# Appendix J

## Acoustical Assessment

# ACOUSTICAL ASSESSMENT
## for the
## Imperial Avalon Project

## Carson, California

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# DEFINITIONS OF COMMONLY USED TERMS IN NOISE CONTROL

The definitions that follow are in general agreement with those contained in publications of various professional organizations, including the American National Standards Institute (ANSI); American Society for Testing and Materials (ASTM); American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE); International Organization for Standardization (ISO); and International Electrotechnical Commission (IEC).

## TERMINOLOGY

**acoustic; acoustical:** *Acoustic* is usually used when the term being qualified designates something that has the properties, dimensions, or physical characteristics associated with sound waves (e.g., acoustic power); *acoustical* is usually used when the term which it modifies does not explicitly designate something that has the properties, dimensions, or physical characteristics of sound (e.g., acoustical material).

**ambient noise:** The all-encompassing noise associated with a given environment at a specified time, usually being a composite of sound from many sources arriving from many directions, near and far; no particular sound is dominant.

**attenuation:** The decrease in level of sound, usually from absorption, divergence, scattering, or the cancellation of sound waves.

**average sound level (equivalent continuous sound level)** ($L_{eq}$): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound. *Unit*: decibel (dBA).

**A-weighted sound level** ($L_A$): The sound level measured with a sound-level meter using A-weighting. *Unit*: decibel (dBA).

**background noise:** The total noise from all sources other than a particular sound that is of interest (e.g., other than the noise being measured or other than the speech or music being listened to).

**decibel** (dB): A unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels correspond to the logarithm (to the base 10) of this ratio. In many sound fields, the sound pressure ratios are not proportional to the corresponding power ratios, but it is common practice to extend the use of the decibel to such cases. One decibel equals one-tenth of a *bel*.

**frequency** ($f$): Of a periodic function, the number of times that a quantity repeats itself in one second (i.e., the number of cycles per second). *Unit*: hertz (Hz).

**noise:** Any disagreeable or undesired sound (i.e., unwanted sound).

**noise level:** Same as sound level. Usually used to describe the sound level of an unwanted sound.

**noise reduction** (NR): The difference in sound pressure level between any two points along a path of sound propagation.

**sound**: (1) A change in air pressure that is capable of being detected by the human ear.
(2) The hearing sensation excited by a change in air pressure.

**sound level**: Ten times the logarithm to the base 10 of the square of the ratio of the frequency-weighted (and time-averaged) sound pressure to the reference sound pressure of 20 micropascals. The frequency-weightings and time-weighting employed should be specified; if they are not specified, it is understood that A-frequency-weighting is used and that an averaging time of 0.125 is used. *Unit*: decibel (dBA).

# SYMBOLS, ABBREVIATIONS, AND ACRONYMS

| | |
|---|---|
| ADT | average daily traffic |
| ANSI | American National Standards Institute |
| APN | Assessor's Parcel Number |
| CEQA | California Environmental Quality Act |
| CNEL | Community Noise Equivalent Level |
| dB | decibel |
| dBA | A-weighted decibel |
| EPA | United States Environmental Protection Agency |
| FHWA | Federal Highway Administration |
| FTA | Federal Transit Administration |
| HVAC | heating, ventilation, and air conditioning |
| in/sec | inches per second |
| $L_{dn}$ | average day/night sound level |
| $L_{eq}$ | equivalent sound level |
| $L_{max}$ | maximum noise level |
| $L_{min}$ | minimum noise level |
| $L_{n}$ | level exceeded "n" percent of the time |
| MPH | miles per hour |
| PPV | peak particle velocity |
| STC | sound transmission class |
| VdB | velocity decibel |
| VMT | Vehicle Miles Traveled |

# EXECUTIVE SUMMARY

The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise impacts resulting from implementation of the proposed Imperial Avalon project. Consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines, Table 1, *Summary of CEQA Significance Findings*, summarizes the results of this assessment based on the significance criteria detailed in this report.

**Table 1**
**Summary of CEQA Significance Findings**

| CEQA Threshold | Significance Findings | |
|---|---|---|
| | Unmitigated | Mitigated |
| **NOI-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? | Potentially Significant | Significant and Unavoidable |
| **NOI-2:** Would the project generate excessive groundborne vibration or groundborne noise levels? | Potentially Significant | Less Than Significant |
| **NOI-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, expose people residing or working in the project area to excessive noise levels? | No Impact | Not Applicable |

# 1.0 INTRODUCTION

The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise impacts resulting from implementation of the proposed Imperial Avalon project (project) in the City of Carson (City).

## 1.1 PROJECT LOCATION

The City is located in the South Bay/Harbor area of Los Angeles County, approximately 13 miles south of downtown Los Angeles; refer to Exhibit 1, *Regional Vicinity*. The City consists of 19.2 square miles. The City is surrounded by the City of Los Angeles to the north, southeast, south, and northwest. The City of Compton is located to the northeast and the City of Long Beach is adjacent to the east. Unincorporated Los Angeles County areas are located to the north, east, and southwest.

The project site is located at 21207 South Avalon Boulevard and encompasses approximately 27.31 acres (Assessor's Parcel Numbers [APNs] 7337-001-025, -026, -027, -028, and -029); refer to Exhibit 2, *Site Vicinity*. The site is currently developed with the Imperial Avalon Mobile Estates mobile home park, which consists of 225 mobile home coaches, a recreational vehicle storage yard, and a common area with a clubhouse, grass field, recreation building, swimming pool, and guest parking spaces. Regional access to the site is provided via the San Diego Freeway (Interstate 405 [I-405]) and the Harbor Freeway (Interstate 110 [I-110]); local access is provided via South Avalon Boulevard and East 213th Street.

## 1.2 PROJECT DESCRIPTION

The project proposes to demolish the existing mobile home park and construct a mixed-use development. The project would construct four multi-story multi-family buildings with public spaces and a townhouse neighborhood; refer to Exhibit 3, *Conceptual Site Plan*. A north-south internal roadway would bisect the two distinct but connected residential areas of the site providing both vehicular and pedestrian access. The project also proposes a pedestrian bridge over the Los Angeles County flood control channel to the north of the project site. The entire community would share the public park spaces and gathering nodes, with walkable paseos connecting the active greenspaces. Utility improvements are proposed along Avalon Boulevard, to the east of the project site. A description of project elements is provided in Table 2, *Project Components*.

**Table 2**
**Project Components**

| Project Site | 1,189,739 square feet \| 27.31 acres | |
|---|---|---|
| **Parcels** | 7337-001-025; -026; 027; -028; -029 | |
| **Area of Proposed Site Uses in Square Feet** | Building Area (GBA) | Building Area of Residential Uses: 1,527,694<br>Building Area of Commercial Uses: 10,352<br>Building Area of Parking: 647,027<br>Total Building Area (including parking): 2,185,073 |
| **Area of Proposed Site Uses in Square Feet (continued)** | Building Area (FAR) | Floor Area Ratio Total Building Area (non-parking floor areas): 1,496,832 |
| **Parking** | Approximately 2,026 parking spaces and approximately 8 loading spaces (minimum two per multi-family building) would be provided. No subterranean parking levels are being proposed. There would be unbundled parking options for residents and a portion of guest parking to be shared with the 26 commercial spaces provided at Buildings B and C. | |
| **Building Height** | Building heights will range from 45 to 90 feet. | |
| **Density** | Multifamily – 69.97 du/ac \| Townhomes – 24.85 du/ac \| Cumulative – 44.4 du/ac | |
| **Floor Area Ratio** | 1.26:1 (1,496,832 FAR sf / 1,189,739 site area sf) | |
| **Commercial Areas** | | |
| *Café / Restaurants* | | |
| **Square Footage (FAR)** | 10,352 | |
| **Parking** | 26 stalls | |
| **Residential** | | |
| **Square Footage (FAR)** | 1,486,480 | |
| **Units** | 1,213 – including 653 non age-restricted multi-family units in Buildings A, B, and D;<br>180 age-restricted senior independent living units in Building C; and<br>380 Townhouse units on Lot E. | |
| **Parking** | 2,026 stalls – including 818 spaces located in individual townhouse garages on Lot E.<br>Multifamily parking ratios by unit type: Studios – 1.25; 1BR – 1.50; 2BR – 1.70<br>Two stalls per TH unit with 53 surface spaces for guests. | |
| **Mix Unit** | Multi-family Buildings A, B, and D:<br>126 Studios (19%) \| 363 1BR (56%) \| 164 2BR (25%) | |
| | Independent Living Senior Building C:<br>180 total units: 56 Studios \| 124 1BR | |
| | Lot E Townhomes:<br>192 2BR (51%) \| 188 3BR (49%) | |
| Notes: sf = square feet, FAR = Floor Area Ratio, GBA = Gross Building Area, BR = Bedroom; all measurements, square footages, and building area ratios provided in Table 2 are approximated. | | |

Located at the northeast corner of the project site, **Building A** consists of a four-story wrap building approximately 60 feet tall with some residential units, resident-accessible leasing office, and recreational amenity spaces at the ground level. Building A would contain 202 units comprised of 40 studios, 108 one-bedroom, and 54 two-bedroom units. An at-grade gathering space across from Building B would create visual and pedestrian connections between neighboring buildings and the project's central park. The large interior courtyard space would feature amenities and a swimming pool. Approximately 308 parking spaces would be located at multiple levels within the at- and above-grade parking structure.

**Building B** would consist of a four-story residential development in a wrap configuration. Building B would be comprised of 206 units consisting of 40 studios, 113 one-bedroom, and 53 two-bedroom units. A large west-facing courtyard would open onto the central park, with a resident leasing office, amenity space, and an approximate 1,890 square foot café bounding the park. At the southeast corner of the building, an approximate 3,200 square foot restaurant would be located at the intersection of Avalon Boulevard and the main project entrance drive. Approximately 315 total parking spaces would be provided with approximately five stalls shared between residential guest and café uses. An approximate 21,300 square foot publicly accessible park would bound Building B to the west and be situated adjacent to the café/restaurant, leasing office, and amenity spaces. An approximate 3,000 square foot dog-park would be apportioned from the central park space to accommodate the growing number of pet owners choosing to reside in highly-amenitized mixed-use developments.

In addition to the three non-age restricted multi-family buildings, **Building C** would provide independent living opportunities for the Senior community. Building C would house three levels of residential units and interior courtyards over two levels of at- and above-grade podium structured parking. At the northeast corner of the Building C, an approximate 5,262 square foot restaurant would be located at the intersection of Avalon Boulevard and the main project entrance drive. Building C would contain 180 age-restricted units comprised of 56 studios and 124 one-bedroom units. Approximately 218 total parking spaces would be provided within the at- and above-grade parking structure with approximately 13 stalls to be shared between the residential guests and restaurant uses.

**Building D** would house four levels of residential units and multiple interior courtyards over three levels of at- and above-grade podium structured parking. Building D would contain 245 units comprised of 46 studios, 142 one-bedroom, and 57 two-bedroom units. Approximately 367 parking spaces would be provided, along with a resident-accessible leasing office, recreational amenity spaces, and a swimming pool. A generous 17-foot landscaped parkway would act as a buffer to the townhouse portion of the site, while providing for pedestrian circulation and connecting to the central park along the main north-south project roadway.

**Lot E** would include an approximate 380-unit for-sale townhouse community integrated into the larger community and would provide an appropriate transition to the single-family neighborhoods to the west and south. While accessible from the multi-family portion of the project, the main entry would be off Grace Avenue and would feature a Leasing/Club Fitness Facility that would serve as a focal point for the community. A potential second access point at the northwest corner of the site, also along Grace Avenue, will be evaluated. A lush green belt and pool/recreation facility with a sun deck would be axially aligned with the central open spaces located on the eastern portion of the site. This planning relationship establishes visual connectivity and linkage, reinforcing walkability between the two communities. Within Lot E, walkable paseos are featured with various pedestrian linkages, including to the recreation and pool facility. The townhouse units are arranged to provide convenient access to the paseos, linear park, and recreational pool area.

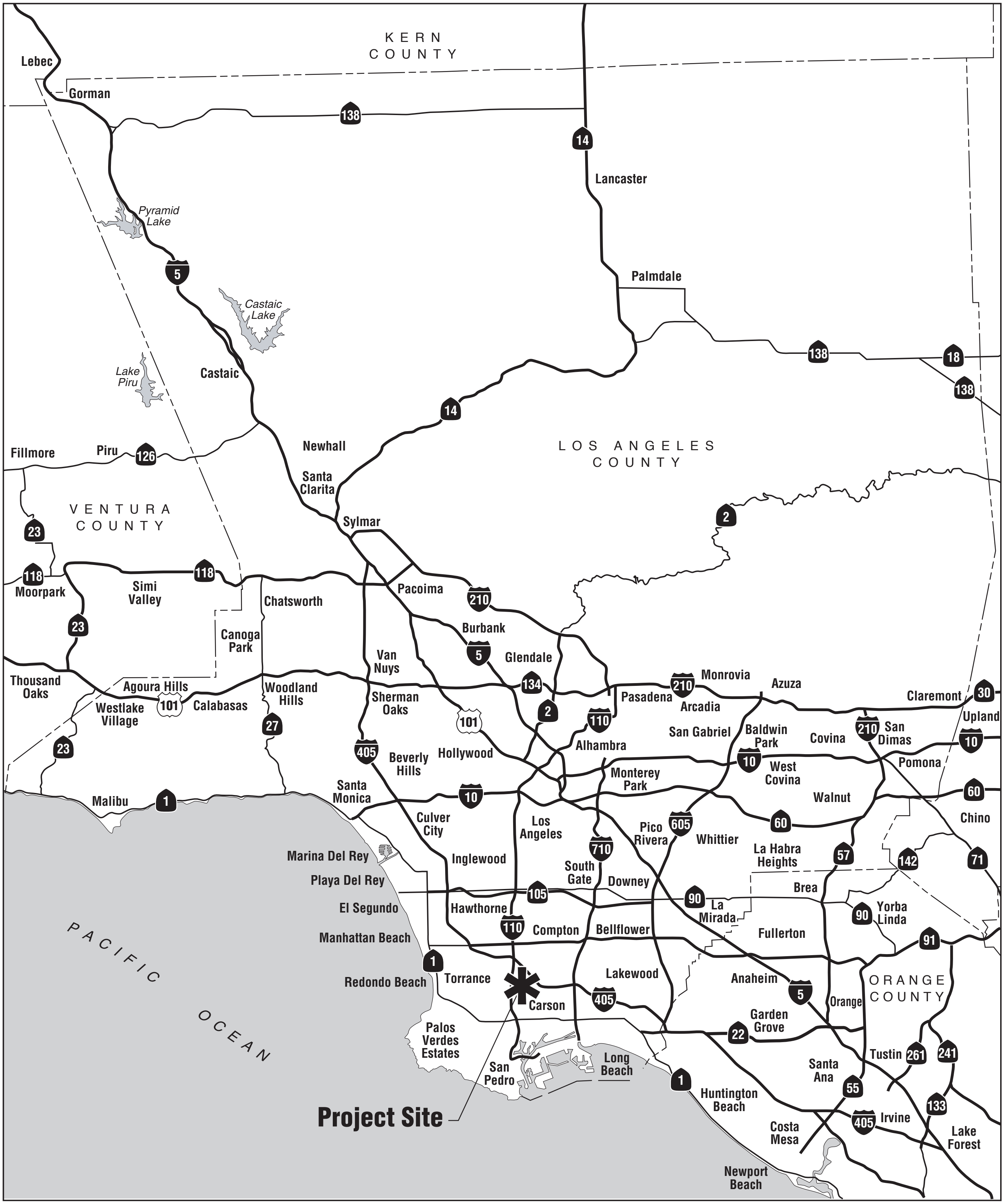
The residential townhome buildings are three stories and 45 feet in height with direct access to the attached two-car garages. Residential dwelling units within the buildings are two- and three-bedrooms ranging from approximately 1,325 to 1,700 square feet, featuring private patios and decks. The design of the dwelling unit interior spaces has a single-family layout and appearance. On the exterior, architectural massing and articulation of the buildings provide a sensitive transition to the existing single-family homes adjacent to this new community.

**Site Access, Parking, and Loading Areas**

Main vehicular site access would be provided at a location approximately midway between I-405 and East 213th Street. A new signalized intersection would be constructed in coordination with the entrance to the proposed redevelopment project on the east side of Avalon Boulevard. A secondary right-in/right-out only entrance/exit and fire lane would be located at the southern edge of the site along Avalon, with a tertiary vehicular entrance potentially to originate at East 213th Street and proceed north through the proposed redevelopment of the auto dealership to the south. The main project access point for the Townhouse portion of the project would occur along Grace Avenue, with a potential additional access point located at the northwest corner of the site also along Grace Avenue.

Parking levels would provide majority single parking with limited use of tandem spaces for some larger units where needed, with some provided commercial parking to be shared between residential guests and restaurant/café uses in Buildings B and C. Townhouse parking would be provided in independent two-car garages for all units, with a portion also provided in tandem configurations.

Two temporary loading spaces would be located adjacent to each building (time-signed and shared where parallel parking is provided) as convenient to building elevator use as possible and regulated by management operations.




