

Acoustical Assessment
The Greens Indio Project
City of Indio, California

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LIST OF ABBREVIATED TERMS

APN	Assessor's Parcel Number
ADT	Average daily traffic
dBA	A-weighted sound level
CEQA	California Environmental Quality Act
CLSP	California Landings Specific Plan
CSMA	California Subdivision Map Act
CNEL	Community equivalent noise level
L_{dn}	Day-night noise level
dB	Decibel
du/ac	Dwelling units per acre
L_{eq}	Equivalent noise level
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	Heating ventilation and air conditioning
Hz	Hertz
HOA	Homeowner's association
in/sec	Inches per second
L_{max}	Maximum noise level
μPa	Micropascals
L_{min}	Minimum noise level
PPV	Peak particle velocity
RMS	Root mean square
VdB	Vibration velocity level

1 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the Greens Indio Project (“Project” or “proposed Project”). The purpose of this Acoustical Assessment is to evaluate the potential construction and operational noise and vibration levels associated with the Project and determine the level of impact the Project would have on the environment.

1.1 Project Location and Setting

The Project site is located at the northeastern corner of Jackson Street and Avenue 42 (APNs 692-670-001, -014, and -017), in the City of Indio (City), California; refer to **Figure 1, Regional Location Map**. The Project site is approximately 6.34 acres and regional access to the Project site is provided via Interstate 10 (I-10). Local access to the Project site is provided via Jackson Street and Avenue 42, both four-lane roadways. The Project site is surrounded by commercial uses to the west, north, and south, a golf course to the east, and residential uses to the north. The site is bordered by a surface parking lot to the north, Jackson Street to the west, Avenue 42 to the south, and the Lights at Indio Golf Course to the east; refer to **Figure 2, Project Vicinity Map**.

1.2 Project Description

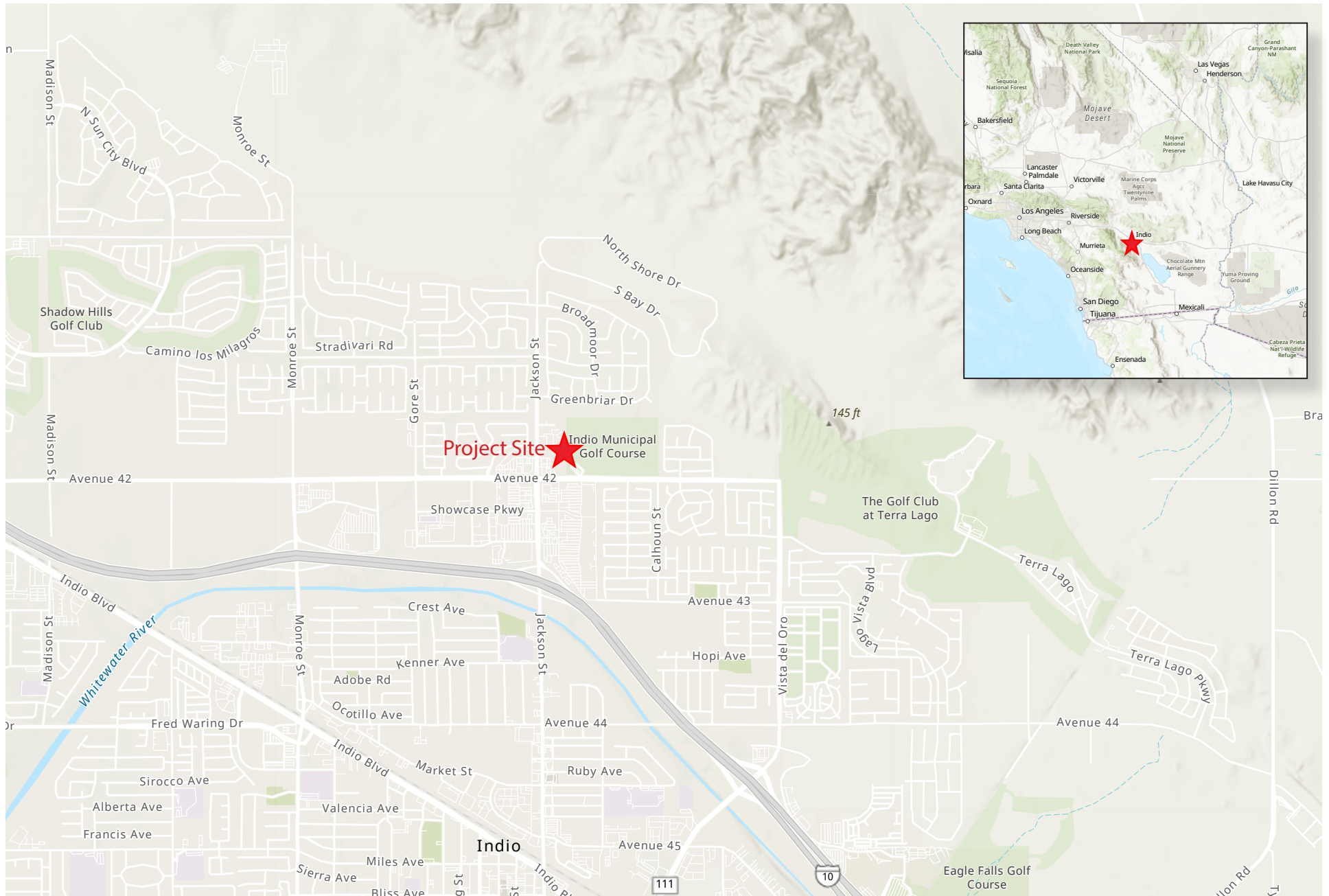
The Project proposes a mixed-use development consisting of 13,288 square feet (sf) of commercial retail space including the following: a 3,750 sf fast food restaurant with drive-through; a 980 sf coffee shop with drive-through; a 3,996 sf fast food restaurant with drive-through; and a 4,562 sf high turnover sit down restaurant with a patio opening up to the golf course; refer to **Figure 3, Site Plan**. As noted above, Project site’s ingress and egress would be provided via four driveways with two located on Jackson Street and two located on Avenue 42. Approximately 17 percent (approximately 38,823 sf) of the Project site area would be landscaped.

Project implementation would require the construction of new on-site and off-site utility infrastructure connections to serve the proposed commercial retail uses. These utilities would be connected to existing utility infrastructure. Trenching for new electrical conduit and wire would occur on the north side of Avenue 42 behind the existing sidewalk and from the single-family development to the western boundary of the Project site. The off-site trenching would be approximately 1,250 feet from the western boundary of the single-family residential development to the eastern terminus of the Project site. Trenching and construction activities associated with these off-site improvements are evaluated as a part of the overall Project.

Construction is anticipated to occur over a duration of approximately eight months, commencing in January 2024.

