face towards the mobile home park. Therefore, the noise level experienced at the nearest single family home would be less than 45 dB. However, this could exceed the City of Lake Elsinore 40 dB L₅₀ nocturnal noise standard without the use of AVC. With an AVC system, menu-board noise levels will be well within City of Lake Elsinore nocturnal noise standards.

RESTAURANT DINING PATIO NOISE IMPACTS

Outdoor dining generally has soft background music and muted conversation. Larger assemblies of people can create a “cocktail party” effect where voices become progressively raised to be heard above a rising background level. This effect can be further fueled by alcohol consumption that frees normal inhibition. If amplified music is included in celebrations such as weddings or special days of celebration, noise conflicts may occur with the closest neighbors.

Depending upon location and orientation, our noise measurements for special outdoor events has observed noise levels of 80 dB at 20 feet from amplified loudspeakers. The City of Lake Elsinore noise ordinance standard could be exceeded to a distance of 600 feet under worst-case (direct line-of-sight) conditions. If the event lasted past 10 p.m., the noise impact zone could extend well over 1,000 feet from the event. However, any impacts can be minimized by temporary shielding, by orientation of any amplification and by activity time limits. With mitigation, these impacts can be reduced to less-than-significant levels. Noise protection measures will be incorporated into conditional use permit (CUP) conditions which any restaurant use must obtain prior to operation. CUP conditions should include periodic verification that special event sound control is adequate to meet City noise ordinance standards. Similarly, any late-night maintenance shall be conducted in a manner to preclude noise intrusion into adjacent off-site residences.

CONCLUSIONS

It is recommended that a 6-foot CMU wall be constructed along the northern perimeter of the project at the boundary with the Mobile Home Park. This wall will ensure noise from traffic entering and leaving the project site, as well as parking lot activity noise, does not exceed standards at any sensitive use. The wall will also break the line-of-site to the menu board at the proposed fast-food restaurant.

An automatic volume control (AVC) option should be mandated for use by the fast-food restaurant menu board.

Project-related off-site traffic noise changes on existing streets are less than significant.

Possible entertainment activities at any project restaurant shall be required to obtain a CUP to maintain compatibility with respect to noise generation and the CUP shall contain conditions to periodically verify compliance with applicable noise ordinance thresholds.

Any installed HVAC equipment must meet the City of Lake Elsinore noise ordinance standard at the residential project boundary through a selection of quiet equipment and physical shielding as needed.

Project related operational hours for loading activity and refuse collection is regulated by the City of Lake Elsinore Municipal Code as follows:

- Refuse collection vehicles shall restrict activity to between the hours of 7 a.m. and 7 p.m.
- Loading or boxes, crates and building materials is restricted to between the hours of 7 a.m. and 10 p.m. adjacent to a residential property line.

Short-term construction noise intrusion shall be mitigated by compliance with the City of Lake Elsinore Noise Ordinance. The allowed hours of construction are from 7 a.m. to 7 p.m. Monday through Friday. Because of the distance between the project and adjacent residential receivers, construction may be noisier than prescribed limits on occasion but are minimized by the following conditions:

- All equipment shall be equipped with properly operating and maintained mufflers.
- Equipment and materials shall be staged in areas that will create the greatest distance between construction-related noise sources and the noise-sensitive receptors nearest the project site during all project construction.
- All construction-related activities shall be restricted to the construction hours outlined in the City's Noise Ordinance.
- Haul truck and other construction-related trucks traveling to and from the project site shall be restricted to the same hours specified for the operation of construction equipment. To the extent feasible, haul routes shall not pass directly by sensitive land uses or residential dwellings.