NOT TO SCALE

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# Regional Vicinity

**Exhibit 1**


Source: Google Earth Pro, 2019

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Project Site

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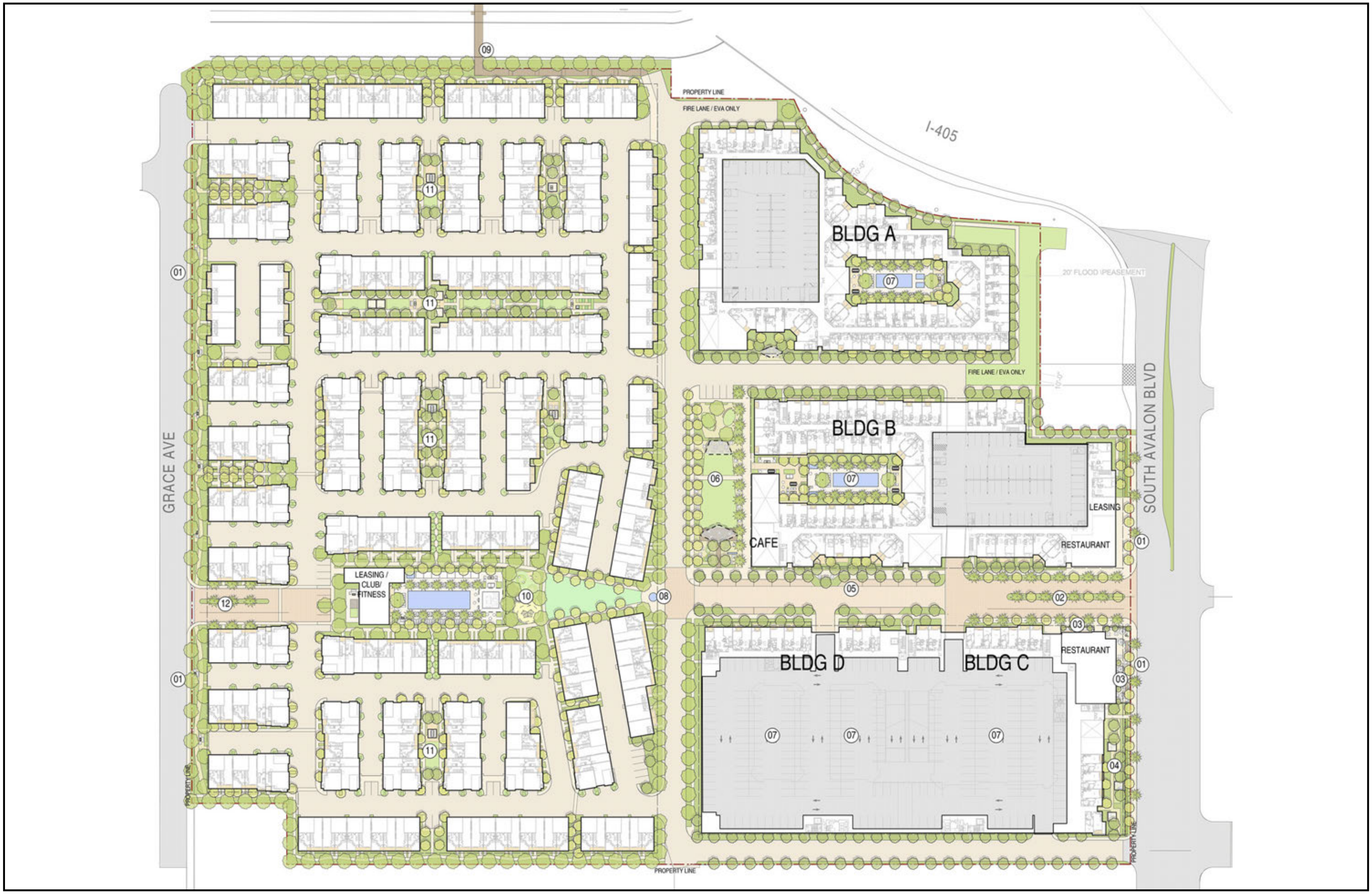
# Site Vicinity

**Exhibit 2**




Source: Architects Orange, March 2021.

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# Conceptual Site Plan

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**Exhibit 3**

**Imperial Avalon Specific Plan**

As a key component of the proposed project, the project applicant proposes the Imperial Avalon Specific Plan (Specific Plan) for the project site. The relatively large size of the site suggests that a specific plan is the proper planning mechanism to describe and codify the development plans. The Specific Plan will codify the development standards, design guidelines and implementation strategies for the project. The uses permitted in the Specific Plan would include residential, commercial, and independent living units for senior residents. The Specific Plan will be consistent with both the Goals and Policies identified in the existing Carson General Plan and the forthcoming updated General Plan.[1]

[1] The City of Carson is currently updating its General Plan with review and approval of key elements coming forward for approvals in 2020/2021.

# 2.0 DESCRIPTION OF NOISE METRICS

## 2.1 STANDARD UNIT OF MEASUREMENT

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

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is perceived to be twice as loud and 20 dBA higher is perceived to be four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples of various sound levels in different environments are illustrated on Exhibit 4, *Common Environmental Noise Levels*.

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

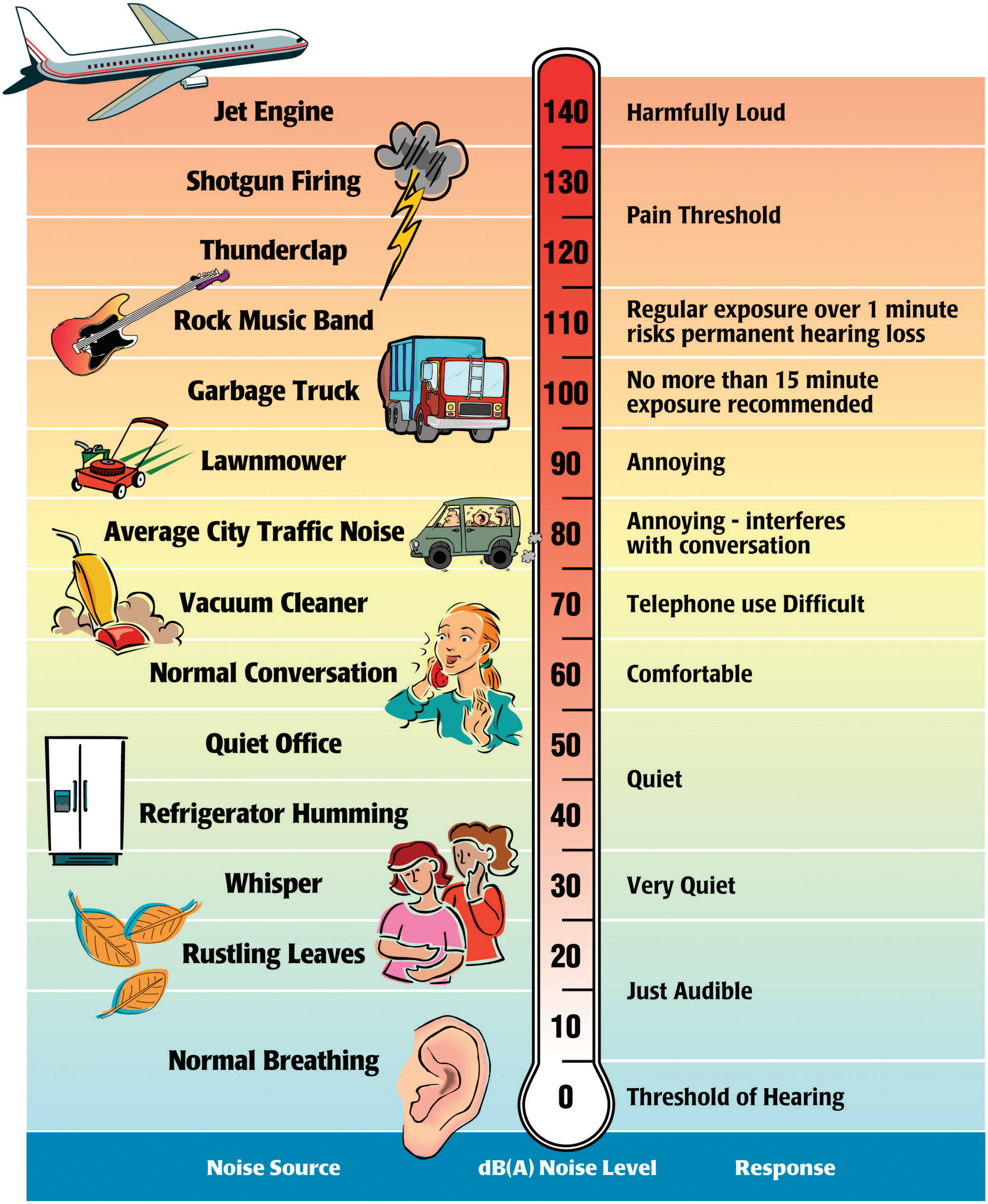
- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Table 3, *Noise Descriptors*, provides a listing of methods to measure sound over a period of time.

**Table 3**
**Noise Descriptors**

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

Source: Cyril M. Harris, *Handbook of Noise Control*, 1979.




**Source:**

Melville C. Branch and R. Dale Beland, *Outdoor Noise in the Metropolitan Environment*, 1970.

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

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**Common Environmental Noise Levels**

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**Exhibit 4**

## 2.2 HEALTH EFFECTS OF NOISE

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

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

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

- Noise-Induced Hearing Loss;
- Interference with Communication;
- Effects of Noise on Sleep;
- Effects on Performance and Behavior;
- Extra-Auditory Health Effects; and
- Annoyance.

Although it often causes discomfort and sometimes pain, noise-induced hearing loss usually takes years to develop. Noise-induced hearing loss can impair the quality of life through a reduction in the ability to hear important sounds and to communicate with family and friends. Hearing loss is one of the most obvious and easily quantified effects of excessive exposure to noise. While the loss may be temporary at first, it could become permanent after continued exposure. When combined with hearing loss associated with aging, the amount of hearing loss directly caused by the environment is difficult to quantify. Although the major cause of noise-induced hearing loss is occupational, substantial damage can be caused by non-occupational sources.

According to the United States Public Health Service, nearly ten million of the estimated 21 million Americans with hearing impairments owe their losses to noise exposure. Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard, depending on the circumstance. Noise can disrupt face-to-face communication and telephone communication, and the enjoyment of music and television in the home. It can also disrupt effective communication between teachers and pupils in schools and can cause fatigue and vocal strain in those who need to communicate in spite of the noise.

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

Recent research indicates that more moderate noise levels can produce disruptive after-effects, commonly manifested as a reduced tolerance for frustration, increased anxiety, decreased incidence of “helping” behavior, and increased incidence of “hostile” behavior. Noise has been implicated in the development or exacerbation of a variety of health problems, ranging from hypertension to psychosis. As with other categories, quantifying these effects is difficult due to the amount of variables that need to be considered in each situation. As a biological stressor, noise can influence the entire physiological system. Most effects seem to be transitory, but with continued exposure some effects have been shown to be chronic in laboratory animals.
Annoyance can be viewed as the expression of negative feelings resulting from interference with activities, as well as the disruption of one’s peace of mind and the enjoyment of one’s environment. Field evaluations of community annoyance are useful for predicting the consequences of planned actions involving highways, airports, road traffic, railroads, or other noise sources. The consequences of noise-induced annoyance are privately held dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects, as discussed above. In a study conducted by the United States Department of Transportation, the relationship between the effects of annoyance and the community were quantified. In areas where exterior noise levels were consistently above 60 dBA Community Noise Equivalent Level (CNEL), approximately nine percent of the community is highly annoyed. When levels exceed 65 dBA CNEL, that percentage rises to 15 percent. Although evidence for the various effects of noise have

differing levels of certainty, it is clear that noise can affect human health. Most of the effects are, to a varying degree, stress related.

# 3.0 REGULATORY SETTING

## 3.1 STATE

California Environmental Quality Act. The Office of Planning and Research's *Noise Element Guidelines* include recommended exterior and interior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The *Noise Element Guidelines* contain a land use compatibility table that describes the compatibility of various land uses with a range of environmental noise levels in terms of the CNEL. Table 4, *Land Use Compatibility for Community Noise Environments*, presents guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

**Table 4**
**Land Use Compatibility for Community Noise Environments**

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

Notes: NA: Not Applicable; $L_{dn}$: average day/night sound level; CNEL: Community Noise Equivalent Level; dBA = A-weighted decibel
Normally Acceptable – Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable – New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
Normally Unacceptable – New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable – New construction or development should generally not be undertaken.
Source: State of California, Governor's Office of Planning and Research, *General Plan Guidelines*, 2017.

## 3.2 LOCAL

### 3.2.1 CITY OF CARSON

General Plan. The *Carson General Plan* (General Plan) Noise Element identifies noise sensitive land uses and noise sources, defines areas of noise impact, and establishes goals, policies, and programs to ensure that Carson residents are protected from excessive noise. The following General Plan goals and policies are applicable to the proposed project:

> ***Goal N-2:*** *Minimize noise impacts on residential uses and noise sensitive receptors along the City's streets, ensuring that the City's interior and exterior noise levels are not exceeded.*
>
> *Policy N-2.1: Limit truck traffic to specific routes and designated hours of travel, where necessary, as defined in the Transportation and Infrastructure Element and by the City's Development Services Group. Said routes and hours shall be reviewed periodically to ensure the protection of sensitive receptors and residential neighborhoods.*
>
> *Policy N-2.5: Discourage through traffic in residential neighborhoods.*
>
> ***Goal N-7:*** *Incorporate noise considerations into land use planning decisions.*
>
> *Policy N-7.2: Continue to incorporate noise assessments into the environmental review process, as needed. Said assessments shall identify potential noise sources, potential noise impacts, and appropriate sound attenuation. In non-residential projects, potential noise sources shall include truck pick-up and loading areas, locations of mechanical and electrical equipment, and similar noise sources. Require mitigation of all significant noise impacts as a condition of project approval.*
>
> *Policy N-7.3: Require all new residential construction in areas with an exterior noise level greater than 65dBA CNEL to include sound attenuation measures that reduce interior noise levels to the standards shown in Table N-3. Sound attenuation measures include:*
>
> - *Sound walls,*
> - *Double glazing,*
> - *Building location, and/or*
> - *Facade treatment.*
>
> *Policy N-7.4: Ensure acceptable noise levels near schools, hospitals, convalescent homes, churches, and other noise sensitive areas in accordance with Table N-2* (Table 5). *To this end, require buffers or appropriate mitigation of potential noise sources. Such sources include, but are not limited to truck pickup and loading areas, mechanical and electrical equipment, exterior speaker boxes, and public address systems.*

***Goal N-8:*** *Minimize noise impacts associated with residential uses in mixed use development.*

*Policy N-8.1: Require the design of mixed use structures to incorporate techniques to prevent transfer of noise and vibration from the commercial to the residential uses.*

*Policy N-8.2: Encourage commercial uses in mixed use developments which are not noise intensive.*

Further, the General Plan includes interior and exterior noise standards as summarized in Table 3, *Interior and Exterior Noise Standards*. Table 5 shows standards and criteria that specify acceptable limits of noise for various land uses throughout Carson. The City uses the standards identified in Table 4 and Table 5 as the primary tools to ensure compatibility between land uses and outdoor ambient noise.

**Table 5**
**Interior and Exterior Noise Standards**

| Type | | CNEL | |
|---|---|---|---|
| **Categories** | **Uses** | **Interior[1,3]** | **Exterior[2,4]** |
| Residential | Single-Family Duplex, Multiple Family | 45 – 55 | 50 – 60 |
| | Mobile Home | 45 | 65 |
| Commercial Industrial Institutional | Hotel, Motel, Transient Lodging | 45 | — |
| | Commercial Retail, Bank, Restaurant | 55 | — |
| | Office Building, Research and Development, Professional Offices, City Office Building | 50 | — |
| | Amphitheater, Concert Hall, Auditorium, Meeting Hall | 45 | — |
| | Gymnasium (Multipurpose) | 50 | — |
| | Sports Club | 55 | — |
| | Manufacturing, Warehousing, Wholesale, Utilities | 65 | — |
| | Movie Theater | 45 | — |
| Institutional | Hospital, School Classroom | 45 | 65 |
| | Church, Library | 45 | — |
| Open Space | Park | — | 65 |

Notes: CNEL = Community Noise Equivalent Level
1. Indoor environment including bedrooms, living areas, bathrooms, toilets, closets, corridors.
2. Outdoor environment limited to private yard of single family; multi-family private patio or balcony which is served by a mans of exit from inside the dwelling; balconies 6 feet deep or less are exempt; mobile home park; park's picnic area; and school's playground.
3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of the Uniform Building Code.
4. Exterior noise levels should be such that interior noise levels do not exceed 45 CNEL.

Source: City of Carson, *Carson General Plan*, 2004.

Municipal Code. Chapter 5 of the *Carson Municipal Code* (Municipal Code) contains noise control regulations. The City adopted the "Los Angeles County Noise Ordinance" as the City's Noise Control Ordinance in 1995. The adopted Noise Ordinance Standards, derived from Los Angeles County Code Section 12.08.390, *Exterior Noise Standards*, and Section 12.08.400, *Interior Noise Standards*, establish exterior and interior noise standards to regulate operation intrusive noises within specific land use zones. These noise standards are summarized in Table 6, *Noise Ordinance Standards*.

**Table 6**
**Noise Ordinance Standards**

| Noise Zone | Land Use (Receptor Property) | Time Interval | Noise Level (dBA) | |
|---|---|---|---|---|
| | | | Exterior | Interior |
| I | Noise Sensitive-Area | Anytime | 45 | — |
| II | Residential Properties | 10:00 p.m. to 7:00 a.m. (nighttime)<br>7:00 a.m. to 10:00 p.m. (daytime) | 45<br>50 | —<br>— |
| III | Commercial Properties | 10:00 p.m. to 7:00 a.m. (nighttime)<br>7:00 a.m. to 10:00 p.m. (daytime) | 55<br>60 | —<br>— |
| IV | Industrial Properties | Anytime | 70 | — |
| All Zones | Multi-family | 10:00 p.m. – 7:00 a.m. | — | 40 |
| | Residential | 7:00 a.m. – 10:00 p.m. | — | 45 |

Source: County of Los Angeles, *County of Los Angeles County Code Section 12.08.490 and 12.08.400*, November 2001.

Additionally, Municipal Code Section 5502(c), *Amendments to Noise Control Ordinance*, provides exterior noise standards that regulate construction noise near residential uses. Noise standards for non-scheduled, intermittent, short-term operations (less than 20 days), as well as standards for repetitively scheduled and relatively long-term construction operations (periods of 21 days or more) of equipment are summarized in Table 7, *Maximum Construction Noise Limits*.

**Table 7**
**Maximum Construction Noise Limits**

| Construction Time | | Maximum Allowed Noise Level (dBA) | |
|---|---|---|---|
| | | Single-Family Residential | Multi-Family Residential |
| Maximum noise levels for nonscheduled, intermittent, short-term operation of 20 days or less for construction equipment. | Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m. | 75 | 80 |
| | Daily, except 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays | 60 | 64 |
| Maximum noise level for repetitively scheduled and relatively long-term operation of 21 days or more for construction equipment. | Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m. | 65 | 70 |
| | Daily, except 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays | 55 | 60 |

Source: City of Carson, *Carson Municipal Code*, codified through Ordinance 20-2013, passed September 1, 2020.

Further, Municipal Code Section 12.08.570 exempts noise associated with motor vehicles operating on private property and public right-of-way from the noise ordinance.

# 4.0 EXISTING CONDITIONS

## 4.1 NOISE MEASUREMENTS

In order to quantify existing ambient noise levels in the project area, Michael Baker International (Michael Baker) conducted four noise measurements on October 17, 2019; refer to Table 8, *Noise Measurements*. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the project site. Ten-minute measurements were taken, between 9:00 a.m. and 10:30 a.m., at each site. Short-term ($L_{eq}$) measurements are considered representative of the noise levels in the project vicinity.

**Table 8**
**Noise Measurements**

| Site No. | Location | $L_{eq}$ (dBA) | $L_{min}$ (dBA) | $L_{max}$ (dBA) | Peak (dBA) | Time |
|---|---|---|---|---|---|---|
| 1 | Southwest corner of East Javelin Street and Grace Avenue | 55.1 | 50.1 | 80.0 | 102.7 | 9:25 a.m. |
| 2 | On Grace Avenue, approximately 435 feet north of East 213th Street | 56.7 | 48.9 | 68.6 | 89.8 | 9:41 a.m. |
| 3 | 213th Street, near western entrance to Kia Carson dealership | 65.5 | 53.6 | 78.2 | 98.8 | 9:57 a.m. |
| 4 | Along South Avalon Boulevard, approximately 600 feet north of East 213th Street | 68.3 | 61.4 | 85.3 | 100.4 | 10:14 a.m. |
| Source: Michael Baker International, October 17, 2019. | | | | | | |

Meteorological conditions consisted of cloudy skies, mild temperatures, with light wind speeds (6 to 8 miles per hour), and low humidity. Measured daytime noise levels ranged from 55.1 to 68.3 dBA $L_{eq}$. Noise monitoring equipment used for the ambient noise survey consisted of a Brüel & Kjær Hand-held Analyzer Type 2250 equipped with a Type 4189 pre-polarized microphone. The monitoring equipment complies with applicable requirements of the American National Standards Institute (ANSI) for Type I (precision) sound level meters. The results of the field measurements are included in Appendix A, *Noise Data*. Refer to Exhibit 5, *Noise Measurement Locations*, for the noise measurement locations.