Parking

The Project is anticipated to provide 245 vehicle parking stall and 10 bicycle parking spaces would be provided on-site. Additionally, a new golf course parking lot, consisting of 87 parking stalls, will be constructed on City owned property located on the southeastern corner of the site, for use by the golf course as part of this Project refer to **Figure 3**.



Source: USGS, 2023

Figure 1: Regional Location Map
The Greens Indio Project



Not to scale



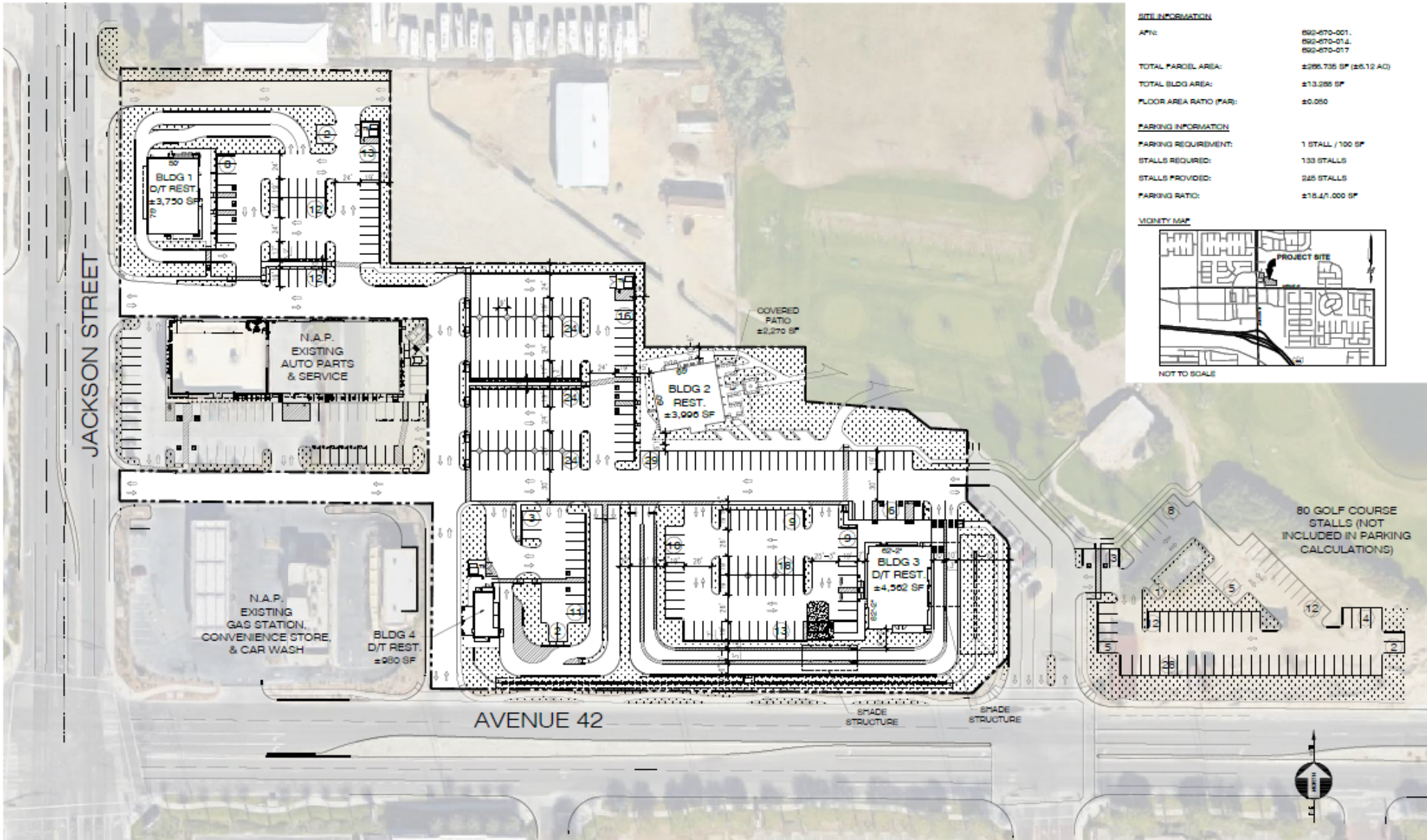
Figure 2: Project Vicinity Map

The Greens Indio Project



Not to scale

Kimley»Horn



2 ACOUSTIC FUNDAMENTALS

2.1 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. The fundamental model consists of a noise source, a receptor, and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound. A typical noise environment consists of ambient noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this ambient noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to continuous noise from 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 range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micro-pascals (μPa) 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 dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness. **Table 1: Typical Noise Levels** provides typical noise levels.

Table 1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Jet fly-over at 1,000 feet	– 110 –	Rock Band
Gas lawnmower at 3 feet	– 100 –	
Diesel truck at 50 feet at 50 miles per hour	– 90 –	Food blender at 3 feet
Noisy urban area, daytime	– 80 –	Garbage disposal at 3 feet
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	– 20 –	Bedroom at night, concert hall (background)
	– 10 –	Broadcast/recording studio
Lowest threshold of human hearing	– 0 –	Lowest threshold of human hearing

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

Noise Descriptors

The dB 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}) represents the equivalent continuous sound pressure level over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of sound energy 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 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 μPa (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 dB 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 μPa). 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 dB 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.
Maximum Noise Level (L_{max}) Minimum Noise Level (L_{min})	The maximum and minimum dBA during the measurement period.
Exceeded Noise Levels (L_{01} , L_{10} , L_{50} , L_{90})	The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day-Night Noise Level (L_{dn})	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 at 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 a.m. to 10:00 a.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 (dBA) 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. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. 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 dBA values. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of dBA, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The dB 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 dB 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.¹ When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions.² Under the dB scale, three sources of equal loudness together would produce an increase of approximately 5 dBA.

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. 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.³ 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.⁴ The way older homes in California were constructed generally

¹ FHWA, *Noise Fundamentals*, 2017. Available at: https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

² Ibid.

³ California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, Page 2-29, September 2013.

⁴ James P. Cowan, *Handbook of Environmental Acoustics*, 1994.

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.⁵ 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 dBA, the following relationships should be noted⁶:

- Except in carefully controlled laboratory experiments, a 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase 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.

Effects of Noise on People

Hearing Loss. While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Annoyance. Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference

⁵ Compiled from James P. Cowan, *Handbook of Environmental Acoustics*, 1994 and Cyril M. Harris, *Handbook of Noise Control*, 1979.

⁶ Compiled from California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013, and FHWA, *Noise Fundamentals*, 2017.

with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance⁷.