## 4.2 SENSITIVE RECEPTORS

Certain land uses are particularly sensitive to noise, including schools, hospitals, rest homes, long-term medical and mental care facilities, and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours. Existing sensitive receptors located in the project vicinity include residential uses, recreational uses, schools, and places of worship. Sensitive receptors are listed in Table 9, *Sensitive Receptors*.


Source: Google Earth Pro, 2019

ACOUSTICAL ASSESSMENT
IMPERIAL AVALON PROJECT

# Noise Measurement Locations

Michael Baker INTERNATIONAL

NOT TO SCALE

11/20 JN 175510

**Exhibit 5**

**Table 9**
**Sensitive Receptors**

| Type | Name | Distance from Project Site (feet) | Direction from Project Site | Location |
|---|---|---|---|---|
| Residential | Residential Uses | 2,721 | Northeast | 950 East Del Amo Boulevard, Carson, CA 90746 |
| | | 3,533 | North | 600 East Turmont Street, Carson, CA 90746 |
| | | Adjoining | South | Along East 213th Street |
| | | 820 | Southeast | 802 East 213th Street, Carson, CA 90745 |
| | | Adjoining | West | Along Grace Avenue |
| Schools | Golden Wings Academy Inc. | 1,503 | North | 20715 South Avalon Boulevard, Suite 360, Carson, CA 90746 |
| | Carnegie Middle School | 2,248 | Southeast | 21820 Bonita Street, Carson, CA 90745 |
| | Bonita Street Elementary School | 2,711 | Southeast | 21929 Bonita Street, Carson, CA 90745 |
| | St. Philomena School | 3,235 | Southwest | 21832 South Main Street, Carson, CA 90745 |
| | Carson Street Elementary School | 2,337 | Southwest | 161 East Carson Street, Carson, CA 90745 |
| Places of Worship | Judson Baptist Church | 4,086 | South | 451 East 223rd Street, Carson, CA 90745 |
| | First Christian Church of Carson | 3,227 | South | 356 East 220th Street, Carson, CA 90745 |
| | Bread of Life Christian Center Church | 2,486 | Northeast | 20620 Leapwood Avenue, Suite H, Carson, CA 90746 |
| | Torrance Apostolic Tabernacle | 2,687 | Southwest | 21818 Dolores Street, Carson, CA 90745 |
| | Carson Spanish Sda Church | 2,756 | Southwest | 21828 Dolores Street, Carson, CA 90745 |
| | Harbor Community Church | 2,577 | Southwest | 21739 Dolores Street, Carson, CA 90745 |
| | St. Philomena Church | 3,235 | Southwest | 21900 South Main Street, Carson, CA 90745 |
| | Greater Love Reformed Baptist Church | 3,453 | West | 20926 South Main Street, Carson, CA 90745 |
| | Glory Christian Fellowship Church | 4,078 | Northwest | 225 Torrance Boulevard, Suite D, Carson, CA 90745 |
| Recreational | Del Amo Park | 3,213 | North | 703 East Del Amo Boulevard, Carson, CA 90746 |
| | The Links at Victoria Golf Course | 3,143 | North | 340 M.L.K. Jr. Street, Carson, CA 90746 |
| | Perry Street Mini-Park | 3,531 | Southeast | East 215th Place and South Perry Street, Carson, CA 90745 |
| | Calas Park | 3,633 | Southeast | 1000 East 220th Street, Carson, CA 90745 |
| | Carson Park | 2,112 | West | 21411 Orrick Avenue, Carson, CA 90745 |

Note:
1 – Distances are measured from the exterior project boundary only and not from individual construction areas within the interior of the project site.

Source: Google Earth, 2020.

## 4.3 EXISTING NOISE LEVELS

In order to assess the potential for mobile source noise impacts, it is necessary to determine existing noise levels generated by vehicles traveling through the project area. Vehicle traffic along Interstate 405 (I-405), Avalon Boulevard, Main Street, Del Amo Boulevard, 213th Street, and Carson Street currently generate the majority of existing noise in the immediate project vicinity.

### REGIONAL MOBILE SOURCES

As discussed above, the project is near I-405, a regionally significant Interstate. According to the California Department of Transportation (Caltrans) Traffic Census Program, The I-405 segment closest to the project site (Carson, Junction Route 110), experienced between 272,000 to 274,000 average daily trips (ADT's) during 2018, the most recent year of data.[2] According to the *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, a doubling of traffic volumes would result in a 3 dB increase in traffic noise levels, which is barely detectable by the human ear.[3] The proposed project would generate an additional 5,586 ADT's compared to the existing conditions.[4] As such, the project-generated trips (i.e., 5,586 ADT) would not double existing traffic volumes along I-405 (i.e., ranging from 272,000 to 274,000 ADT) and an increase in traffic noise levels along I-405 would be imperceptible. This analysis conservatively assumes that every single project-generated trip would travel along I-405. However, in reality, the project's ADT's would be split along the nearby local roadways. Thus, the project's net new ADT's would not have the potential to significantly increase traffic noise volumes along I-405 and this roadway was not further analyzed.

## LOCAL MOBILE SOURCES

Mobile source noise was modeled using the Federal Highway Administration's Highway Noise Prediction Model (FHWA RD-77-108). The model calculates the average noise level at specific locations based on traffic volumes, average speeds represented by the posted speed limit, roadway geometry, and site environmental conditions. The model does not account for ambient noise levels. Noise projections are based on modeled vehicular traffic as derived from The *Imperial Avalon Project Average Daily Trip Segment Volumes* (ADT Volumes) excel sheet provided by the Project Applicant on March 1, 2021; refer to Appendix A for modeling assumptions and vehicle speeds along the roadway segments. Existing modeled traffic noise levels and compatibility with adjacent land uses are shown in Table 10, *Existing Traffic Noise Levels*. As shown in Table 10, existing mobile noise sources in the vicinity of the site range from 49.3 to 74.0 dBA CNEL at 50 feet from roadway centerline. Therefore, existing traffic noise levels fall within the City of Caron's "normally acceptable", "conditionally acceptable", or "normally unacceptable" community noise/land use compatibility criteria; refer to Table 4.

## STATIONARY SOURCES

The project area is located in an urbanized area. The primary sources of stationary noise in the project vicinity are urban-related activities, including parking areas, people talking, truck deliveries, dogs barking, etc. The noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term/continuous noise.

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2 California Department of Transportation, *Traffic Census Program*, https://dot.ca.gov/programs/traffic-operations/census, accessed by November 24, 2020.

3 U.S. Department of Transportation, *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, updated August 24, 2017, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed on February 23, 2021.

4 Fehr and Peers, *Imperial Avalon Local Transportation Assessment*, July 16, 2021.

**Table 10**
**Existing Traffic Noise Levels**

| Roadway Segment | Existing Land Uses Located along Roadway Segment | CNEL @ 50 Feet from Roadway Centerline (dBA) | Land Use Compatibility[1] |
|---|---|---|---|
| **Avalon Boulevard** | | | |
| Albertoni Street to Victoria Street | Residential | 70.1 | NU |
| Victoria Street to M.L.K. Jr. Street | Residential, Outdoor Spectator Sports, Commercial, Neighborhood Parks | 72.8 | NU |
| M.L.K. Jr. Street to Del Amo Boulevard | Residential, Golf Course, Commercial | 74.0 | NU |
| Del Amo Boulevard to I-405 | Commercial | 71.2 | NA |
| I-405 to Imperial Avalon Main Entrance | Residential, Commercial | 70.5 | NU |
| Imperial Avalon Main Entrance to 213th Street | Residential, Commercial | 70.6 | NU |
| 213th Street to Carson Street | Residential, Business Professional, Commercial | 69.7 | CA |
| Carson Street to 220th Street | Residential, Commercial | 70.4 | NU |
| **Grace Avenue** | | | |
| North of 213th Street | Residential | 49.3 | NA |
| **Main Street** | | | |
| Torrance Boulevard to 213th Street | Residential, Manufacturing, Commercial | 70.3 | NU |
| 213th Street to Carson Street | Residential, Commercial, Neighborhood Park | 70.0 | CA |
| Carson Street to 220th Street | Residential, Church, Commercial | 69.8 | CA |
| **Del Amo Boulevard** | | | |
| Avalon Boulevard to Central Avenue | Residential, Utilities, Commercial, Neighborhood Parks | 72.2 | NU |
| **213th Street** | | | |
| Grave Avenue to Avalon Boulevard | Residential, Commercial | 62.7 | CA |
| **Carson Street** | | | |
| Figueroa Street to Main Street | Residential, Commercial | 68.9 | CA |
| Main Street to Grave Avenue | Residential, Commercial | 68.6 | CA |
| Grave Avenue to Avalon Boulevard | Residential, Commercial | 68.8 | CA |
| Avalon Boulevard to I-405 | Residential, Business Professional, Hotel, Commercial | 70.7 | NU |

**Table 10**
**Existing Traffic Noise Levels**

| Roadway Segment | Existing Land Uses Located along Roadway Segment | CNEL @ 50 Feet from Roadway Centerline (dBA) | Land Use Compatibility[1] |
|---|---|---|---|

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = Community Noise Equivalent Level.

1. Land use compatibility:
   - NA = 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.
   - CA = Conditionally Acceptable – New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
   - NU = Normally Unacceptable – New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
   - CU = Clearly Unacceptable – New construction or development should generally not be undertaken.

Source: Noise modeling is based on traffic data within *Imperial Avalon Project Average Daily Trip Segment Volumes* (ADT Volumes) excel sheet provided by the Project Applicant on March 1, 2021.

# 5.0 POTENTIAL NOISE IMPACTS

## 5.1 CEQA THRESHOLDS

Appendix G of the CEQA Guidelines contains the Environmental Checklist form that was used during the preparation of this study. Accordingly, a project may create a significant environmental impact if it causes one or more of the following to occur:

- 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 (refer to Impact Statement NOI-1);

- Generate excessive groundborne vibration or groundborne noise levels (refer to Impact Statement NOI-2); and/or

- 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 (refer to Impact Statement NOI-3).

Based on these standards and thresholds, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are provided for potentially significant impacts.

**TRAFFIC NOISE THRESHOLDS**

An off-site traffic noise impact typically occurs when there is a discernable increase in traffic and the resulting noise level exceeds an established noise standard. In community noise considerations, changes in noise levels greater than 3 dB are often identified as substantial, while changes less than 1 dB are not discernible to local residents. In the range of 1 to 3 dB, residents who are very sensitive to noise may perceive a slight change. In laboratory testing situations, humans are able to detect noise level changes of slightly less than 1 dB. However, this is based on a direct, immediate comparison of two sound levels. Community noise exposures occur over a long period of time and changes in noise levels occur over years (rather than the immediate comparison made in a laboratory situation). Therefore, the level at which changes in community noise levels become discernible is likely to be some value greater than 1 dB, with a 3 dB change as the most commonly accepted discernable difference. A 5 dB change is generally recognized as a clearly discernable difference.

According to the *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, a doubling of traffic volumes would result in a 3 dB increase in traffic noise levels, which is barely detectable by the human ear.[5] Further, a change in ambient noise levels of 5 dBA is considered clearly noticeable.[6] Therefore, the project would have a significant impact if the project causes the ambient noise level to increase by 5 dBA CNEL at the affected sensitive land use within the "normally acceptable" or "conditionally acceptable" category, or by 3 dBA CNEL at the affected sensitive land use within the "normally unacceptable" or "clearly unacceptable" category; refer to Table 4.

## 5.2 IMPACT ANALYSES

## NOI-1 GENERATE A SUBTANTIAL 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?

### SHORT-TERM CONSTRUCTION

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., grading, paving, building construction). Noise generated by construction equipment, including graders and concrete saws, can reach high levels. During construction, exterior noise levels could affect the residential neighborhoods in the vicinity of the construction site. Construction of the proposed project would occur over approximately 60 months and would include demolition, grading, paving, building construction, and architectural coatings. Construction activities are anticipated to require temporary shoring during the grading phase, off-site utility and signalized intersection improvements during the paving phase, pedestrian bridge construction during the building construction and paving phase, and vapor barrier installation during the building construction phase. Groundborne noise and other types of construction-related noise impacts would typically occur during the grading construction phase and have the potential to create the highest levels of noise. As such, the grading phase represents the worst-case condition for short-term construction noise levels that may occur at the nearest noise-sensitive receptors.

Construction noise is difficult to quantify because of the many variables involved, including the specific equipment types, size of equipment used, percentage of time each piece is in operation, condition of each piece of equipment, and number of pieces that would operate on the site. Construction equipment produce maximum noise levels when equipment is operating under full power conditions (i.e., the equipment engine at maximum speed). However, equipment used on

[5] U.S. Department of Transportation, *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, updated August 24, 2017, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed on November 20, 2020.

[6] Bies & Hansen, Engineering Noise Control, Table 2.1, 1988.

construction sites typically operates under less than full power conditions, or part power. To more accurately characterize construction-period noise levels, the average ($L_{eq}$) noise level associated with each construction stage is calculated based on the quantity, type, and usage factors for each type of equipment that would be used during each construction stage. These noise levels are typically associated with multiple pieces of equipment simultaneously operating on part power. The loudest construction phase would be the grading phase as heavy-duty construction equipment may operate up to the closest sensitive receptor property line (i.e., approximately 5 feet from the nearest residential structure). During the demolition phase, crushing of materials may occur in the northeastern portion of the project site (i.e., approximately 650 feet from the nearest residential structure), which may result in elevated noise levels. The estimated demolition and grading construction noise levels at the nearest noise-sensitive receptors is presented in Table 11, *Demolition and Grading Construction Noise Levels at Adjacent Residential Receptors*. To present a conservative impact analysis, the estimated noise levels were calculated for a scenario in which all heavy construction equipment were assumed to operate simultaneously and be located at the construction area nearest to the affected receptors.

Although the City has identified a construction noise standard of 65 dBA, this analysis utilizes a construction noise threshold in reference to ambient noise levels. A change in ambient noise levels of 5 dBA is considered clearly noticeable, and therefore, is utilized as the threshold of significance for this analysis.[7] As shown in Table 8, ambient noise levels in the vicinity of the project site range from 55.1 dBA to 68.3 dBA. To provide a conservative analysis, the construction noise threshold is based on the lowest ambient noise level in the project vicinity (i.e., 55.1 dBA). As such, construction noise impacts are based on a construction noise threshold of 60.1 dBA.

As depicted in Table 11, adjacent residential receptors could be exposed to temporary and intermittent noise levels ranging from 70.4 to 114.2 dBA (without mitigation). The noise levels presented in Table 11 are conservative, as these noise levels assume the simultaneous operation of all heavy construction equipment during the demolition and grading phases at the same precise location. Modeled heavy construction equipment include excavators, dozers, tractors, and crushing equipment during the demolition phase and excavators, graders, loaders, and vibratory drivers during the grading phase. It should also be acknowledged that construction activities would occur during normal daytime hours (between 7:00 a.m. and 8:00 p.m.) to avoid noise disturbances at nearby receptors during the more sensitive hours (between 8:00 p.m. and 7:00 a.m.).[8]

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[7] Bies & Hansen, Engineering Noise Control, Table 2.1, 1988.

[8] Project construction will not occur at night (8:00 p.m. to 7:00 a.m.), on Sundays, or legal holidays.

**Table 11**
**Demolition and Grading Construction Noise Levels at Adjacent Residential Receptors**

| Phase | Nearest Sensitive Receptor to Project Site | Estimated Exterior Construction Noise Level (dBA $L_{eq}$)[1] | Estimated Exterior Construction Noise Level (dBA $L_{eq}$) with Mitigation[2] | Construction Noise Threshold (dBA $L_{eq}$)[3] | Exceeds Standards with Mitigation? |
|---|---|---|---|---|---|
| Demolition | Southern/Southwestern Residences (approximately 650 feet) | 70.4 | 60.4 | 60.1 | **Yes** |
| Grading | Southern/Southwestern Residences (approximately 5 feet) | 114.2 | 104.2 | 60.1 | **Yes** |

Notes:
1. These noise levels conservatively assume the simultaneous operation of all heavy construction equipment at the same precise location. Modeled heavy construction equipment include excavators, dozers, tractors, and crushing equipment during the demolition phase and excavators, graders, loaders, and vibratory drivers during the grading phase.
2. Project estimated exterior construction noise levels with mitigation include a sound reduction of 10 dBA from Mitigation Measure NOI-MM-2.
3. The construction noise threshold is based on a change in ambient noise levels of 5 dBA. As shown in Table 8, ambient noise levels in the vicinity of the project site range from 55.1 dBA to 68.3 dBA. To provide a conservative analysis, the construction noise threshold is based on the lowest ambient noise level in the project vicinity (i.e., 55.1 dBA). Therefore, the construction noise threshold is 60.1 dBA.

Source: Federal Highway Administration, *Roadway Construction Noise Model (RCNM)*, 2006 (see Appendix A).

Noise source control is the most effective method of controlling construction noise. Source controls, which limit noise, are the easiest to oversee on a construction project. Mitigation at the source reduces the problem everywhere, not just along one single path or for one receiver. Noise path controls are the second method in controlling noise. Barriers or enclosures can provide a substantial reduction in the nuisance effect in some cases. Path control measures include moving equipment farther away from the receiver; enclosing especially noisy activities or stationary equipment; erecting noise enclosures, barriers, or curtains; and using landscaping as a shield and dissipater.

Modern noise barriers or enclosures can substantially reduce construction noise levels.[9] To be effective, a noise enclosure/barrier must physically fit in the available space, must completely break the line of sight between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source and extend length-wise and vertically as far as feasibly possible to be most effective. The limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the

[9] Echo Barrier, *H9 Acoustic Barrier*, https://cdn2.hubspot.net/hubfs/3882358/Current%20Spec%20Sheets/US%20spec%20sheets/Echo+Barrier+H9+Product+Specification+Sheet+US.pdf?__hstc=142594029.328a8c029c1473d436adaac1ede62776.1605573497439.1605573497439.1605573497439.1&__hssc=142594029.2.1605573497440&__hsfp=1026759523, accessed November 15, 2020.

barrier. In these cases, the enclosure/barrier system must either be very tall or have some form of roofed enclosure to protect upper-story receptors.

As shown in Table 11, construction noise levels during demolition and grading activities would exceed the construction noise threshold of 60.1 dBA. To substantially reduce construction-generated noise at nearby receptors, the proposed project would be required to implement Mitigation Measures NOI-MM-1 and NOI-MM-2. Mitigation Measure NOI-MM-1 would include the designation of a "Noise Disturbance Coordinator" and orientation of stationary construction equipment away from nearby sensitive receivers, among other requirements. Further, implementation of Mitigation Measure NOI-MM-2 would reduce the project's construction noise levels by at least 10 dBA with the use of a temporary noise barrier or enclosure along the southern/southwestern portion of the project site to break the line of sight between the construction equipment and the adjacent residences. As depicted in Table 11, construction noise levels during the demolition and grading phase, with implementation of Mitigation Measures NOI-MM-1 and NOI-MM-2, would be 60.4 dBA and 104.2 dBA, respectively. Therefore, construction noise levels would exceed the construction noise threshold of 60.1 dBA during the demolition and grading phases. No further mitigation measures are feasible. Thus, construction noise impacts would be significant and unavoidable.

**Construction Truck Trips**

Construction activities would also cause increased noise along access routes to and from the project site due to movement of equipment and workers, as well as hauling trips. Construction activities would include demolition of approximately 322,308 square feet of building area, which would result in approximately 1,466 hauling trips.[10] Grading at the project site would require approximately 120,000 cubic yards of import, which would result in approximately 15,000 hauling trips.[11] It is anticipated that construction worker trips would be a maximum of 1,321 trips per day, and vendor trips would be a maximum of 304 trips per day.[12] As a result, mobile source noise would increase along access routes to and from the project site during construction. However, mobile traffic noise from construction trips would be temporary and would cease upon completion of project construction.

As discussed above, the construction noise threshold is based on a 5 dBA increase in ambient noise levels. As the lowest ambient noise level in the project vicinity was measured at 55.1 dBA, construction noise impacts are based on a construction noise threshold of 60.1 dBA. Based on FTA data, haul truck (i.e. concrete mixer trucks, drill rig trucks, and dump trucks) noise levels range from 84 to 85 dBA at a distance of 50 feet.[13] Sensitive receptors (i.e. residential uses) along

[10] Based on California Emissions Estimator Model version 2016.3.2 (CalEEMod) outputs provided in the *Air Quality Assessment for the Imperial Avalon Project* prepared by Michael Baker International, September 2021.

[11] Ibid.

[12] Ibid.

[13] Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054)*, January 2006.

Grace Avenue and 213th Street would be located as close as 25 feet from haul truck operations during construction. At this distance, haul truck operation noise levels would range from 90 to 91 dBA which would exceed the construction noise threshold of 60.1 dBA. Therefore, Mitigation Measures NOI-MM-2 and NOI-MM-3 would be implemented to reduce haul truck trip noise levels at sensitive receptors. Mitigation Measure NOI-MM-2 would reduce the project's construction noise levels by at least 10 dBA with the use of a temporary noise barrier or enclosure along the southern portion of the project site to break the line of sight between haul truck operations and the adjacent residences. Mitigation Measure NOI-MM-3 would route haul truck trips away from sensitive receptors and limit haul truck deliveries to the same hours specified for construction equipment (between the hours of 7:00 a.m. to 8:00 p.m. on weekdays and Saturdays only). Specifically, Mitigation Measure NOI-MM-3 would include a haul route exhibit specifying site access for construction hauling trips along Avalon Boulevard. The nearest sensitive receptor[14] would be located along 213th Street at a distance of approximately 520 feet from the closest potential access point for construction hauling trips along Avalon Boulevard. Accounting for Mitigation Measures NOI-MM-2 and NOI-MM-3, haul truck noise levels would range from 53.7 to 54.7 dBA at the nearest sensitive receptor. Therefore, haul truck noise levels would not exceed the construction noise threshold of 60.1 dBA and impacts would be less than significant with implementation of Mitigation Measures NOI-MM-2 and NOI-MM-3.

## LONG-TERM OPERATIONS

### Mobile Noise

The proposed project would result in additional traffic on adjacent roadways from daily activities, thereby increasing vehicular noise in the vicinity of existing and proposed land uses. Based on the *Imperial Avalon Local Transportation Assessment* (Transportation Assessment) prepared by Fehr and Peers (dated July 16, 2021), typical daily activities are forecast to generate 5,586 net new average daily trips, including net new 402 trips during the a.m. peak hour and 457 trips during the p.m. peak hour. The calculated traffic noise levels for the "Future Year Without Project" and "Future Year With Project" scenarios are compared in Table 12, *Future (2027) Traffic Noise Levels*. As depicted in Table 12, under the "Future Without Project" scenario, noise levels would range from approximately 49.4 dBA to 75.1 dBA, with the highest noise levels occurring along the Avalon Boulevard segment from M.L.K. Jr. Street to Del Amo Boulevard. The "Future Year With Project" scenario noise levels would range from approximately 52.5 dBA to 75.2 dBA, with the highest noise levels also occurring along the Avalon Boulevard segment from M.L.K. Jr. Street to Del Amo Boulevard.

As previously discussed, the project would have a significant impact if the "Future With Project" scenario causes the "Future Without Project" scenario traffic noise levels to increase by 5 dBA CNEL at the affected sensitive land use within the "normally acceptable" or "conditionally

[14] The nearest sensitive receptor would be located at 624 E 213th Street.

acceptable" category, or an increase of 3 dBA CNEL at the affected sensitive land use within the "normally unacceptable" or "clearly unacceptable" category; refer to Table 4. The Increase Significance Thresholds shown in Table 12 are based on the land use compatibility categories identified in Table 10. As depicted in Table 12, the "Future With Project" traffic noise levels would not exceed the 5.0 dBA or 3.0 dBA Increase Significance Thresholds along any of the surrounding roadways. Therefore, a less than significant impact would occur in this regard.

**Table 12**
**Future (2027) Traffic Noise Levels**

| Roadway Segment | CNEL at 50 feet from Roadway Centerline (dBA) | | Project Noise Level Increase (dBA)[2] | *Increase Significance Threshold (dBA)* | Exceeds Thresholds? |
|---|---|---|---|---|---|
| | Future Without Project[1] | Future With Project[1] | | | |
| **Avalon Boulevard** | | | | | |
| Albertoni Street to Victoria Street | 70.8 | 70.8 | 0.0 | *3.0* | No |
| Victoria Street to M.L.K. Jr. Street | 74.0 | 74.0 | 0.0 | *3.0* | No |
| M.L.K. Jr. Street to Del Amo Boulevard | 75.1 | 75.2 | 0.1 | *3.0* | No |
| Del Amo Boulevard to I-405 | 71.8 | 71.8 | 0.0 | *5.0* | No |
| I-405 to Imperial Avalon Main Entrance | 72.0 | 72.4 | 0.4 | *3.0* | No |
| Imperial Avalon Main Entrance to 213th Street | 71.6 | 71.7 | 0.1 | *3.0* | No |
| 213th Street to Carson Street | 70.9 | 71.0 | 0.1 | *5.0* | No |
| Carson Street to 220th Street | 71.0 | 71.0 | 0.0 | *3.0* | No |
| **Grace Avenue** | | | | | |
| North of 213th Street | 49.4 | 52.5 | 3.1 | *5.0* | No |
| **Main Street** | | | | | |
| Torrance Boulevard to 213th Street | 71.0 | 71.0 | 0.0 | *3.0* | No |
| 213th Street to Carson Street | 70.7 | 70.7 | 0.0 | *5.0* | No |
| Carson Street to 220th Street | 70.4 | 70.4 | 0.0 | *5.0* | No |
| **Del Amo Boulevard** | | | | | |
| Avalon Boulevard to Central Avenue | 72.8 | 72.8 | 0.0 | *3.0* | No |
| **213th Street** | | | | | |
| Grave Avenue to Avalon Boulevard | 63.2 | 63.3 | 0.1 | *5.0* | No |
| **Carson Street** | | | | | |
| Figueroa Street to Main Street | 69.7 | 69.7 | 0.0 | *5.0* | No |
| Main Street to Grave Avenue | 69.2 | 69.2 | 0.0 | *5.0* | No |
| Grave Avenue to Avalon Boulevard | 69.7 | 69.7 | 0.0 | *5.0* | No |
| Avalon Boulevard to I-405 | 71.3 | 71.3 | 0.0 | *3.0* | No |

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level.
1. The Future Year 2027 has been selected based on the project Opening Year 2027.
2. Increase relative to traffic noise levels comparing the "Future With Project" scenario to the "Future Without Project" Scenario.

Source: Noise modeling is based on traffic data within *Imperial Avalon Project Average Daily Trip Segment Volumes* excel sheet provided by the Project Applicant on March 1, 2021.

### *Cumulative Mobile Source Impacts*

The proposed project, in combination with cumulative projects, may result in increased long-term mobile noise levels in the project vicinity. The project's contribution to a cumulative traffic noise increase would be considered significant if the following occurred:

- The "Future With Project" traffic noise levels cause a 3.0 dBA or 5.0 dBA (i.e., Increase Significance Threshold) increase above the "Existing" traffic noise levels at sensitive land uses, depending on the land use compatibility identified in Table 10.

Noise, by definition, is a localized phenomenon and reduces as distance from the source increases. Consequently, only the proposed project and growth due to occur in the site vicinity would contribute to cumulative noise impacts. Table 13, *Cumulative Noise Scenario*, lists the traffic noise effects along roadway segments in the project vicinity for "Existing" and "Future With Project" conditions, including the applicable Increase Significance Threshold.

As indicated in Table 13, the cumulative increase in traffic noise levels, as a result of the proposed project and cumulative projects, would not exceed the 5.0 dBA or 3.0 dBA Increase Significance Thresholds along any of the surrounding roadways. Therefore, traffic noise impacts would be less than significant.

**Table 13**
**Cumulative Noise Scenario**

| Roadway Segment | CNEL at 50 feet from Roadway Centerline (dBA) | | Cumulative Increase[2] (dBA) | *Increase Significance Threshold (dBA)* | Exceeds Thresholds? |
|---|---|---|---|---|---|
| | Existing | Future With Project[1] | | | |
| **Avalon Boulevard** | | | | | |
| Albertoni Street to Victoria Street | 70.1 | 70.8 | 0.7 | *3.0* | No |
| Victoria Street to M.L.K. Jr. Street | 72.8 | 74.0 | 1.2 | *3.0* | No |
| M.L.K. Jr. Street to Del Amo Boulevard | 74.0 | 75.2 | 1.2 | *3.0* | No |
| Del Amo Boulevard to I-405 | 71.2 | 71.8 | 0.6 | *5.0* | No |
| I-405 to Imperial Avalon Main Entrance | 70.5 | 72.4 | 1.9 | *3.0* | No |
| Imperial Avalon Main Entrance to 213th Street | 70.6 | 71.7 | 1.1 | *3.0* | No |
| 213th Street to Carson Street | 69.7 | 71.0 | 1.3 | *5.0* | No |
| Carson Street to 220th Street | 70.4 | 71.0 | 0.6 | *3.0* | No |
| **Grace Avenue** | | | | | |
| North of 213th Street | 49.3 | 52.5 | 3.2 | *5.0* | No |
| **Main Street** | | | | | |
| Torrance Boulevard to 213th Street | 70.3 | 71.0 | 0.7 | *3.0* | No |
| 213th Street to Carson Street | 70.0 | 70.7 | 0.7 | *5.0* | No |
| Carson Street to 220th Street | 69.8 | 70.4 | 0.6 | *5.0* | No |
| **Del Amo Boulevard** | | | | | |
| Avalon Boulevard to Central Avenue | 72.2 | 72.8 | 0.6 | *3.0* | No |

**Table 13 (Continued)**
**Cumulative Noise Scenario**

| Roadway Segment | CNEL at 50 feet from Roadway Centerline (dBA) | | Cumulative Increase[2] (dBA) | *Increase Significance Threshold (dBA)* | Exceeds Thresholds? |
|---|---|---|---|---|---|
| | Existing | Future With Project[1] | | | |
| **213th Street** | | | | | |
| Grave Avenue to Avalon Boulevard | 62.7 | 63.3 | 0.6 | *5.0* | No |
| **Carson Street** | | | | | |
| Figueroa Street to Main Street | 68.9 | 69.7 | 0.8 | *5.0* | No |
| Main Street to Grave Avenue | 68.6 | 69.2 | 0.6 | *5.0* | No |
| Grave Avenue to Avalon Boulevard | 68.8 | 69.7 | 0.9 | *5.0* | No |
| Avalon Boulevard to I-405 | 70.7 | 71.3 | 0.6 | *3.0* | No |

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level.
1. The Future Year 2027 has been selected based on the project Opening Year 2027.
2. Increase relative to traffic noise levels comparing the "Existing" scenario to the "Future With Project" Scenario.

Source: Noise modeling is based on traffic data within *Imperial Avalon Project Average Daily Trip Segment Volumes* excel sheet provided by the Project Applicant on March 1, 2021.

### Stationary Noise Impacts

*Outdoor Gathering Areas*

The project proposes a 3,000 square foot dog park, a 7,200 square foot greenbelt and a 18,300 square foot central park in the center of the project site; refer to Exhibit 3. The project would also include a courtyard in the center of both Buildings A and B. These proposed parks have the potential to be used as outdoor gathering areas, which may be accessed by groups of people intermittently for outdoor events (i.e., parties, lunch, dinner, etc.). Noise generated by groups of people (i.e., crowds) is dependent on several factors including vocal effort, impulsiveness, and the random orientation of the crowd members. Crowd noise is estimated to be 60 dBA at one meter (3.28 feet) away for raised normal speaking.[15,16] This noise level would have a +5 dBA adjustment for the impulsiveness of the noise source, and a -3 dBA adjustment for the random orientation of the crowd members.[17] Therefore, crowd noise would be approximately 62 dBA at one meter (3.28 feet) from the source (i.e., park and greenbelt areas). Noise has a decay rate due to distance attenuation, which is calculated based on the Inverse Square Law. Based upon the Inverse Square Law, sound levels decrease by 6 dBA for each doubling of distance from the source.[18] As a result, crowd noise at the nearest sensitive receptor (residential property to the south located approximately 330 feet away from the nearest outdoor gathering area, the

[15] M.J. Hayne, et al., *Prediction of Crowd Noise, Acoustics*, November 2006.
[16] University of Michigan, *Harmful Noise Levels*, https://www.uofmhealth.org/health-library/tf4173, accessed August 12, 2021.
[17] Ibid.
[18] Cyril M. Harris, *Noise Control in Buildings*, 1994.

greenbelt) would be 22 dBA; refer to Exhibit 3. Proposed three story townhomes on Lot E would be in-between this greenbelt area and the nearest sensitive receptor, shielding this sensitive receptor and reducing noise levels by approximately 15 dBA.[19] Thus, crowd noises would be around 7 dBA, which is substantially below the City's 50 dBA daytime and 45 dBA nighttime noise standard for residential properties. As such, project-related operational noise associated with outdoor gathering areas would not result in a temporary or permanent increase in ambient noise levels in excess of the City's noise standards, and impacts would be less than significant.

*Mechanical Equipment*

The project would include heating, ventilation, and air conditioning (HVAC) units located at on the rooves of the proposed three-story townhomes (45 feet in height). HVAC systems can result in noise levels of approximately 55 dBA $L_{eq}$ at 2.9 feet from the source.[20] The nearest sensitive receptor is located adjacent to the proposed townhomes, on the southern portion of the project site, and the subsequent HVAC unit is approximately 30 feet to the south. This would place the HVAC units approximately 45 feet up and 30 feet to the north of the nearest sensitive receptors. By using the Pythagorean theorem, this calculates that the HVAC unit could be located as close as 54 feet from a sensitive receptor.[21] In addition, the HVAC units would not be visible to the nearest sensitive receptors as a parapet would separate the proposed townhomes and receptors, further attenuating the HVAC noise levels by approximately 5 dBA.[22] Therefore, the closest HVAC unit could produce a noise level of approximately 25 dBA. As such, the City's daytime (50 dBA) and nighttime (45 dBA) noise standards would not be exceeded as a result of HVAC units at the project site. Impacts would be less than significant in this regard.

*Garbage Trucks*

The proposed project would involve occasional trash/recycling pickups from slow-moving garbage trucks. Trash/recycling pickup would occur throughout the site. Low-speed truck noise results from a combination of engine, exhaust, and tire noise as well as the intermittent sounds of back-up alarms and releases of compressed air associated with truck air-brakes. However, trash/recycling truck operations would be short-term and irregular and are considered part of standard operations in the area (i.e. existing trash/recycling collection activities at adjacent uses) and would not differ from the existing garbage truck operations on the project site. Therefore,

[19] Federal Highway Administration, *Roadway Construction Noise Model User's Guide*, January 2016.

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

[21] The Pythagorean theorem allows individuals to calculate the actual distance between a suspended object and a starting point. In this case, the starting point would be the closest sensitive receptor located approximately 30 feet to the south (side a) of the HVAC unit and the suspended object is the HVAC unit, located 45 feet up (side b). By plugging these values into the equation, we can calculate the hypotenuse (side c), or the distance between the HVAC unit and the sensitive receptor.

[22] Federal Highway Administration, *Roadway Construction Noise Model User's Guide*, January 2016.

trash/recycling pickups would not introduce a new intrusive noise source compared to existing conditions. As such, a less than significant impact would occur in this regard.

*Parking Areas*

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. However, the instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys may be an annoyance to adjacent noise-sensitive receptors. Conversations in parking areas may also be an annoyance to adjacent sensitive receptors. Sound levels of speech typically range from 33 dBA at 48 feet for normal speech to 50 dBA at 50 feet for very loud speech.[23] Estimates of the maximum noise levels associated with typical parking lot activities are presented in Table 14, *Typical Noise Levels Generated by Parking Lots*.

**Table 14**
**Typical Noise Levels Generated by Parking Lots**

| Noise Source | Maximum Noise Levels at 50 Feet from Source |
|---|---|
| Car door slamming | 63 dBA $L_{eq}$ |
| Car starting | 60 dBA $L_{eq}$ |
| Car idling | 53 dBA $L_{eq}$ |
| Source: Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991. | |

The project proposes approximately 2,026 parking spaces within parking structures split between buildings A through D, and individual garages within the town homes. Majority of the parking, approximately 818 spaces, would be located within individual townhome garages and would not be a source of a parking lot noise. The remainder of the parking spots would be split between buildings A through D and would be located within an at or above-grade parking structure. The nearest sensitive receptor would be located approximately 125 feet to the south of the proposed parking structure within building D. As shown in Table 14, parking lot noise levels could range between 53 dBA and 63 dBA at 50 feet. At a distance of 120 feet, parking lot noise would range from 45 to 55 dBA. However, parking lot noise is anticipated to be lower than the levels presented in Table 14 as the parking structures would be predominantly enclosed. Furthermore, a large existing stone wall would separate the proposed parking structure and sensitive receptor, further attenuating the parking lot noise levels. The combination of the predominantly enclosed parking structure and large stone wall would lower parking lot noise levels by at least 10 dBA.[24]

[23] Ibid.
[24] Ibid.