2.2 Ground-Borne Vibration

Sources of ground-borne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions or heavy equipment use during construction). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is vibration decibels (VdB) (the vibration velocity level in decibel scale). Other methods are the peak particle velocity (PPV) and the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations, displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where ground-borne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for ground-borne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

⁷ Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Maximum PPV (in/sec)	Vibration Annoyance Potential Criteria	Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.008	--	Extremely fragile historic buildings, ruins, ancient monuments	--
0.01	Barely Perceptible	--	--
0.04	Distinctly Perceptible	--	--
0.1	Strongly Perceptible	Fragile buildings	--
0.12	--	--	Buildings extremely susceptible to vibration damage
0.2	--	--	Non-engineered timber and masonry buildings
0.25	--	Historic and some old buildings	--
0.3	--	Older residential structures	Engineered concrete and masonry (no plaster)
0.4	Severe	--	--
0.5	--	New residential structures, Modern industrial/commercial buildings	Reinforced-concrete, steel or timber (no plaster)

PPV = peak particle velocity; in/sec = inches per second; FTA = Federal Transit Administration

Source: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020 and Federal Transit Administration, *Transit Noise and Vibration Assessment Manual*, 2018.

3 REGULATORY SETTING

To limit population exposure to physically 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 Federal

Federal Transit Administration Noise and Vibration Guidance

The Federal Transit Administration (FTA) has published the Transit Noise and Vibration Impact Assessment Manual (FTA Transit Noise and Vibration Manual) to provide guidance on procedures for assessing impacts at different stages of transit project development. The report covers both construction and operational noise impacts and describes a range of measures for controlling excessive noise and vibration. In general, the primary concern regarding vibration relates to potential damage from construction. The guidance document establishes criteria for evaluating the potential for damage for various structural categories from vibration.

3.2 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 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.

3.3 Local

City of Indio General Plan

The Indio General Plan identified goals, policies, and implementations in Chapter 11. The Noise Chapter contains goals, policies, and actions that seek to reduce community noise exposure to excessive noise levels through the establishment of noise level standards for a variety of land uses. **Table 4: Noise**

Compatibility Guidelines describes the eight land-use categories and their outdoor noise compatibility guidelines.

Table 4: Noise Compatibility Guidelines

Land-Use Category	Exterior Noise Exposure (DNL), in dBA		
	Acceptable ¹	Conditionally Acceptable ²	Unacceptable ³
Residential – Single family residences, mobile homes, senior housing, convalescent homes	Up to 60	>60 to 75	>75
Residential - Multi-family residences, mixed-use (commercial/residential)	Up to 65	>65 to 75	>75
Transient Lodging – Motel, Hotels, Resorts	Up to 65	>65 to 75	>75
Schools, Churches, Hospitals, Nursing Homes, Child Care Facilities	Up to 65	>65 to 80	>80
Passive Recreational Parks, Nature Preserves, Contemplative Spaces, Cemeteries	Up to 65	>65 to 75	>75
Active Parks, Golf Courses, Athletic Fields, Outdoor Spectator Sports, Water Recreation	Up to 70	>70 to 75	>75
Office/Professional, Government, Medical/Dental, Commercial, Retail, Laboratories	Up to 70	>70 to 75	>75
Industrial, Manufacturing, Utilities, Agriculture, Mining, Stables, Ranching, Warehouse, Maintenance and Repair	Up to 70	>70 to 85	>85
1. Normally Acceptable – Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. 2. Conditionally Acceptable – New construction or development should be undertaken only after a detailed noise analysis is conducted to determine if noise reduction measures are necessary to achieve acceptable levels for land use. If a project cannot mitigate noise to a level deemed Acceptable, the appropriate county decision-maker must determine that mitigation has been provided to the greatest extent practicable or that extraordinary circumstances exist. 3. Unacceptable – New construction or development shall not be undertaken.			
Source: City of Indio General Plan, 2019.			

Chapter 11, Noise, of the General Plan identifies the following goals and policies related to noise:

Goal NE-1: Land Use Compatibility. A City where noise exposure is minimized for those living, working, and visiting the community.

- NE 1.1: Protect noise-sensitive uses, such as residences, schools, health care facilities, hotels, libraries, and churches, from excessive noise levels through land use capability/adjacency build design, and noise ordinance enforcement.
- NE 1.2: Apply the Noise Compatibility Matrix, shown in Table 11-1, as a guide for planning and development decisions. The City will require projects involving new development or modifications to existing development to implement mitigation measures, where necessary, to reduce noise levels to at least the normally compatible range shown in the City's Noise Compatibility Matrix shown in Table 11-1. Mitigation measures should focus on architectural features and building design and construction, rather than site design features, such as excessive setbacks, berms, and sound walls, to maintain compatibility with adjacent and surrounding uses.
- NE-1.6: Limit delivery or service hours for stores and businesses with loading areas, docks, or trash bins that front, side, border, or gain access on driveways next to residential and other noise sensitive areas, such as residences, schools, hospitals, religious meeting spaces, and recreation areas.
- NE-1.7: Prioritize the building design and character policies in the Land Use and Community Character Element over those in the Noise Element to ensure that new development meets the design vision of the city. This policy will not apply when noise levels are clearly in the incompatible range as shown in the City's Noise Compatibility Matrix shown in Table 11-1.

Goal NE-2: Mobile Noise Sources. A City with minimal mobile source-generated noise levels.

- NE-2.4: Implement the policies listed under Goal 1 to reduce the impacts of roadway noise on noise-sensitive receptors where roadway noise exceeds the normally compatible range shown in the City's Noise Compatibility Matrix shown in Table 11-1.
- NE-2.5: Require the use of traffic calming measures such as reduced speed limits or roadway design features to reduce noise levels where roadway noise exceeds the normally compatible range shown in the City's Noise Compatibility Matrix shown in Table 11-1.

Goal NE-3: Stationary Noise Sources. A City with minimal stationary source-generated noise levels.

- NE-3.1: Minimize noise conflicts between neighboring properties through enforcement of applicable regulations, such as the City's Noise Control Ordinance.
- NE-3.3: Require noise generating uses, such as restaurants, bars, entertainment venues, and industrial manufacturing operations to minimize noise impacts on adjacent noise-sensitive receptors when there is a potential for adverse noise impacts to occur.

- NE-3.4: Require development to minimize the exposure of neighboring properties to excessive noise levels from construction-related activity during all phases of construction.

City of Indio Municipal Code

Per Section 95C.08 Disturbing, Excessive, Offensive Noises or Vibration Created by Vehicles, Tools, Machinery; Declaration of Certain Acts Constituting, the following activities, among others, are declared to cause disturbing, excessive or offensive noises or vibration in violation of this section but such enumeration shall not be deemed to be exclusive, namely:

- b. Controlled hours of operation. Notwithstanding the provisions of Chapter 151 of the City's Code it shall be unlawful for any person to operate, permit, use or cause to operate, any of the following:
 - 2. Loading and unloading of vehicles, operating of fork lifts or cranes within 1,000 feet of a residence [exempted if distance from residential area exceeds 1,000 feet or as it may be reduced by the Planning Commission subject to design review or conditional use permit]; and
 - 3. Construction tools and machinery

Other than between the hours of:

Pacific Standard Time.

- a. Monday through Friday, 7:00 AM through 6:00 PM
- b. Saturday, 8:00 AM through 6:00 PM
- c. Sunday, 9:00 AM through 5:00 PM
- d. Government Holidays, 9:00 AM through 5:00 PM

Pacific Daylight Time.

- a. Monday through Friday, 6:00 AM through 6:00 PM
- b. Saturday, 7:00 AM through 6:00 PM
- c. Sunday, 9:00 AM through 5:00 PM
- d. Government Holidays, 9:00 AM through 5:00 PM

4 EXISTING CONDITIONS

4.1 Existing Noise Sources

The City is impacted by various noise sources. Mobile sources of noise, especially cars, trucks, and trains are the most common and significant sources of noise. Other noise sources are the various land uses (i.e., residential, commercial, institutional, and recreational and parks activities) throughout the City that generate stationary-source noise.

Mobile Sources

The predominant mobile noise source near the Project site is the traffic noise along Avenue 42, which is located directly south of the site, and Jackson Street, which is located to the west. I-10 is located approximately 0.5-mile to the south of the Project site and is also a contributor to mobile traffic noise in the vicinity of the site.

Stationary Sources

The primary sources of stationary noise in the vicinity of the Project site are those associated with the operations of adjacent commercial uses surrounding the site. The noise associated with these sources may represent a single-event noise occurrence or short-term noise. Other noises include those typical of urban areas, including mechanical equipment (e.g., heating ventilation and air conditioning [HVAC] equipment), dogs barking, idling vehicles, and employee/patron talking.

4.2 Noise Measurements

To quantify existing ambient noise levels in the Project area, Kimley-Horn conducted four short-term noise measurements on January 31, 2023; see Appendix A: Noise Data. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Project site. The 10-minute measurements were taken between 11:11 a.m. and 12:07 p.m. near potential and existing sensitive receptors (see **Figure 4, Noise Measurement Locations**) surrounding the site. Short-term L_{eq} measurements are considered representative of the noise levels throughout the day. The noise levels and sources of noise measured at each location are listed in **Table 5: Existing Noise Measurements**.

Table 5: Existing Noise Measurements

Site	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Time
1	Corner of Avenue 42 and Gold Course Drive, by the Lights Golf Course Office	58.3	48.3	71.4	11:11 a.m.
2	North of Avenue 42, in between Jackson Street and Golf Course Road	65.8	55.3	77.0	11:25 a.m.
3	Corner of Generations Drive and Jackson Street	66.4	40.7	79.4	11:45 a.m.
4	Jackson Street between Desert Trace Way and Generations Drive	63.4	42.4	76.1	11:57 a.m.
Source: Noise measurements taken by Kimley-Horn, January 31, 2023. See Appendix A for noise measurement results.					



Source: Nearmap, 2023

Figure 4: Noise Measurement Locations
The Greens Indio Project



Not to scale

Kimley»Horn
Expect More. Experience Better.

4.3 Sensitive Receptors

Sensitive populations are more susceptible to the effects of noise pollution than is the general population. Sensitive receptors that are in proximity to stationary sources of noise and vibration are of particular concern. Noise sensitive uses typically include residences, hospitals, schools, childcare facilities, and places of assembly. Vibration sensitive receivers are generally similar to noise sensitive receivers but may also include businesses, such as research facilities and laboratories that use vibration-sensitive equipment. Sensitive land uses within 1,000 feet of the Project site consist of single-family residential communities. Sensitive land uses nearest to the Project site are shown in **Table 6: Sensitive Receptors**.

Table 6: Sensitive Receptors

Receptor Description	Distance ¹ and Direction from the Project
Single-Family Residences	150 feet to the southeast
Single-Family Residences	190 feet to the northwest
1. Distance measured from the Project site boundary to the nearest sensitive receptor property line.	
Source: Google Earth, 2023.	

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains analysis guidelines related to noise impacts. These guidelines have been used by the City to develop thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generate excessive ground-borne vibration or ground-borne noise levels; and
- For a project located within the vicinity of a private airstrip or 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.

5.2 Methodology

Construction

Construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration (FTA) and FHWA. Construction noise is assessed in dBA L_{eq} . This unit is appropriate because L_{eq} can be used to describe noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period.

Reference noise levels are used to estimate operational noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

The City of Indio has not adopted a numerical threshold that identifies what a substantial increase would be. For purposes of this analysis, the criteria from the FTA Transit Noise and Vibration Manual is used to establish significance thresholds. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. For residential uses, the daytime noise threshold is 80 dBA L_{eq} averaged over an 8-hour period ($L_{eq(8-hr)}$); and the nighttime noise threshold is 70 dBA $L_{eq(8-hr)}$. For commercial uses, the daytime and nighttime noise threshold is 85 dBA $L_{eq(8-hr)}$. In compliance with the City's Municipal Code, it is assumed that construction would not occur during the noise-sensitive nighttime hours.

Operations

The analysis of the Project's noise environment is based on noise prediction modeling and empirical observations. Reference noise level data are used to estimate the Project's operational noise impacts from stationary sources. Noise levels were collected from published sources from similar types of activities and used to estimate noise levels expected with the Project's stationary sources. The reference noise levels are used to represent a worst-case noise environment as noise level from stationary sources can vary

throughout the day. Operational noise is evaluated based on the standards within the City's noise standards and General Plan. Per the City of Indio General Plan, exterior noise levels of up to 60 dBA CNEL are "acceptable for single-family residential uses, 65 dBA CNEL are "acceptable" for multi-family residential uses, and levels up to 75 dBA CNEL are "conditionally acceptable" for both single-family and multi-family residential uses.

Vibration

Ground-borne vibration levels associated with construction activities for the Project were evaluated utilizing typical ground-borne vibration levels associated with construction equipment, obtained from FTA published data for construction equipment. Potential ground-borne vibration impacts related to building/structure damage and interference with sensitive existing operations were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria for structural damage and human annoyance. Per FTA guidance, a vibration limit of 12.7 millimeters per second (mm/sec; 0.5 inch/sec) PPV is used for buildings that are structurally sound and designed to modern engineering standards. A conservative vibration limit of five mm/sec (0.2 inches/sec) PPV has been used for buildings that are found to be structurally sound but where structural damage is a major concern. For historic buildings or buildings that are documented to be structurally weakened, a conservative limit of two mm/sec (0.08 inches/sec) PPV is used to provide the highest level of protection.

6 POTENTIAL IMPACTS AND MITIGATION

6.1 Acoustical Impacts

Threshold 6.1 Would the Project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Construction

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. During construction, exterior noise levels could affect the residential neighborhoods located to the northwest and southeast of the construction site. However, it is acknowledged that construction activities would occur throughout the Project site and would not be concentrated at a single point near sensitive receptors.

Construction activities would include site preparation, grading, building construction, paving, and architectural coating. Typical operating cycles for the construction equipment used in these phases may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping material or the hydraulic movement of machinery lifts). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Typical noise levels associated with individual construction equipment are listed in **Table 7: Typical Construction Noise Levels**.