Therefore, parking lot noises would range from 35 to 45 dBA. It should also be noted that only the southwestern portion of the parking lot would be located at this distance; the majority of the parking structure and spaces would be located farther away and would yield lower parking lot noises. As such, parking lot noise levels would not exceed the City's daytime (50 dBA) and nighttime (45 dBA) noise standards and noise impacts from parking lot activities would be less than significant.

***Cumulative Stationary Noise Impacts***

Cumulative stationary noise levels associated with the proposed project (i.e. outdoor gathering areas, mechanical equipment, and garbage trucks) were modeled with the SoundPLAN version 8.2 three-dimensional noise model. SoundPLAN allows computer simulations of noise situations, and creates noise contour maps using reference noise levels, topography, point and area noise sources, mobile noise sources, and intervening structures. Noise contours associated with the project's stationary noise sources are included in Appendix A and represent the collective noise level from outdoor gathering areas, mechanical equipment, and garbage truck operations[25] at the project site. As shown in Table 15, *Cumulative Stationary Noise Levels at Adjacent Receivers*, daytime exterior noise levels would range from 23.6 to 33.4 dBA and nighttime exterior noise levels would range from 22.3 to 31.9 dBA at the nearest sensitive receptors to the south of the project site. It should be noted that the modeled noise contours indicated the sensitive receptors to the south of the project site would experience the greatest increase in project-generated noise levels; refer to Appendix A. In addition, traffic along Grace Avenue would mask project-generated noise levels experienced at sensitive receptors to the west of the project site. Thus, cumulative noise levels from the project's stationary noise sources would not exceed the City's noise standards. Impacts would be less than significant in this regard.

[25] Trash collection for the multi-family buildings would occur within the Building B parking structure. Noise associated with garbage truck circulation on the project site has been modeled with SoundPLAN; refer to Appendix A.

**Table 15**
**Cumulative Stationary Noise Levels at Adjacent Receivers**

| Receiver | Calculated Exterior Daytime Noise Level (dBA) | Calculated Exterior Nighttime Noise Level (dBA) | City Daytime / Nighttime Noise Standard (dBA) | Exceed City Standard? |
|---|---|---|---|---|
| 1 | 27.0 | 25.3 | 50 / 45 | No |
| 2 | 23.6 | 22.3 | 50 / 45 | No |
| 3 | 28.2 | 27.1 | 50 / 45 | No |
| 4 | 33.4 | 31.9 | 50 / 45 | No |
| 5 | 25.5 | 24.4 | 50 / 45 | No |
| 6 | 26.0 | 25.0 | 50 / 45 | No |
| 7 | 27.9 | 27.2 | 50 / 45 | No |
| Source: SoundPLAN Model Version 8.2; refer to Appendix A. | | | | |

**Mitigation Measures:**

NOI-MM-1 To reduce noise levels during construction activities, the Applicant must demonstrate, to the satisfaction of the City of Carson Community Development Director, that the project complies with the following:

- Construction contracts must specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state-required noise attenuation devices.

- A sign, legible at a distance of 50 feet, shall be posted at the project construction site providing a contact name and a telephone number where residents can inquire about the construction process and register complaints. This sign shall indicate the dates and duration of construction activities. In conjunction with this required posting, a noise disturbance coordinator shall be identified to address construction noise concerns received. The coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the disturbance coordinator shall notify the City within 24 hours of the complaint and determine the cause of the noise complaint (starting too early, malfunctioning muffler, etc.) and shall implement reasonable measures to resolve the complaint, as deemed acceptable by the City. All signs posted at the construction site shall include the contact name and the telephone number for the noise disturbance coordinator.

- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.

- Per Section 5502 (c) of the Municipal Code, construction shall be limited to the hours between 7:00 a.m. and 8:00 p.m. daily (except Sundays and legal holidays). All construction activities shall be prohibited at night (between 8:00 p.m. and 7:00 a.m.) and on Sundays and legal holidays.

NOI-MM-2 In order to reduce construction noise, a temporary noise barrier or enclosure shall be used along the southern and southwestern portion property lines to break the line of sight between the construction equipment and the adjacent residences; Assessor's Parcel Number (APN) 7337-002-047, 7337-002-004, 7337-002-008, 7337-002-010, 7337-002-012, 7337-002-040. The temporary noise barrier shall have a sound transmission class (STC) of at least 10 or greater in accordance with American Society for Testing and Materials Test Method E90, or at least 2 pounds per square foot to ensure adequate transmission loss characteristics. In order to achieve this, the barrier may consist of 3-inch steel tubular framing, welded joints, a layer of 18-ounce tarp, a 2-inch-thick fiberglass blanket, a half-inch-thick weatherwood asphalt sheathing, and 7/16-inch sturdy board siding with a heavy duct seal around the perimeter. The length, height, and location of noise control barrier walls shall be adequate to assure proper acoustical performance. In addition, to avoid objectionable noise reflections, the source side of the noise barrier shall be lined with an acoustic absorption material meeting a noise reduction coefficient rating of 0.70 or greater in accordance with American Society for Testing and Materials Test Method C423. All noise control barrier walls shall be designed to preclude structural failure due to such factors as winds, shear, shallow soil failure, earthquakes, and erosion.

NOI-MM-3 To reduce construction truck trip noise impacts on sensitive receptors during construction activities, the Applicant must demonstrate, to the satisfaction of the City of Carson Community Development Director, that the project complies with the following:

- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (between the hours of 7:00 a.m. to 8:00 p.m. on weekdays and Saturdays with no activity allowed on Sundays or holidays). A haul route exhibit shall be submitted to the City of Carson Community Development Director that designs delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise. Specifically, the haul route exhibit shall depict site access for construction haul truck trips along Avalon Boulevard.

**Level of Significance After Mitigation:** Significant and Unavoidable.

## NOI-2 GENERATE EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS?

### SHORT-TERM CONSTRUCTION

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The Caltrans *Transportation and Construction Vibration Manual* identifies various vibration damage criteria for different building classes. This evaluation uses the Caltrans architectural damage criterion for continuous vibrations at older residential structures of 0.3 inch-per-second PPV. Further, as the nearest sensitive receptors to project construction are residents, the criterion for human annoyance of 0.2 inch-per-second PPV is utilized. 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. Building damage can be cosmetic or structural.

Construction of the proposed project would occur over approximately 60 months and would include demolition, grading, paving, building construction, and architectural coatings. Construction activities are anticipated to require temporary shoring during the grading phase, off-site utility and signalized intersection improvements during the paving phase, pedestrian bridge construction during the building construction and paving phase, and vapor barrier installation during the building construction phase. The highest degree of groundborne vibration would be generated during the grading construction phase due to the operation of a vibratory driver during temporary shoring activities adjacent to residential structures along the south and southwestern project boundary. Groundborne vibration levels associated with representative construction equipment are summarized in Table 16, *Representative Vibration Source Levels for Construction Equipment*.

**Table 16**
**Representative Vibration Source Levels for Construction Equipment**

| Equipment | | Approximate peak particle velocity at 5 feet (inch-per-second)[1] | Approximate peak particle velocity at 15 feet (inch-per-second)[1] | Reference peak particle velocity at 25 feet (inch-per-second) | Approximate peak particle velocity at 26 feet (inch-per-second)[1] | Approximate peak particle velocity at 60 feet (inch-per-second)[1] |
|---|---|---|---|---|---|---|
| Vibratory Driver[2] | *Upper Range* | 8.206 | 1.579 | 0.734 | 0.692 | 0.197 |
| | *Typical* | 1.901 | 0.366 | 0.170 | 0.160 | 0.046 |
| Vibratory Roller | | 2.348 | 0.452 | 0.210 | 0.198 | 0.056 |
| Large bulldozer | | 0.995 | 0.191 | 0.089 | 0.084 | 0.024 |
| Caisson Drilling | | 0.995 | 0.191 | 0.089 | 0.084 | 0.024 |
| Loaded trucks | | 0.850 | 0.164 | 0.076 | 0.072 | 0.020 |
| Small bulldozer | | 0.034 | 0.006 | 0.003 | 0.003 | 0.001 |

Notes:
1. Calculated using the following formula:

$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

where: PPV (equip) = the peak particle velocity in inch-per-second of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in inch-per-second from Table 7-4 of the FTA *Transit Noise and Vibration Impact Assessment Manual*
D = the distance from the equipment to the receiver

2. Vibratory driver is referenced as a sonic pile driver in the FTA *Transit Noise and Vibration Impact Assessment Manual* (dated September 2018).

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

Construction activities are anticipated to occur up to the project boundary line. Therefore, the nearest structures (i.e. residential uses) would be located approximately 5 feet to the south and southwest of the project site boundary. As indicated in Table 16, vibration velocities from typical heavy construction equipment operations that would be used during project construction range from 0.034 to 8.206 inch/second PPV at 5 feet from the source of activity. Therefore, construction groundborne vibration would exceed the human annoyance criterion (0.2 inch-per-second PPV) and the structural damage criterion (0.3 inch-per-second PPV). As such, Mitigation Measure NOI-MM-4 would be required to reduce vibration impacts to a less than significant level. Mitigation Measure NOI-MM-4 is directly related to vibration control, as it requires a qualified professional to prepare construction vibration mitigation plans and to utilize pneumatic impact equipment. It also requires a buffer distance for heavy equipment operation adjacent to sensitive uses and structures. With implementation of Mitigation Measure NOI-MM-4, impacts would be less than significant.

**LONG-TERM OPERATIONS**

The proposed residential and commercial uses would not generate groundborne vibration that could be felt by surrounding uses. The proposed project would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses. Thus, no impact would occur in this regard.

**Mitigation Measures:**

NOI-MM-4 The following measures shall be incorporated on all grading and building plans and specifications subject to approval of the City's Building and Safety Division prior to issuance of a demolition or grading permit (whichever occurs first):

- The developer shall ensure construction equipment will not approach the construction buffer zone adjacent to the residential structures along the project's southern and southwestern project boundary. The buffer zone shall be tiered based on distances established in Table 16, *Representative Vibration Source Levels for Construction Equipment*. As shown in Table 16, vibratory drivers shall not operate within 60 feet of residential structures; vibratory rollers shall not operate within 26 feet of residential structures; and large bulldozers, caisson drilling activities, and loaded trucks shall not operate within 15 feet of residential structures. The buffer zone shall be in enforced around the existing residential structures between the hours of 7:00 a.m. and 8:00 p.m. pursuant to Municipal Code Section 5502 (c).

- The developer shall utilize a construction vibration monitoring system with the potential to measure low levels of vibration (i.e. 0.2 inch-per-sec PPV and 0.3 inch-per-sec PPV) to ensure human annoyance and structural damage does not occur. If the human annoyance criterion (0.2 inch-per-second PPV) and the structural damage criterion (0.3 inch-per-second PPV) are exceeded, construction must cease and alternate strategies shall be employed to ensure the human annoyance and structural damage vibration criteria are not exceeded.

- Conduct sensitivity training to inform construction personnel about the existing sensitive receptors surrounding the project and about methods to reduce noise and vibration.

**Level of Significance after Mitigation:** Less Than Significant Impact.

## NOI-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, EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?

The nearest airport to the project site is the Compton/Woodley Airport located approximately 3.5 miles to the northeast in the City of Compton. According to the General Plan, the 60 dBA and 65 dBA noise contours from the Compton/Woodley Airport do not extend into the City of Carson. Additionally, the project site is not located within the vicinity of a private airstrip or related facilities.[26] Therefore, project implementation would not expose people residing or working in the project area to excessive noise levels associated with aircraft. No impacts would occur in this regard.

**Mitigation Measures:** No mitigation measures are required.

**Level of Significance After Mitigation:** No Impact.

[26] The Goodyear Blimp Airship Base, situated approximately 1.07 miles to the northwest of the project site, is not considered an airport, as blimp operations are only infrequent compared to aircraft activity at airports, and produce much lower sound levels than traditional aircraft.

# 6.0 REFERENCES

## 6.1 LIST OF PREPARERS

**MICHAEL BAKER INTERNATIONAL**
5 Hutton Centre Drive, Suite 500
Santa Ana, California 92707
949/472-3505

Eddie Torres, Planning Department Manager
Danielle Regimbal, Air Quality, Noise, and Climate Change Specialist
Faye Stroud, Graphic Artist

## 6.2 DOCUMENTS

1. Bies & Hansen, *Engineering Noise Control*, *Table 2.1*, 1988.

2. California Department of Transportation, *Traffic Census Program*, https://dot.ca.gov/programs/traffic-operations/census, accessed by November 24, 2020.

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

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

10. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

11. Fehr & Pehrs, *Imperial Avalon Project Average Daily Trip Segment Volumes* (ADT Volumes) excel sheet, provided on March 1, 2021.

12. Fehr and Peers, *Imperial Avalon Local Transportation Assessment*, July 16, 2021.

13. Harris, Cyril, *Handbook of Noise Control,* 1979.

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16. M.J. Hayne, et al, *Prediction of Crowd Noise*, Acoustics, November 2006.

17. Michael Baker International, *Air Quality Assessment for the Imperial Avalon Project*, September 2021.

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20. University of Michigan, *Harmful Noise Levels*, https://www.uofmhealth.org/health-library/tf4173, accessed on August 12, 2021.


## 6.3 SOFTWARE/WEBSITES


1. Federal Highway Administration's Highway Noise Prediction Model (FHWA RD-77-108)

2. Federal Highway Administration, Roadway Construction Noise Model (RCNM), 2006

3. Google Earth, 2021.

# APPENDIX A: NOISE DATA

| | | | |
|---|---|---|---|
| **Site Number:** Imperial Avalon Site # 1 | | | |
| **Recorded By:** Pierre Glaize and Winnie Woo | | | |
| **Job Number:** 175510 | | | |
| **Date:** 10/17/2019 | | | |
| **Time:** 9:25 a.m. | | | |
| **Location:** To west of the project site, at the intersection of Grace and East Javelin Street. | | | |
| **Source of Peak Noise:** Garbage truck and Interstate 405 | | | |
| **Noise Data** | | | |
| **Leq (dB)** | **Lmax(dB)** | **Lmin (dB)** | **Peak (dB)** |
| 55.1 | 80.0 | 50.1 | 102.7 |

| **Equipment** | | | | | | |
|---|---|---|---|---|---|---|
| **Category** | **Type** | **Vendor** | **Model** | **Serial No.** | **Cert. Date** | **Note** |
| Sound | Sound Level Meter | **Brüel & Kjær** | **2250** | **3011133** | **04/08/2019** | |
| | Microphone | **Brüel & Kjær** | **4189** | **3086765** | **04/08/2019** | |
| | Preamp | **Brüel & Kjær** | **ZC 0032** | **25380** | **04/08/2019** | |
| | Calibrator | **Brüel & Kjær** | **4231** | **2545667** | **04/08/2019** | |

| **Weather Data** | | | |
|---|---|---|---|
| **Est.** | **Duration:** 10 minutes | | **Sky:** Cloudy |
| | **Note:** dBA Offset = -0.01 | | **Sensor Height (ft):** 5 ft |
| | **Wind Ave Speed (mph / m/s)** | **Temperature (degrees Fahrenheit)** | **Barometer Pressure (inches)** |
| | 7 mph | 67° | 29.83 |

**Photo of Measurement Location**

## 2250

| | | |
|---|---|---|
| Instrument: | | 2250 |
| Application: | | BZ7225 Version 4.7.4 |
| Start Time: | | 10/17/2019 09:25:34 |
| End Time: | | 10/17/2019 09:35:34 |
| Elapsed Time: | | 00:10:00 |
| Bandwidth: | | 1/3-octave |
| Max Input Level: | | 142.08 |

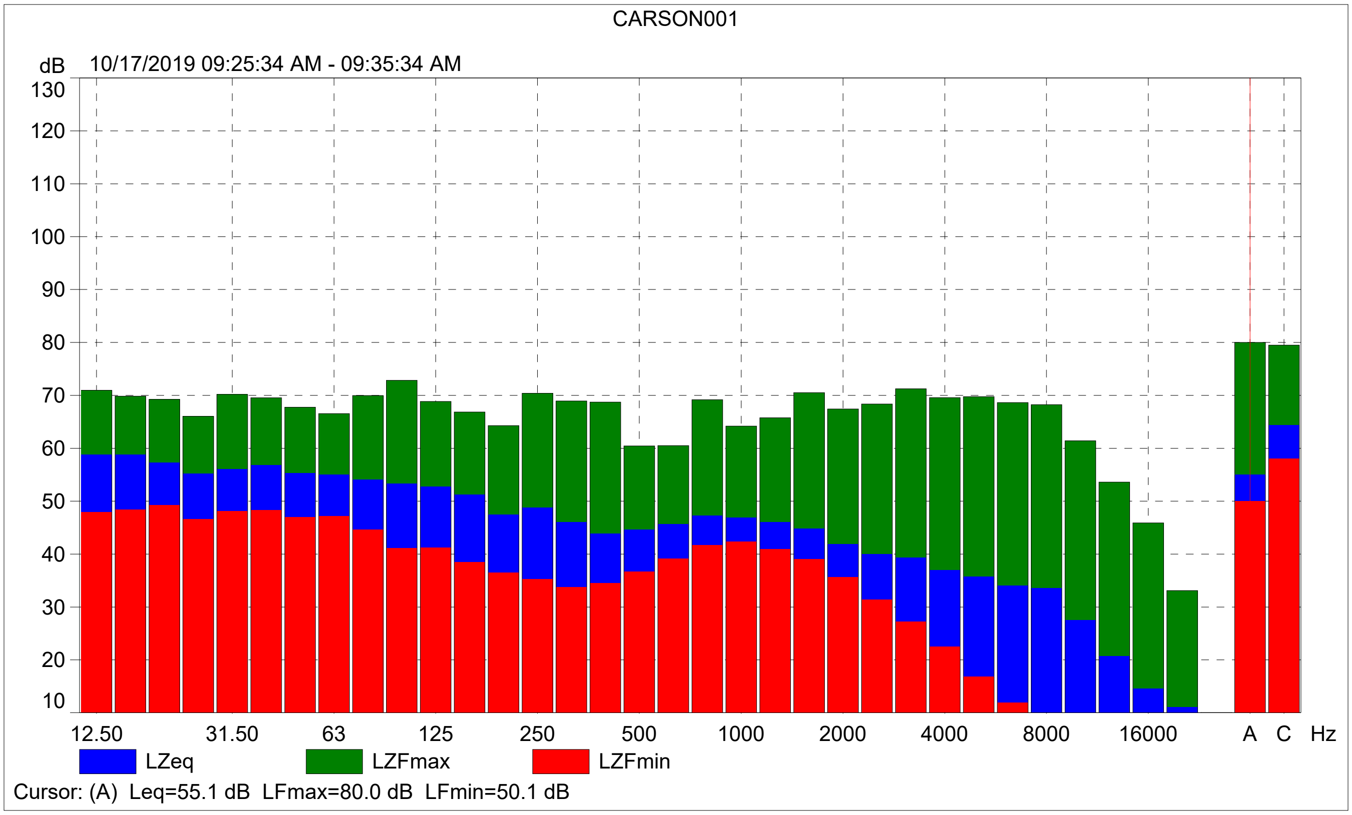
| | Time | Frequency |
|---|---|---|
| Broadband (excl. Peak): | FSI | AC |
| Broadband Peak: | | C |
| Spectrum: | FS | Z |

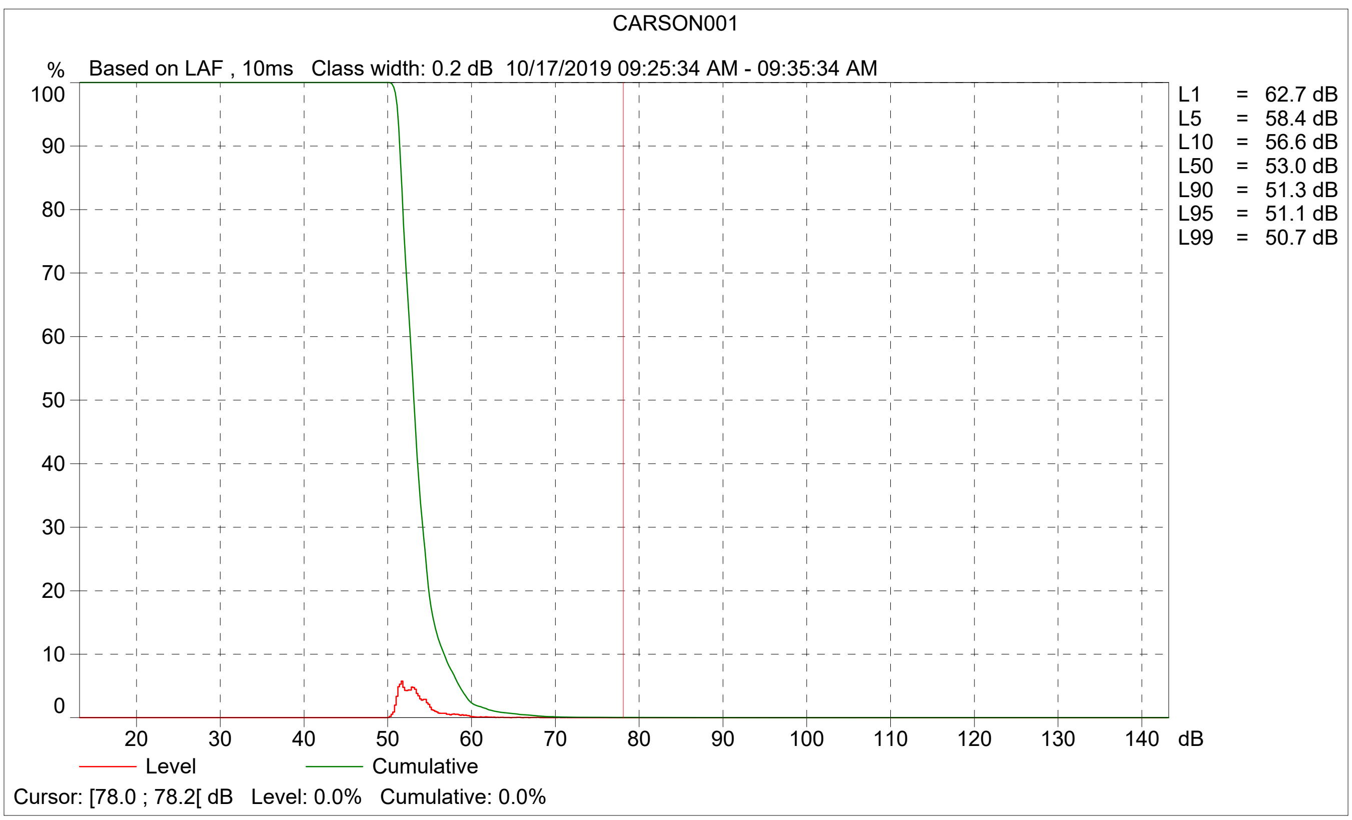
| | | |
|---|---|---|
| Instrument Serial Number: | | 3011133 |
| Microphone Serial Number: | | 3086765 |
| Input: | | Top Socket |
| Windscreen Correction: | | UA-1650 |
| Sound Field Correction: | | Free-field |

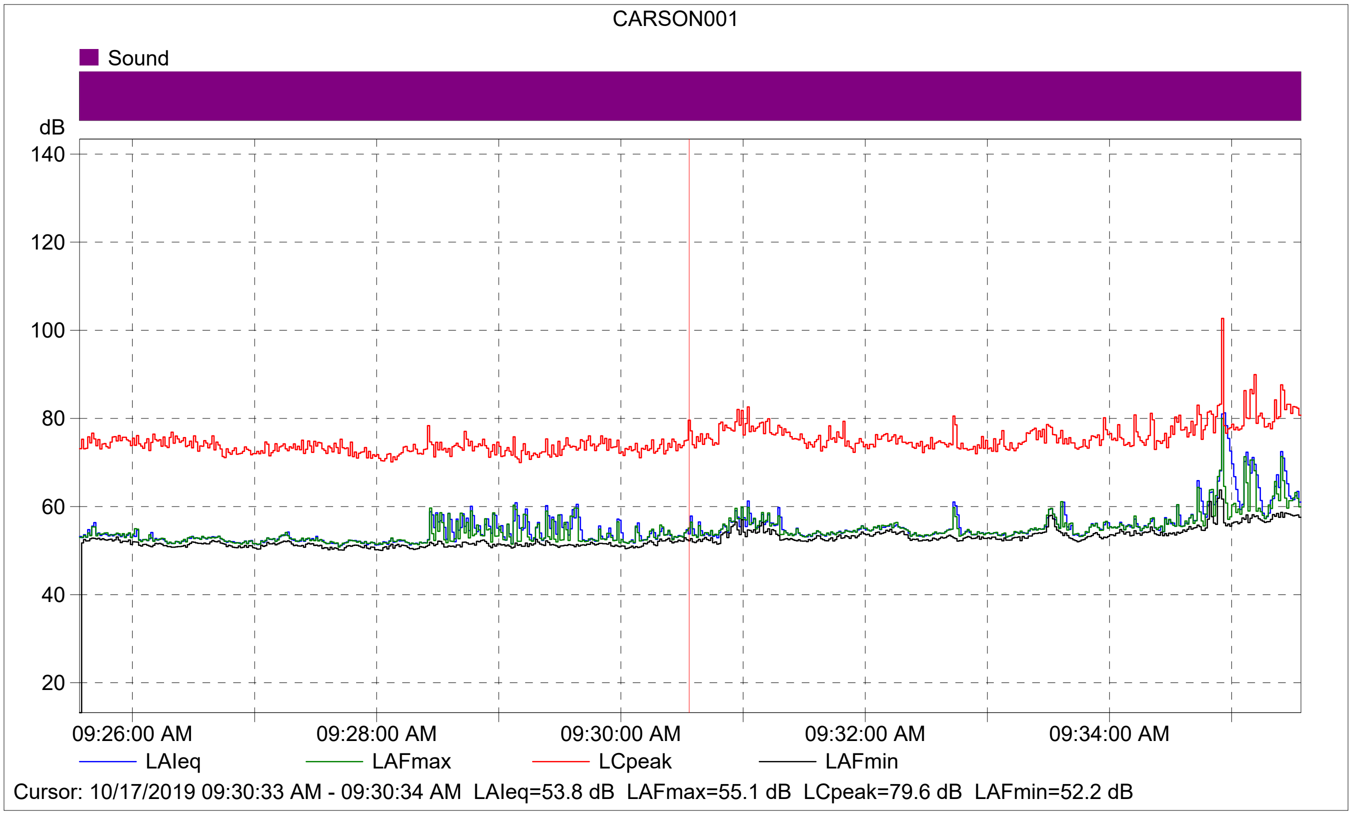
| | | |
|---|---|---|
| Calibration Time: | | 10/17/2019 08:13:12 |
| Calibration Type: | | External reference |
| Sensitivity: | | 43.8202656805515 mV/Pa |

## CARSON001

| | Start time | End time | Elapsed time | Overload [%] | LAeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|---|---|
| Value | | | | 0.00 | 55.1 | 80.0 | 50.1 |
| Time | 09:25:34 AM | 09:35:34 AM | 0:10:00 | | | | |
| Date | 10/17/2019 | 10/17/2019 | | | | | |

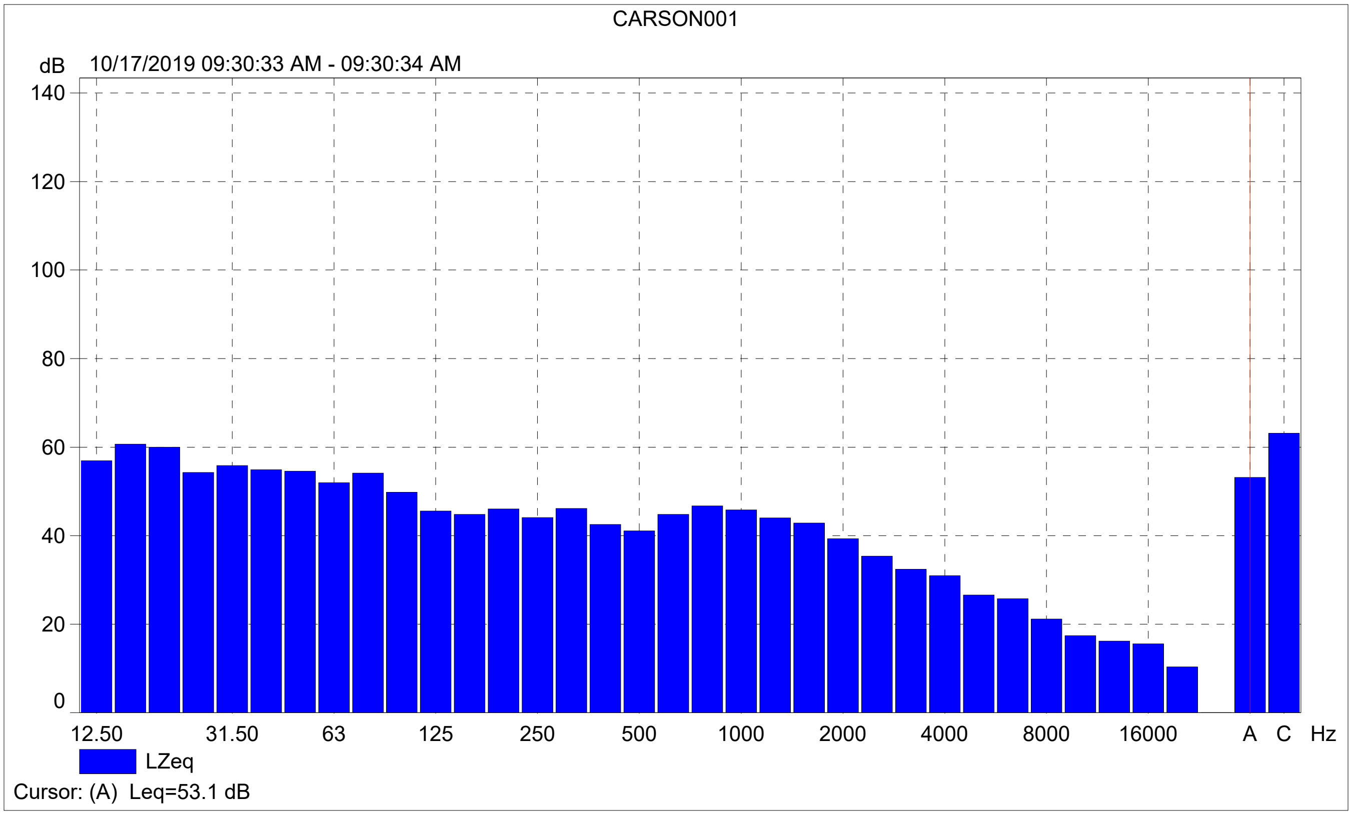

CARSON001
dB 10/17/2019 09:25:34 AM - 09:35:34 AM
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=55.1 dB LFmax=80.0 dB LFmin=50.1 dB

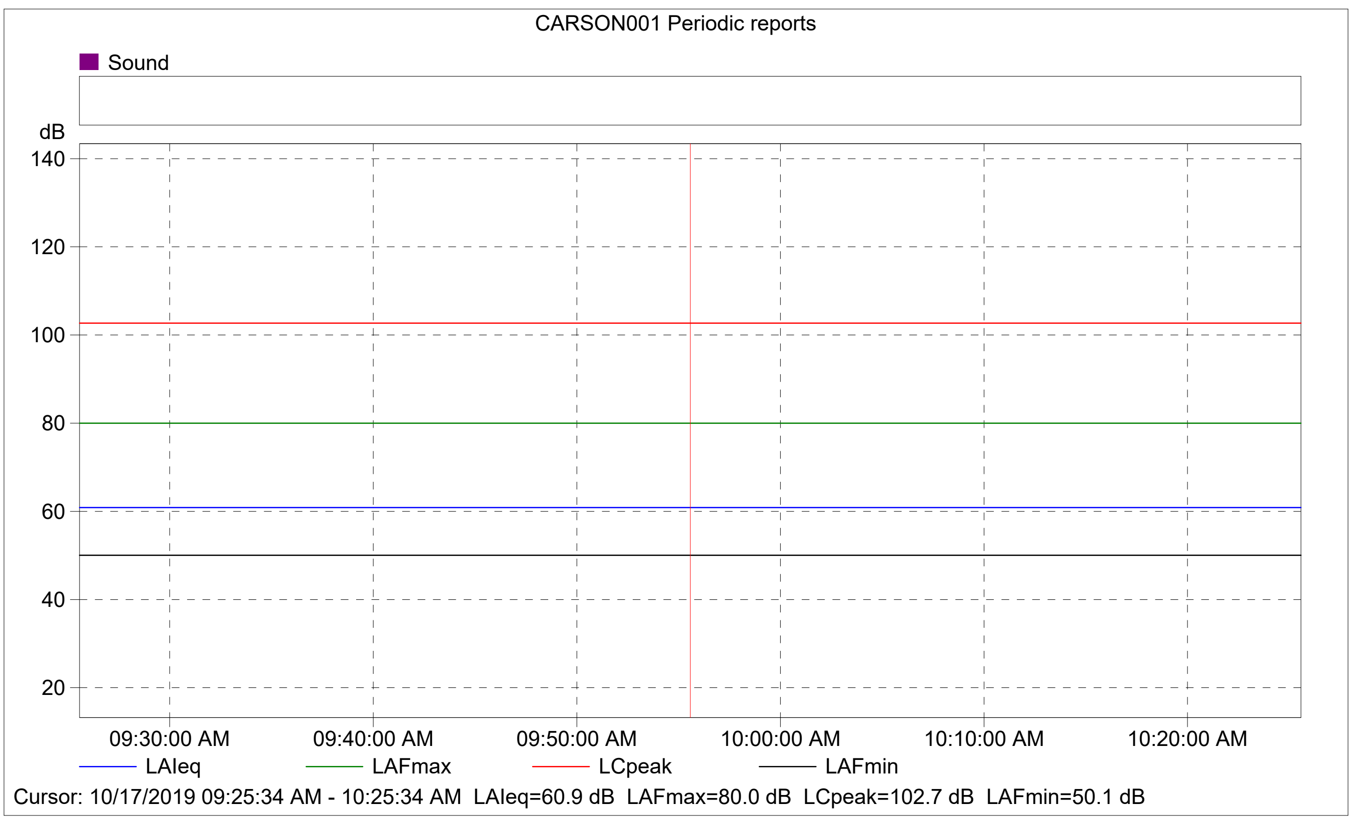

CARSON001
% Based on LAF , 10ms Class width: 0.2 dB 10/17/2019 09:25:34 AM - 09:35:34 AM
100
90
80
70
60
50
40
30
20
10
0
20
30
40
50
60
70
80
90
100
110
120
130
140
dB
L1 = 62.7 dB
L5 = 58.4 dB
L10 = 56.6 dB
L50 = 53.0 dB
L90 = 51.3 dB
L95 = 51.1 dB
L99 = 50.7 dB
Level
Cumulative
Cursor: [78.0 ; 78.2[ dB Level: 0.0% Cumulative: 0.0%




## CARSON001

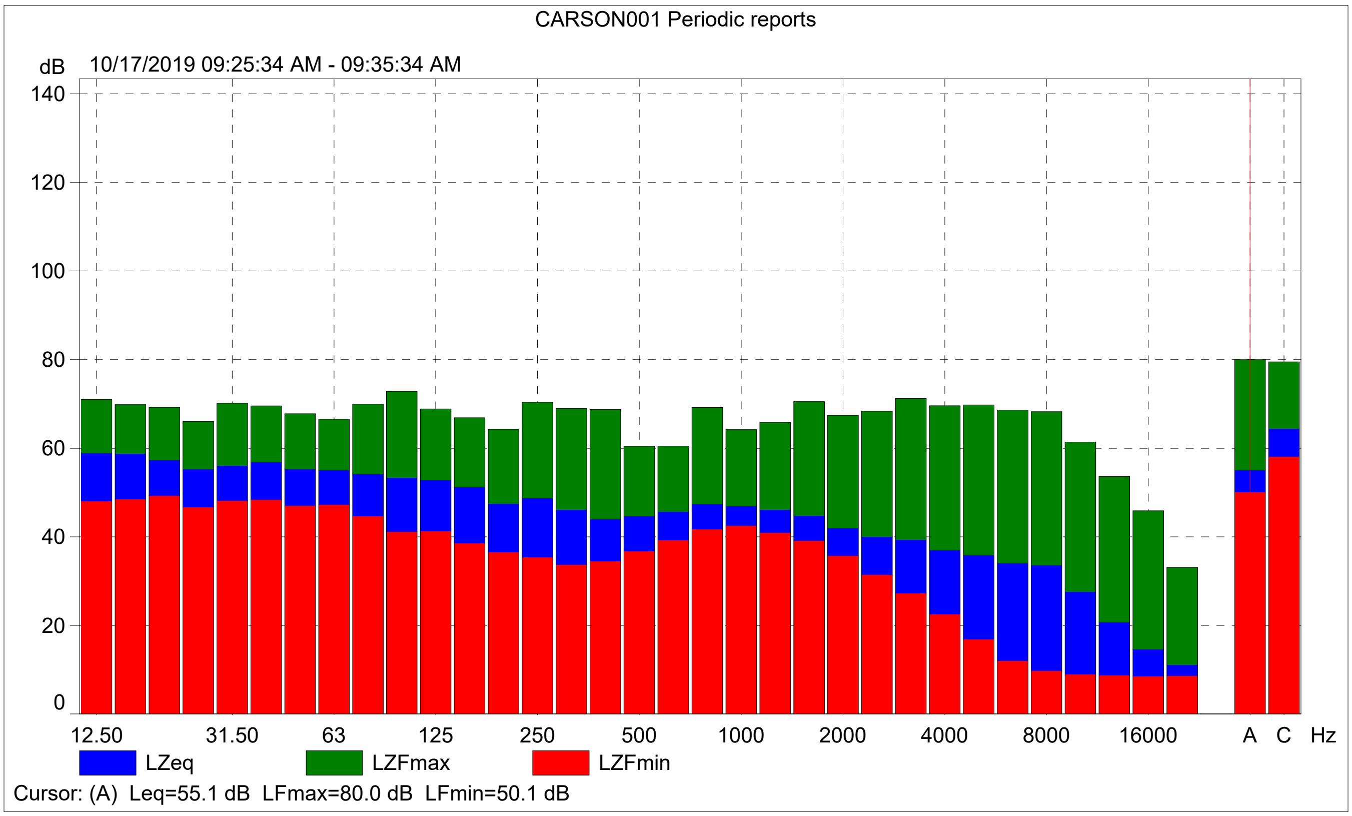
| | Start time | Elapsed time | LAIeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|
| Value | | | 53.8 | 55.1 | 52.2 |
| Time | 09:30:33 AM | 0:00:01 | | | |
| Date | 10/17/2019 | | | | |