Table 7: Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source
Air Compressor	80
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	82
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	80
Paver	85
Pile-driver (Impact)	101

Table 7: Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source
Pile-driver (Sonic)	95
Pneumatic Tool	85
Pump	77
Roller	85
Saw	76
Scraper	85
Shovel	82
Truck	84
Source: Federal Transit Administration, <i>Transit Noise and Vibration Impact Assessment Manual</i> , September 2018.	

Following the FTA's methodology for quantitative construction noise assessments, the FHWA Roadway Construction Noise Model (RCNM) was used to predict construction noise. Per the FTA Transit Noise and Vibration Manual, when calculating construction noise, all construction equipment is assumed to operate simultaneously at the center of the active construction zone. Because in reality, equipment would be operating throughout the site and not all of the equipment would be operating at the point closest to the sensitive receptors and considering the distance between the center of the Project site and the sensitive receptors is a reasonable assumption.

The noise levels identified in **Table 8: Project Construction Noise Levels**, show the exterior construction noise at the nearest sensitive receptors, without accounting for attenuation from existing physical barriers. As shown in **Table 8**, construction noise levels would not exceed the applicable FTA construction noise thresholds. The highest exterior noise level at the nearest sensitive receptors would occur during the grading stage of construction and would be 64.4 dBA which is below the FTA's 80 dBA L_{eq} construction threshold.

Construction activities may also cause increased noise along site access routes due to movement of equipment and workers. However, compliance with the Municipal Code would minimize impacts from construction noise, as construction would be limited to daytime hours on weekdays and Saturdays.

As discussed above, construction noise levels associated with the proposed Project would not exceed the FTA's construction noise thresholds and would be required to comply with the Municipal Code standards. Therefore, the Project would result in a less than significant construction noise impact.

Table 8: Project Construction Noise Levels

Construction Phase	Receptor Location		Worst Case Modeled Noise Level, dBA _{Leq (8-hour)} ²	FTA Noise Standard, dBA _{Leq} ³	Exceeded?
	Land Use	Distance (feet) ¹			
Demolition	Residential	780	62.8	80	No
	Residential	850	62.1	80	No
Site Preparation	Residential	780	61.2	80	No
	Residential	850	60.4	80	No
Grading	Residential	780	64.4	80	No
	Residential	850	63.7	80	No
Trenching	Residential	75	73.9	80	No
	Residential	160	67.3	80	No
Paving	Residential	780	59.1	80	No
	Residential	850	58.3	80	No
Building Construction	Residential	780	59.5	80	No
	Residential	850	58.8	80	No
Architectural Coating	Residential	780	49.9	80	No
	Residential	850	49.1	80	No

1. Distance measured from the center of the Project site to the receptor's nearest property line. For trenching, distances are measured from the location of trenching activities to the receptor's nearest property line.

2. Modeled noise levels conservatively assume the simultaneous operation of all pieces of equipment.

3. The FTA Noise and Vibration Manual establishes construction noise standards of 80 dBA_{Leq(8-hour)} for residential uses and 85 dBA_{Leq(8-hour)} for commercial uses.

Source: Federal Highway Administration, *Roadway Construction Noise Model*, 2006. Refer to [Appendix A](#) for noise modeling results.

Operations

Implementation of the proposed Project would create new sources of noise in the vicinity of the Project site. The major noise sources associated with the Project including the following:

- Mechanical equipment (e.g., trash compactors, air conditioners);
- Drive-through operations;
- Outdoor dining;
- Parking areas (i.e., car door slamming, car radios, engine start-up, and car pass-by); and
- Off-site traffic noise

Mechanical Equipment. Potential stationary noise sources related to long-term operation of the Project site would include mechanical equipment. Mechanical equipment (e.g., heating ventilation and air conditioning [HVAC] equipment) typically generates noise levels of approximately 52 dBA at 50 feet.⁸ At the closest sensitive receptor (the single-family residences located approximately 250 feet northwest of on-site mechanical equipment), mechanical equipment noise would attenuate to 38.0 dBA and would not

⁸ Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.

exceed the City's allowable noise levels of 60 dBA for residential uses. Therefore, the proposed Project would result in a less than significant impact related to stationary noise levels.

Drive-Through Operations. The Project proposes three new drive-through restaurants on vacant land. Drive-through menu boards and intercoms could be located to the west of the proposed restaurant building located in the northwestern corner of the Project site along Jackson Street, as well as to the south of the proposed restaurant building located in the southeastern corner of the Project site along Avenue 42. The Project would also include a drive-through coffee-shop located on the southwestern corner of the site. Project noise sources from drive-through operations include amplified speech from the intercom, idling vehicles, vehicles circulating along the drive-through lanes. The measured noise level associated with active drive-through operations is 64 dBA at a distance of 20 feet.⁹ The closest sensitive receptors to the proposed drive-through activities are the single-family residences located approximately 140 feet to the northwest of the Project site. At this distance, drive-through noise would attenuate to 47.1 dBA, which is below the City's 60 dBA exterior noise level standards for residential uses. Therefore, the proposed Project would result in a less than significant impact related to drive-through noise levels.

Outdoor Dining. The Project would include an outdoor dining area on the eastern façade of the proposed high-turnover restaurant building located in the northeastern corner of the Project site. The outdoor dining area would be used by individuals or small groups to gather outside for a meal and may include low-level background music. Outdoor dining areas with music can generate noise levels up to approximately 82 dBA at one meter from the source.¹⁰ At the nearest sensitive receptors (single-family residences) located approximately 630 feet northwest of the outdoor dining area, outdoor dining noise would attenuate to 35.6 dBA and would not exceed the City's allowable noise levels of 60 dBA for residential uses. Therefore, the proposed Project would result in a less than significant impact related to outdoor dining noise levels.

Parking Lot Noise. The Project would provide 242 parking stalls for passenger vehicles. Parking stalls would be located throughout the Project site. Nominal parking noise would occur within the on-site parking facilities. Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 53 to 61 dBA¹¹ at 50 feet and may be an annoyance to adjacent noise-sensitive receptors. Conversations in parking areas may also be an annoyance to nearby sensitive receptors. Sound levels of speech typically range from 33 dBA at 50 feet for normal speech to 50 dBA at 50 feet for very loud speech.¹² It should be noted that parking lot noises are instantaneous noise levels compared to noise standards in the hourly L_{eq} metric, which are averaged over the entire duration of a time period.

Parking lot noise would occur at the surface parking lot on-site and would attenuate to approximately 47.0 dBA at the nearest residential receptors located 250 feet northwest of the Project parking area and would not exceed the City's allowable noise levels of 60 dBA for residential uses. Parking lot noise also currently occurs at the adjacent properties under existing conditions. Parking lot noise would be consistent with the existing noise in the vicinity and would be partially masked by background noise from

⁹ Drive-through noise sample collected at Raising Cane's restaurant by Kimley-Horn on August 17, 2018.

¹⁰ Obtained from the SoundPLAN Essential version 5.0 reference noise level database.

¹¹ Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.

¹² Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, 2015.

traffic along area roadways. Noise associated with parking lot activities is not anticipated to exceed the City's noise standards during operation. Therefore, noise impacts from parking lots would be less than significant.

Off-Site Traffic Noise. Implementation of the Project would generate increased traffic volumes along nearby roadway segments. Traffic data provided by Kimley-Horn (2023) shows that the proposed Project would generate 7,632 daily 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.¹³ 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.

According to the Coachella Valley Association of Governments (CVAG) Coachella Valley Traffic Count Data 2010–2017, the average daily traffic along Jackson Street (the closest Collector Roadway with available traffic volumes) is 8,468 vehicles.¹⁴ Therefore, the proposed Project would not generate sufficient traffic to double existing volumes and result in a permanent 3-dBA increase in ambient noise levels. Noise impacts associated with traffic would be less than significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.2 Would the Project generate excessive ground-borne vibration or ground-borne noise levels?

Increases in ground-borne vibration levels attributable to the proposed Project would be primarily associated with short-term construction-related activities. Construction on the Project site would have the potential to result in varying degrees of temporary ground-borne vibration, depending on the specific construction equipment used and the operations involved.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations in their 2018 *Transit Noise and Vibration Impact Assessment Manual*. The types of construction vibration impacts include human annoyance and building damage. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 in/sec) appears to be conservative. The types of construction vibration impacts 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 (0.20 in/sec annoyance threshold)¹⁵. 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. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines

¹³ Federal Highway Administration, *Highway Traffic Noise Analysis and Abatement Policy and Guidance, Noise Fundamentals*, https://www.fhwa.dot.gov/Environment/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed February 2, 2023.

¹⁴ Coachella Valley Association of Governments (CVAG), *Coachella Valley Traffic Count Data 2010–2017*, <https://www.arcgis.com/apps/View/index.html?appid=fb9489b188e74be3b599afb52741849d>, accessed February 2, 2023. This represents the closest intersection to the Project site for which recent traffic counts have been collected.

¹⁵ California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, Table 5, April 2020

show that a vibration level of up to 0.20 in/sec is considered safe and would not result in any construction vibration damage.

The nearest structure to the Project site is the AutoZone Auto Parts building located approximately 30 feet to the west. The nearest residential structure is located approximately 75 feet northwest of the Project site. **Table 9: Typical Construction Equipment Vibration Levels**, lists vibration levels at 25 feet, 30 feet and 140 feet for typical construction equipment. Ground-borne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in **Table 9**, based on FTA data, vibration velocities from typical heavy construction equipment operations that could be used during Project construction range from 0.002 to 0.159 in/sec PPV at 30 feet from the source of activity (the distance from active construction zone to the nearest structure to the west), which is below the FTA's 0.20 PPV threshold for structural damage and Caltrans threshold for annoyance. Therefore, vibration impacts associated with the Project construction would be less than significant.

Table 9: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity at 25 Feet (in/sec)	Peak Particle Velocity at 30 Feet (in/sec) ¹	Peak Particle Velocity at 140 Feet (in/sec) ¹
Vibratory Roller	0.210	0.159	0.040
Large Bulldozer	0.089	0.067	0.017
Loaded Trucks	0.076	0.058	0.015
Small Bulldozer/ Tractors	0.003	0.002	0.001
1. Calculated using the following formula: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$, where: PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for the distance; PPV_{ref} = the reference vibration level in in/sec from Table 7-4 of the Federal Transit Administration, <i>Transit Noise and Vibration Impact Assessment Manual</i> , 2018; D = the distance from the equipment to the receiver. 2. Calculated using the following formula: $L_v(D) = L_v(25 \text{ feet}) - (30 \times \log_{10}(D/25 \text{ feet}))$ per the FTA Transit Noise and Vibration Impact Assessment Manual (2018).			
Source: Federal Transit Administration, <i>Transit Noise and Vibration Impact Assessment Manual</i> , 2018.			

Once operational, the Project would not be a significant source of ground-borne vibration. Ground-borne vibration surrounding the Project currently result from heavy-duty vehicular travel (e.g., refuse trucks, heavy duty trucks, delivery trucks, and transit buses) on the nearby local roadways. Operations of the proposed Project would include periodic truck deliveries. Due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity. According to the FTA's Transit Noise and Vibration Impact Assessment, trucks rarely create vibration levels that exceed 70 VdB (equivalent to 0.012 inches per second PPV) when they are on roadways. Therefore, trucks operating at the Project site or along surrounding roadways would not exceed FTA thresholds for building damage or annoyance. Impacts would be less than significant in this regard.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.3 For a Project located within the vicinity of a private airstrip or 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?

The nearest airport to the Project site is the Crown Aero Bermuda Dunes Airport, a public use strip, located approximately 2.9 miles to the west. The Project site is not within 2.0 miles of a public airport or private airfield, or identified within an airport land use plan. Therefore, the Project would not expose people residing or working in the Project area to excessive airport- or airstrip-related noise levels and no mitigation is required.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

6.2 Cumulative Noise Impacts

Cumulative Construction Noise

The Project's construction activities would not result in a substantial temporary increase in ambient noise levels. Construction noise would be periodic and temporary noise impacts that would cease upon completion of construction activities. The Project would contribute to other proximate construction Project noise impacts if construction activities were conducted concurrently. However, based on the noise analysis above, the Project's construction-related noise impacts would be less than significant following the City of Indio Municipal Code and FTA Construction Noise Standards.

Construction activities at other planned and approved projects near the Project site would be required to comply with applicable City rules related to noise and would take place during daytime hours on the days permitted by the applicable Municipal Code, and projects requiring discretionary City approvals would be required to evaluate construction noise impacts, comply with the City's standard conditions of approval, and implement mitigation, if necessary, to minimize noise impacts. Construction noise impacts are by nature localized. Based on the fact that noise dissipates as it travels away from its source, noise impacts would be limited to the Project site and vicinity. Therefore, Project construction would not result in a cumulatively considerable contribution to significant cumulative impacts, assuming such a cumulative impact existed, and impacts in this regard are not cumulatively considerable.

Cumulative Operational Noise

Cumulative Off-Site Traffic Noise. Cumulative noise impacts describe how much noise levels are projected to increase over existing conditions with the development of the proposed Project and other foreseeable projects. Cumulative noise impacts generally occur as a result of increased traffic on local roadways due to buildout of the proposed Project and other projects in the vicinity. However, the Project is projected to result in 7,632 net new daily vehicular trips and would result in a minimal traffic noise increase (less than 3.0 dBA) along local roadways. Therefore, the proposed Project's contribution would not be cumulatively considerable.