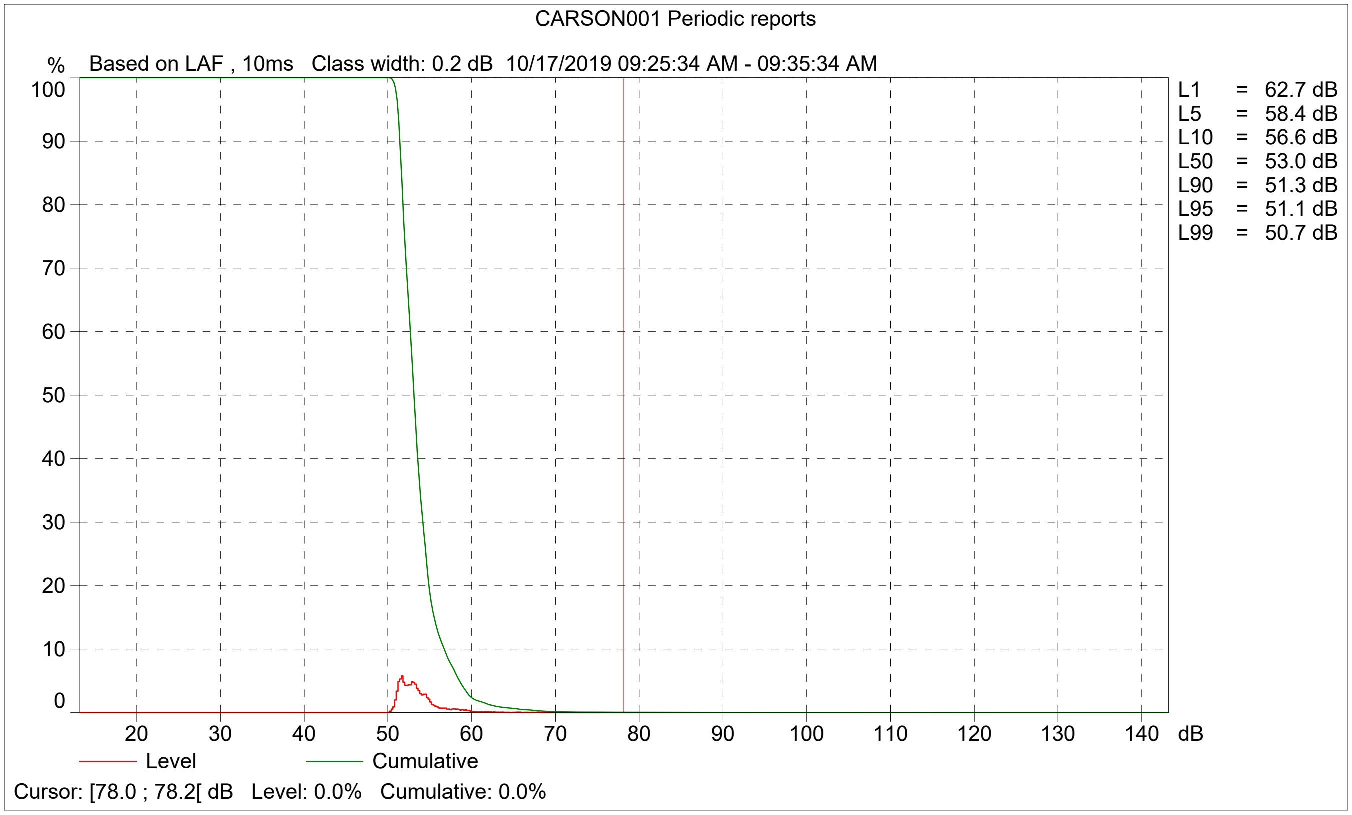

CARSON001
dB 10/17/2019 09:30:33 AM - 09:30:34 AM
140
120
100
80
60
40
20
0
12.50 31.50 63 125 250 500 1000 2000 4000 8000 16000 A C Hz
LZeq
Cursor: (A) Leq=53.1 dB


CARSON001 Periodic reports
Sound
dB
140
120
100
80
60
40
20
09:30:00 AM 09:40:00 AM 09:50:00 AM 10:00:00 AM 10:10:00 AM 10:20:00 AM
LAIeq LAFmax LCpeak LAFmin
Cursor: 10/17/2019 09:25:34 AM - 10:25:34 AM LAIeq=60.9 dB LAFmax=80.0 dB LCpeak=102.7 dB LAFmin=50.1 dB

# CARSON001 Periodic reports

| | Start time | Elapsed time | Overload [%] | LAIeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|---|
| Value | | | 0.00 | 60.9 | 80.0 | 50.1 |
| Time | 09:25:34 AM | 0:10:00 | | | | |
| Date | 10/17/2019 | | | | | |




CARSON001 Periodic reports
% Based on LAF , 10ms Class width: 0.2 dB 10/17/2019 09:25:34 AM - 09:35:34 AM
100
90
80
70
60
50
40
30
20
10
0
20 30 40 50 60 70 80 90 100 110 120 130 140 dB
L1 = 62.7 dB
L5 = 58.4 dB
L10 = 56.6 dB
L50 = 53.0 dB
L90 = 51.3 dB
L95 = 51.1 dB
L99 = 50.7 dB
Level
Cumulative
Cursor: [78.0 ; 78.2[ dB Level: 0.0% Cumulative: 0.0%

| **Site Number:** Imperial Avalon Site #2 | | | |
|---|---|---|---|
| **Recorded By:** Pierre Glaize and Winnie Woo | | | |
| **Job Number:** 175510 | | | |
| **Date:** 10/17/2019 | | | |
| **Time:** 9:41 a.m. | | | |
| **Location:** On Grace Avenue, before E 213th street. | | | |
| **Source of Peak Noise:** A leaf blower, plane above, and dogs barking. | | | |
| **Noise Data** | | | |
| **Leq (dB)** | **Lmax(dB)** | **Lmin (dB)** | **Peak (dB)** |
| 56.7 | 68.6 | 48.9 | 89.8 |

| **Equipment** | | | | | | |
|---|---|---|---|---|---|---|
| **Category** | **Type** | **Vendor** | **Model** | **Serial No.** | **Cert. Date** | **Note** |
| Sound | Sound Level Meter | **Brüel & Kjær** | **2250** | **3011133** | **04/08/2019** | |
| | Microphone | **Brüel & Kjær** | **4189** | **3086765** | **04/08/2019** | |
| | Preamp | **Brüel & Kjær** | **ZC 0032** | **25380** | **04/08/2019** | |
| | Calibrator | **Brüel & Kjær** | **4231** | **2545667** | **04/08/2019** | |

| **Weather Data** | | | |
|---|---|---|---|
| **Est.** | **Duration:** 10 minutes | | **Sky:** cloudy |
| | **Note:** dBA Offset = -0.01 | | **Sensor Height (ft):** 5 ft |
| | **Wind Ave Speed (mph / m/s)** | **Temperature (degrees Fahrenheit)** | **Barometer Pressure (inches)** |
| | 8 mph | 67° | 29.83 |

## Photo of Measurement Location

## 2250

| | | |
|---|---|---|
| Instrument: | | 2250 |
| Application: | | BZ7225 Version 4.7.4 |
| Start Time: | | 10/17/2019 09:41:59 |
| End Time: | | 10/17/2019 09:51:59 |
| Elapsed Time: | | 00:10:00 |
| Bandwidth: | | 1/3-octave |
| Max Input Level: | | 142.08 |

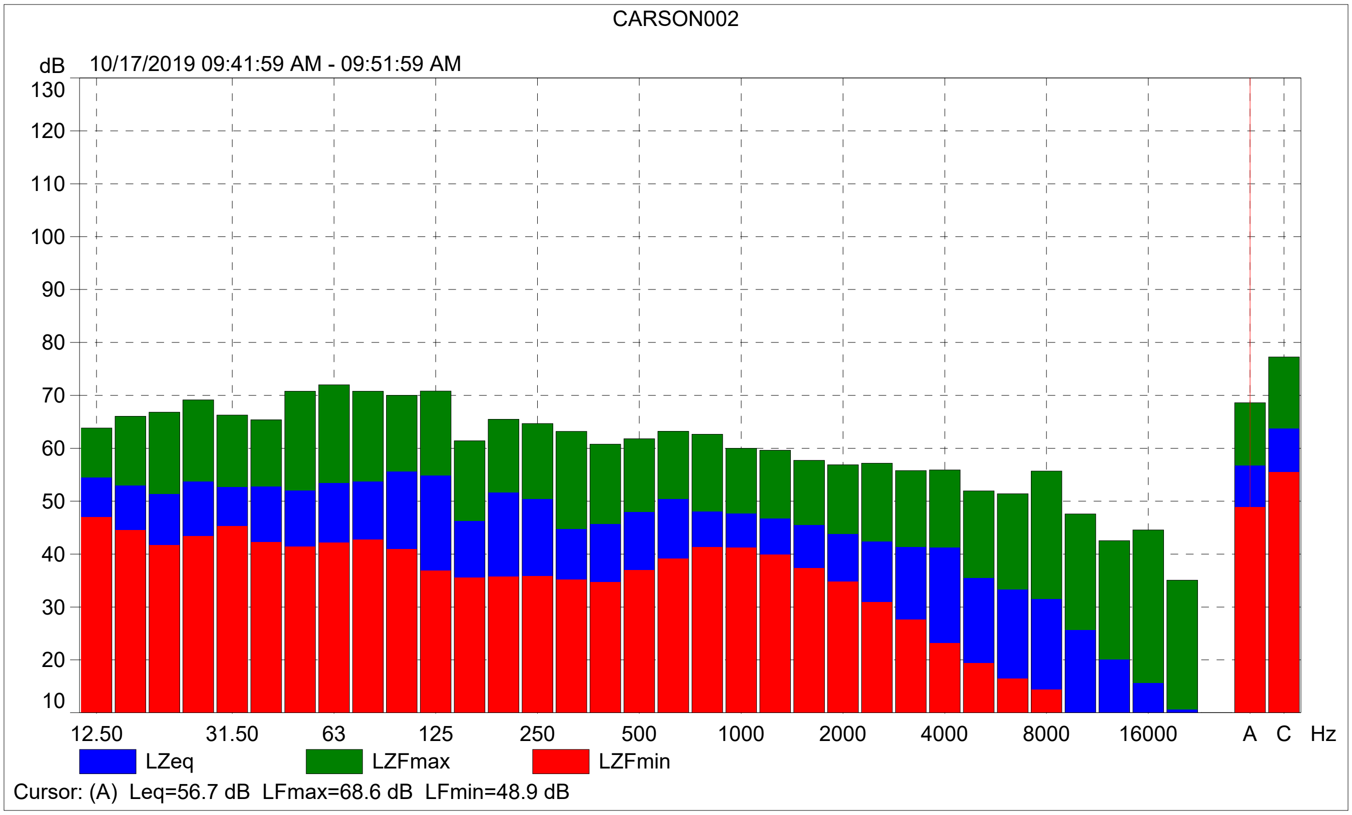
| | Time | Frequency |
|---|---|---|
| Broadband (excl. Peak): | FSI | AC |
| Broadband Peak: | | C |
| Spectrum: | FS | Z |

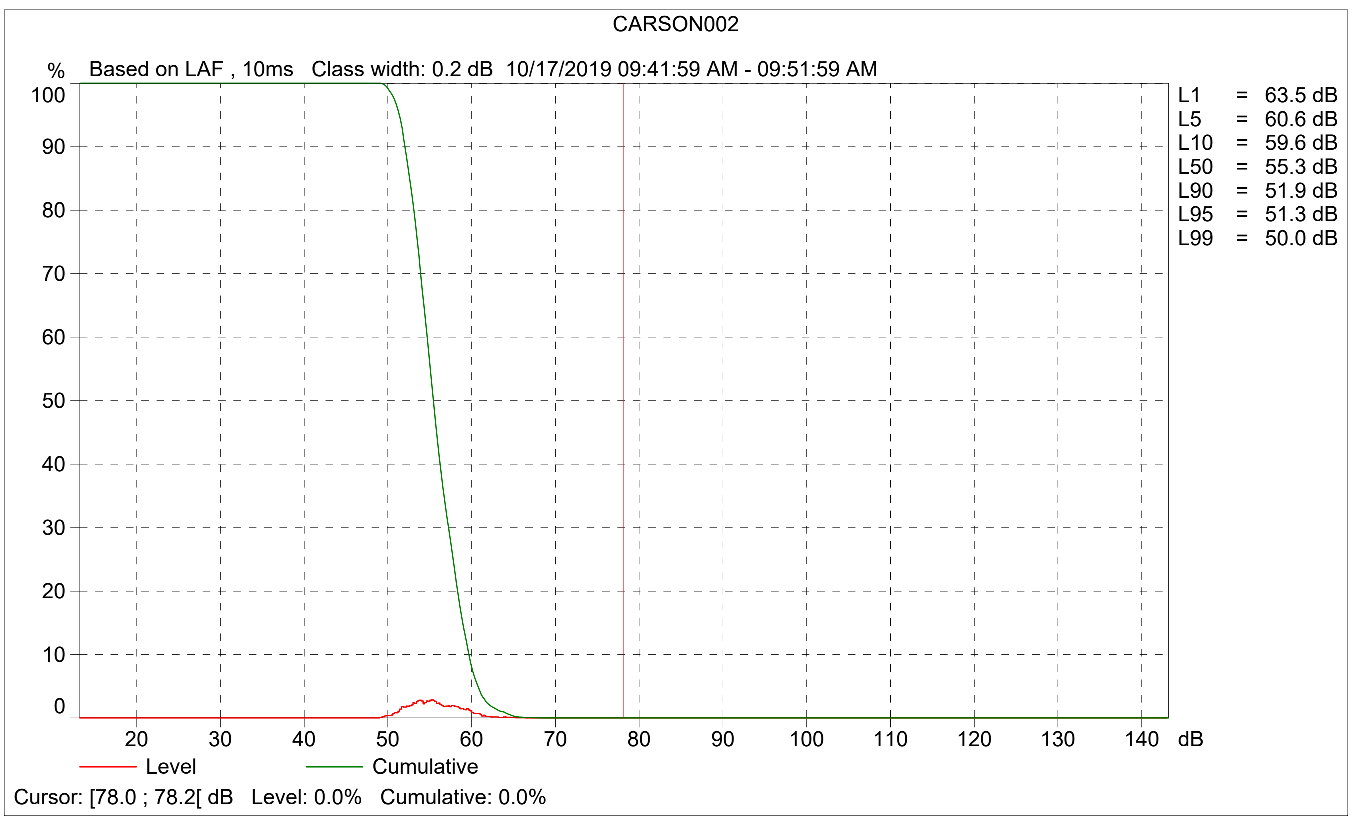
| | | |
|---|---|---|
| Instrument Serial Number: | | 3011133 |
| Microphone Serial Number: | | 3086765 |
| Input: | | Top Socket |
| Windscreen Correction: | | UA-1650 |
| Sound Field Correction: | | Free-field |

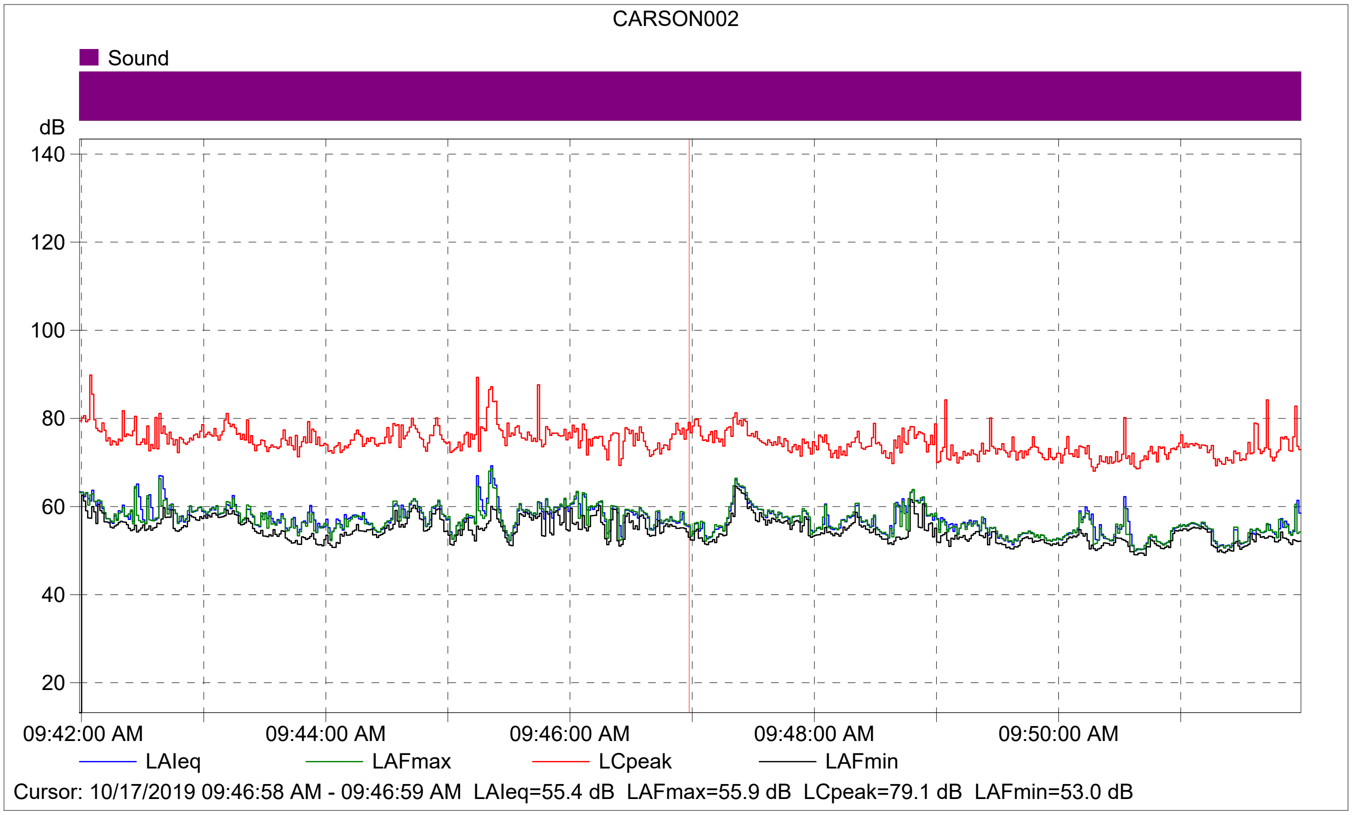
| | | |
|---|---|---|
| Calibration Time: | | 10/17/2019 08:13:12 |
| Calibration Type: | | External reference |
| Sensitivity: | | 43.8202656805515 mV/Pa |