Cumulative Stationary Noise. Stationary noise sources of the proposed Project would result in an incremental increase in non-transportation noise sources in the vicinity of the site. However, as discussed above, operational noise caused by the proposed Project would be less than significant. Similar to the proposed Project, other planned and approved projects would be required to mitigate for stationary noise

impacts at nearby sensitive receptors, if necessary. As stationary noise sources are generally localized, there is a limited potential for other projects to contribute to cumulative noise impacts.

No known present or reasonably foreseeable projects would combine with the operational noise levels generated by the Project to increase noise levels above acceptable standards because each project must comply with applicable City regulations that limit operational noise. Therefore, the Project, together with other projects, would not create a significant cumulative impact, and even if there was such a significant cumulative impact, the Project would not make a cumulatively considerable contribution to significant cumulative operational noises.

Given that noise dissipates as it travels away from its source, operational noise impacts from on-site activities and other stationary sources would be limited to the Project site and immediate vicinity. Thus, cumulative operational noise impacts from related projects, in conjunction with Project-specific noise impacts, would not be cumulatively significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

7 REFERENCES

1. California Department of Transportation, *Traffic Noise Analysis Protocol*, 2011.
2. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.
3. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020
4. City of Indio, *General Plan*, 2019.
5. City of Indio, *Municipal Code*, 2022.
6. Coachella Valley Association of Governments (CVAG), *Coachella Valley Traffic Count Data 2010–2017*, <https://www.arcgis.com/apps/View/index.html?appid=fb9489b188e74be3b599afb52741849d>, accessed February 2, 2023.
7. Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010
8. Federal Highway Administration, *Noise Fundamentals*, 2017.
9. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
10. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
11. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018
12. James P. Cowan, *Handbook of Environmental Acoustics*, 1994
13. Kimley-Horn, *Trip Generation for the Greens Indio Project*, January 2023.
14. Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.

Appendix A

NOISE DATA

The Greens Indio

Construction Hours:

Daytime hours (7 am to 7 pm)	8
Evening hours (7 pm to 10 pm)	0
Nighttime hours (10 pm to 7 am)	0

Receptor (Land Use)		Distance (feet)	Shielding	Direction												
Single Family NW		850	0	NW												
Single Family SE		780	0	SE												
Single Family NE		75	0	W												
Single Family S		160	0	NW												
					RECEPTOR 1		RECEPTOR 2		RECEPTOR 3			RECEPTOR 4				
Equipment Type	No. of Equip.	Reference		Noise Level at 50ft per Unit, Lmax	Noise Level at Receptor 1, Lmax	Noise Level at Receptor 1, Leq	Noise Level at Receptor 2, Lmax	Noise Level at Receptor 2, Leq	Noise Level at Receptor 3, Lmax	Noise Level at Receptor 3, Leq	Noise Level at Receptor 4, Lmax	Noise Level at Receptor 4, Leq				
		Acoustical Usage Factor														
Concrete Saw	1	20%	90	65.0	58.0	65.7	749515.8	58.7								
Dozer	1	40%	82	57.1	53.1	57.8	243114.5	53.9								
Tractor	2	40%	84	62.4	58.4	63.1	825735.2	59.2								
Backhoe	1	40%	78	53.0	49.0	53.7	94582.5	49.8								
					62.1			62.8								
Grader	1	40%	85	60.4	56.4	61.1	519769.5	57.2								
Scraper	1	40%	84	59.0	55.0	59.7	376539.7	55.8								
Tractor	1	40%	84	59.4		60.1	412867.6	56.2								
					60.4			61.2								
Grader	2	40%	85	63.4	59.4	64.1	1039539.0	60.2								
Dozer	2	40%	82	60.1	56.1	60.8	486228.9	56.9								
Tractor	3	40%	84	64.2	60.2	64.9	1238602.8	60.9								
					63.7			64.4								
Crane	1	16%	81	56.0	48.0	56.7	75486.8	48.8								
Man Lift	2	20%	75	53.1	46.1	53.8	48507.7	46.9								
Generator	1	50%	81	56.0	53.0	56.7	235896.1	53.7								
Tractor	1	40%	84	59.4	55.4	60.1	412867.6	56.2								
Welder/Torch	3	40%	74	54.2	50.2	54.9	123860.3	50.9								
					58.8			59.5								
Concrete Mixer Truck	1	40%	79	54.2	50.2	54.9	124684.0	51.0								
Paver	1	50%	77	52.6	49.6	53.3	107825.3	50.3								
Roller	2	20%	80	58.4	51.4	59.1	164365.5	52.2								
Tractor	1	40%	84	59.4	55.4	60.1	412867.6	56.2								
					58.3			59.1								
Compressor (air)	1	40%	78	53.1	49.1	53.8	96785.6	49.9								
					49.1			49.9								
Slurry Trenching Machine	1	50% #N/A	80 #N/A	55.8 0.0	52.8 0.0	56.5 0.0	225279.1 1.0	53.5 0.0	76.9 0.0	24366182.1 1.0	73.9 0.0	70.3 0.0	5353897.4 1.0	67.3 0.0		
					52.8			53.5			73.9			67.3		

Source for Ref. Noise Levels: RCNM, 2005

Noise Measurement Field Data			
Project:	The Greens Indio	Job Number:	094671010.1.103
Site No.:	ST-1	Date:	1/31/2023
Analyst:	Kiana Graham and Skye Hansen	Time:	11:11-11:21
Location:	Corner of Avenue 42 and Golf Course Drive, near the Lights Golf Course office		
Noise Sources:	cars in parking lot, golf course pedestrains, birds, road traffic		
Comments:			
Results (dBA):			
Measurement 1:	Leq:	Lmin:	Lmax:
	58.3	48.3	71.4
			Peak:
			85.9

Equipment		Weather	
Sound Level Meter:	LD SoundExpert LxT	Temp. (degrees F):	57
Calibrator:	CAL200	Wind (mph):	12
Response Time:	Slow	Sky:	Clear
Weighting:	A	Bar. Pressure:	30.13"
Microphone Height:	5 feet	Humidity:	15%

Photo:



Measurement Report

Report Summary

Meter's File Name	ST-.040.s	Computer's File Name	LxTse_0007061-20230131 111144-ST-.(
Meter	LxT SE 0007061	Firmware	2.404
User		Location	
Job Description			
Note			
Start Time	2023-01-31 11:11:44	Duration	0:10:00.0
End Time	2023-01-31 11:21:44	Run Time	0:10:00.0
Pre-Calibration	2023-01-31 08:12:26	Post-Calibration	None
		Pause Time	0:00:00.0
		Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	58.3 dB		
LAE	86.1 dB	SEA	--- dB
EA	45.1 μPa^2h		
LA_{peak}	85.9 dB	2023-01-31 11:19:31	
LAS_{max}	71.4 dB	2023-01-31 11:19:31	
LAS_{min}	48.3 dB	2023-01-31 11:13:29	
LA_{eq}	58.3 dB		
LC_{eq}	70.6 dB	$LC_{eq} - LA_{eq}$	12.3 dB
LAI_{eq}	59.9 dB	$LAI_{eq} - LA_{eq}$	1.6 dB

Exceedances

	Count	Duration
$LAS > 85.0$ dB	0	0:00:00.0
$LAS > 115.0$ dB	0	0:00:00.0
$LA_{peak} > 135.0$ dB	0	0:00:00.0
$LA_{peak} > 137.0$ dB	0	0:00:00.0
$LA_{peak} > 140.0$ dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
58.3 dB	58.3 dB	0.0 dB	
LDEN	LDay	LEve	LNi
58.3 dB	58.3 dB	--- dB	--- dB

Any Data

	A		C	
	Level	Time Stamp	Level	Time Stamp
L_{eq}	58.3 dB		70.6 dB	
$LS_{(max)}$	71.4 dB	2023-01-31 11:19:31	--- dB	None
$LS_{(min)}$	48.3 dB	2023-01-31 11:13:29	--- dB	None
$L_{Peak(max)}$	85.9 dB	2023-01-31 11:19:31	--- dB	None

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	62.3 dB
LAS 10.0	60.5 dB
LAS 33.3	57.3 dB
LAS 50.0	55.8 dB
LAS 66.6	54.4 dB
LAS 90.0	52.5 dB

Noise Measurement Field Data			
Project:	The Greens Indio	Job Number:	094671010.1.103
Site No.:	ST-2	Date:	1/31/2023
Analyst:	Kiana Graham and Skye Hansen	Time:	11:25-11:35
Location:	North of Avenue 42, in between Jackson St and Golf Course Rd		
Noise Sources:	road traffic		
Comments:			
Results (dBA):			
Measurement 1:	Leq:	Lmin:	Lmax:
	65.8	55.3	77.0
			Peak:
			92.3

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	57
Wind (mph):	11
Sky:	Clear
Bar. Pressure:	30.12"
Humidity:	15%

Photo:



Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	ST-.041.s	Computer's File Name	LxTse_0007061-20230131 112522-ST-.0
Meter	LxT SE 0007061	Firmware	2.404
User		Location	
Job Description			
Note			
Start Time	2023-01-31 11:25:22	Duration	0:10:00.0
End Time	2023-01-31 11:35:22	Run Time	0:10:00.0
Pre-Calibration	2023-01-31 08:12:26	Post-Calibration	None
		Pause Time	0:00:00.0
		Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	65.8 dB		
LAE	93.6 dB	SEA	--- dB
EA	253.5 μPa^2h		
LA_{peak}	92.3 dB		2023-01-31 11:30:31
$LA_{S_{max}}$	77.0 dB		2023-01-31 11:34:24
$LA_{S_{min}}$	55.3 dB		2023-01-31 11:28:12
LA_{eq}	65.8 dB		
LC_{eq}	73.7 dB	$LC_{eq} - LA_{eq}$	7.9 dB
LAI_{eq}	67.1 dB	$LAI_{eq} - LA_{eq}$	1.3 dB

Exceedances

	Count	Duration
$LAS > 85.0$ dB	0	0:00:00.0
$LAS > 115.0$ dB	0	0:00:00.0
$LA_{peak} > 135.0$ dB	0	0:00:00.0
$LA_{peak} > 137.0$ dB	0	0:00:00.0
$LA_{peak} > 140.0$ dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
65.8 dB	65.8 dB	0.0 dB	
LDEN	LDay	LEve	LNi
65.8 dB	65.8 dB	--- dB	--- dB

Any Data

	A		C	
	Level	Time Stamp	Level	Time Stamp
L_{eq}	65.8 dB		73.7 dB	
$L_{S_{(max)}}$	77.0 dB	2023-01-31 11:34:24	--- dB	None
$L_{S_{(min)}}$	55.3 dB	2023-01-31 11:28:12	--- dB	None
$L_{Peak(max)}$	92.3 dB	2023-01-31 11:30:31	--- dB	None

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	71.7 dB
LAS 10.0	69.9 dB
LAS 33.3	64.5 dB
LAS 50.0	62.5 dB
LAS 66.6	60.1 dB
LAS 90.0	57.0 dB

Noise Measurement Field Data			
Project:	The Greens Indio	Job Number:	094671010.1.103
Site No.:	ST-3	Date:	1/31/2023
Analyst:	Kiana Graham and Skye Hansen	Time:	11:45-11:55
Location:	Corner of Generations Dr and Jackson St		
Noise Sources:	road traffic		
Comments:			
Results (dBA):			
Measurement 1:	Leq:	Lmin:	Lmax:
	66.4	40.7	79.4
			Peak:
			95.8

Equipment		Weather	
Sound Level Meter:	LD SoundExpert LxT	Temp. (degrees F):	57
Calibrator:	CAL200	Wind (mph):	11
Response Time:	Slow	Sky:	Clear
Weighting:	A	Bar. Pressure:	30.12"
Microphone Height:	5 feet	Humidity:	15%

Photo:



Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	ST-.042.s	Computer's File Name	LxTse_0007061-20230131 114522-ST-.042.ldbin
Meter	LxT SE 0007061	Firmware	2.404
User		Location	
Job Description			
Note			
Start Time	2023-01-31 11:45:22	Duration	0:10:00.0
End Time	2023-01-31 11:55:22	Run Time	0:10:00.0
Pre-Calibration	2023-01-31 08:12:26	Post-Calibration	None
		Pause Time	0:00:00.0
		Calibration Deviation	---

Results

Overall Metrics

LA _{eq}	66.4 dB		
LAE	94.2 dB	SEA	--- dB
EA	291.0 µPa²h		
LA _{peak}	95.8 dB		2023-01-31 11:47:14
LAS _{max}	79.4 dB		2023-01-31 11:51:26
LAS _{min}	40.7 dB		2023-01-31 11:49:14
LA _{eq}	66.4 dB		
LC _{eq}	72.4 dB	LC _{eq} - LA _{eq}	6.0 dB
LAI _{eq}	68.4 dB	LAI _{eq} - LA _{eq}	2.0 dB

Exceedances

Count	Duration
LAS > 85.0 dB	0
LAS > 115.0 dB	0
LApeak > 135.0 dB	0
LApeak > 137.0 dB	0
LApeak > 140.0 dB	0

Community Noise

LDN	LDay	LNight
66.4 dB	66.4 dB	0.0 dB
LDEN	LDay	LEve
66.4 dB	66.4 dB	---
		LNight

Any Data

A	C	Z
Level	Level	Level
Time Stamp	Time Stamp	Time Stamp
L _{eq}	66.4 dB	72.4 dB
LS _(max)	79.4 dB	---
LS _(min)	40.7 dB	---
L _{Peak(max)}	95.8 dB	---

Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	73.4 dB
LAS 10.0	71.2 dB
LAS 33.3	62.5 dB
LAS 50.0	57.5 dB
LAS 66.6	51.3 dB
LAS 90.0	45.8 dB