## CARSON002

| | Start time | End time | Elapsed time | Overload [%] | LAeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|---|---|
| Value | | | | 0.00 | 56.7 | 68.6 | 48.9 |
| Time | 09:41:59 AM | 09:51:59 AM | 0:10:00 | | | | |
| Date | 10/17/2019 | 10/17/2019 | | | | | |


CARSON002
dB 10/17/2019 09:41:59 AM - 09:51:59 AM
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=56.7 dB LFmax=68.6 dB LFmin=48.9 dB

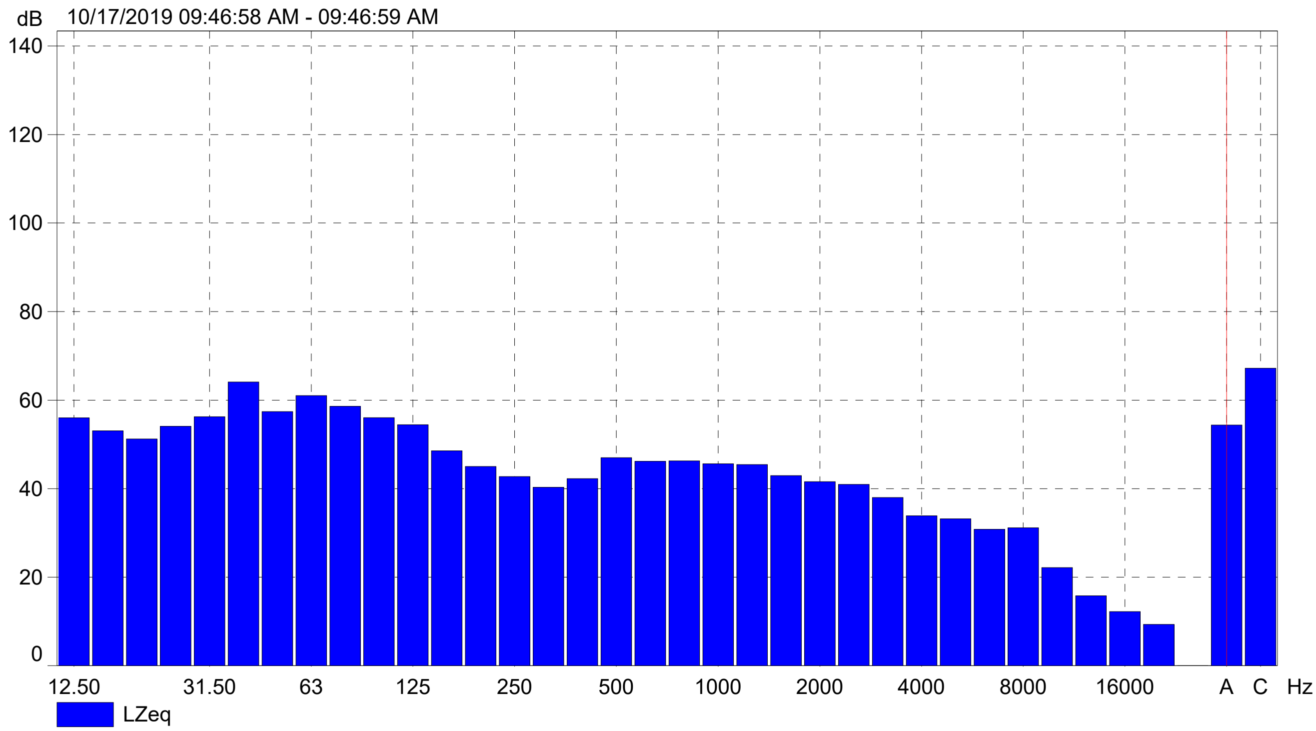

CARSON002
% Based on LAF , 10ms Class width: 0.2 dB 10/17/2019 09:41:59 AM - 09:51:59 AM
100
90
80
70
60
50
40
30
20
10
0
20
30
40
50
60
70
80
90
100
110
120
130
140
dB
L1 = 63.5 dB
L5 = 60.6 dB
L10 = 59.6 dB
L50 = 55.3 dB
L90 = 51.9 dB
L95 = 51.3 dB
L99 = 50.0 dB
Level
Cumulative
Cursor: [78.0 ; 78.2[ dB Level: 0.0% Cumulative: 0.0%




## CARSON002

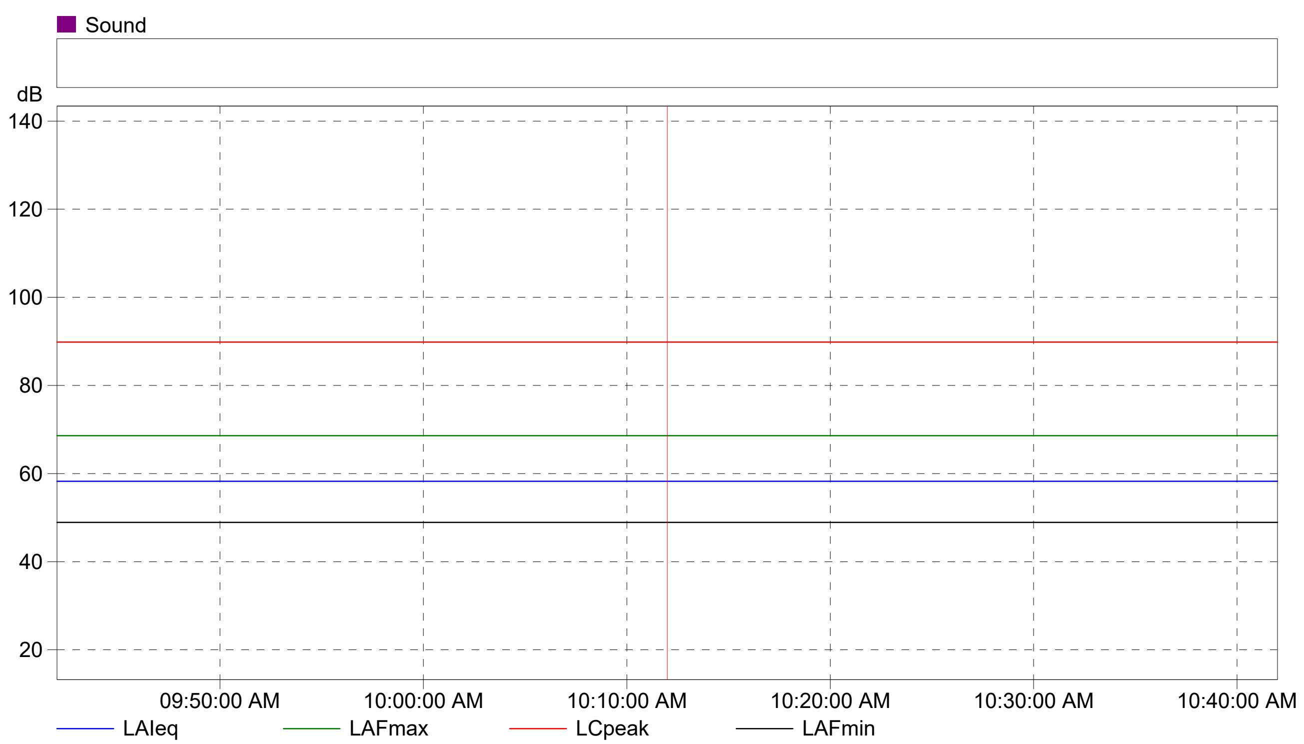
| | Start time | Elapsed time | LAIeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|
| Value | | | 55.4 | 55.9 | 53.0 |
| Time | 09:46:58 AM | 0:00:01 | | | |
| Date | 10/17/2019 | | | | |

CARSON002




Cursor: (A) Leq=54.4 dB

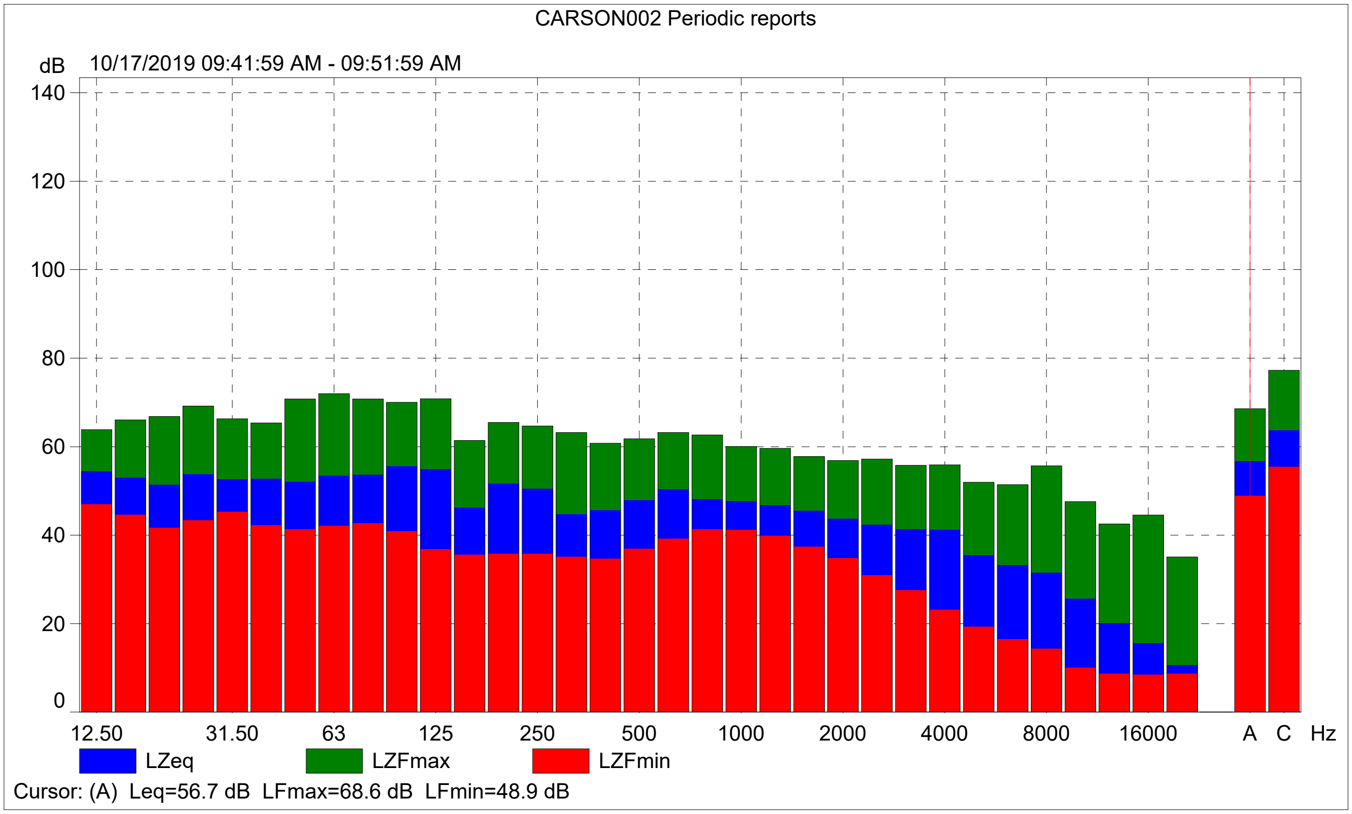
CARSON002 Periodic reports

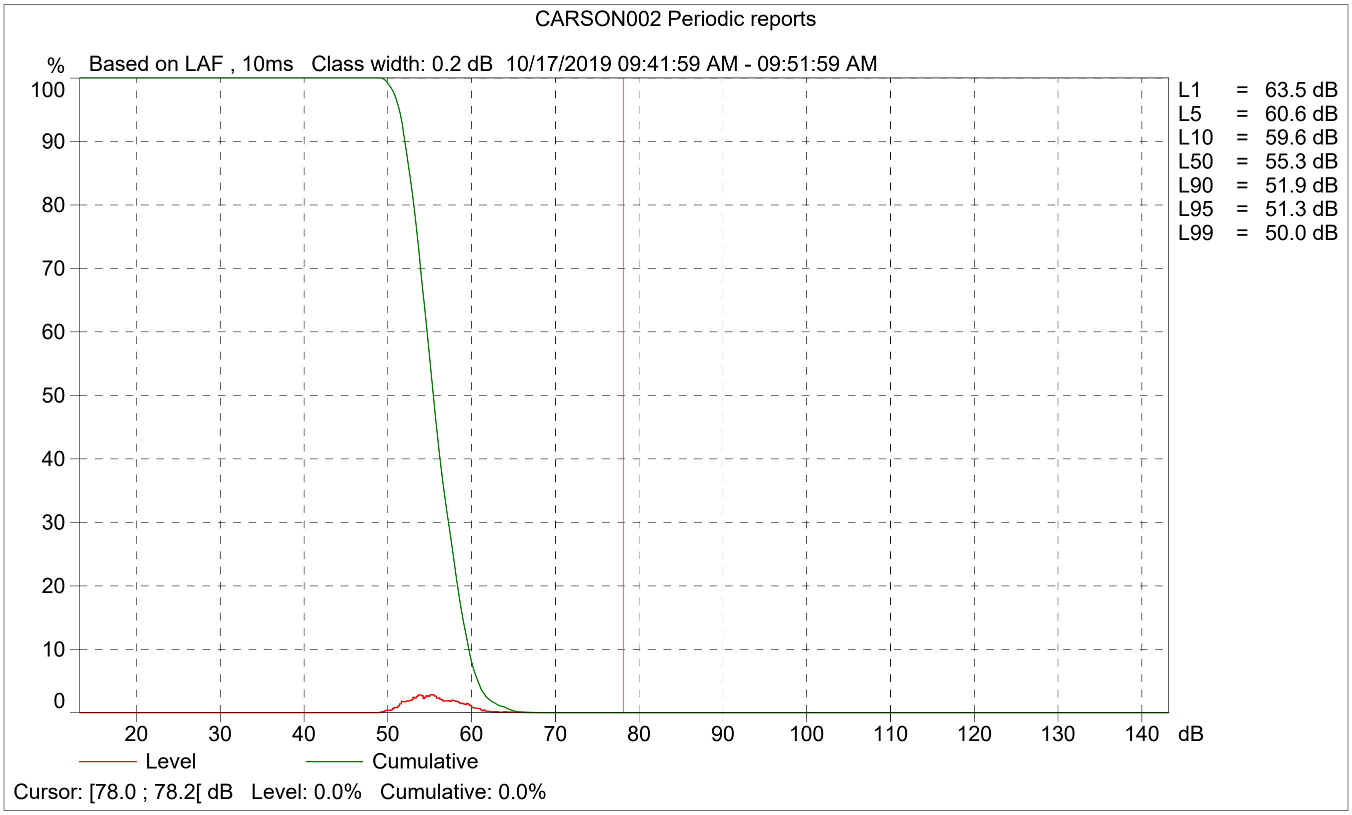



Cursor: 10/17/2019 09:41:59 AM - 10:41:59 AM LAIeq=58.2 dB LAFmax=68.6 dB LCpeak=89.8 dB LAFmin=48.9 dB

# CARSON002 Periodic reports

| | Start time | Elapsed time | Overload [%] | LAIeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|---|
| Value | | | 0.00 | 58.2 | 68.6 | 48.9 |
| Time | 09:41:59 AM | 0:10:00 | | | | |
| Date | 10/17/2019 | | | | | |




CARSON002 Periodic reports
%
Based on LAF , 10ms Class width: 0.2 dB 10/17/2019 09:41:59 AM - 09:51:59 AM
100
90
80
70
60
50
40
30
20
10
0
20
30
40
50
60
70
80
90
100
110
120
130
140
dB
L1 = 63.5 dB
L5 = 60.6 dB
L10 = 59.6 dB
L50 = 55.3 dB
L90 = 51.9 dB
L95 = 51.3 dB
L99 = 50.0 dB
Level
Cumulative
Cursor: [78.0 ; 78.2[ dB Level: 0.0% Cumulative: 0.0%

| | |
|---|---|
| **Site Number:** Imperial Avalon Site # 3 | |
| **Recorded By:** Pierre Glaize and Winnie Woo | |
| **Job Number:** 175510 | |
| **Date:** 10/17/2019 | |
| **Time:** 9:57 a.m. | |
| **Location:** Along 213th street, in-front of a house near the Kia dealership. | |
| **Source of Peak Noise:** Traffic along 213th street. | |

| Noise Data | | | |
|---|---|---|---|
| **Leq (dB)** | **Lmax(dB)** | **Lmin (dB)** | **Peak (dB)** |
| 65.5 | 78.2 | 53.6 | 98.8 |

| Equipment | | | | | | |
|---|---|---|---|---|---|---|
| **Category** | **Type** | **Vendor** | **Model** | **Serial No.** | **Cert. Date** | **Note** |
| Sound | Sound Level Meter | **Brüel & Kjær** | **2250** | **3011133** | **04/08/2019** | |
| | Microphone | **Brüel & Kjær** | **4189** | **3086765** | **04/08/2019** | |
| | Preamp | **Brüel & Kjær** | **ZC 0032** | **25380** | **04/08/2019** | |
| | Calibrator | **Brüel & Kjær** | **4231** | **2545667** | **04/08/2019** | |

| Weather Data | | | |
|---|---|---|---|
| **Est.** | **Duration:** 10 minutes | | **Sky:** Cloudy |
| | **Note:** dBA Offset = -0.01 | | **Sensor Height (ft):** 5 ft |
| | **Wind Ave Speed (mph / m/s)** | **Temperature (degrees Fahrenheit)** | **Barometer Pressure (inches)** |
| | 8 mph | 67° | 29.83 |

## Photo of Measurement Location

## 2250

| | | |
|---|---|---|
| Instrument: | | 2250 |
| Application: | | BZ7225 Version 4.7.4 |
| Start Time: | | 10/17/2019 09:57:50 |
| End Time: | | 10/17/2019 10:07:50 |
| Elapsed Time: | | 00:10:00 |
| Bandwidth: | | 1/3-octave |
| Max Input Level: | | 142.08 |

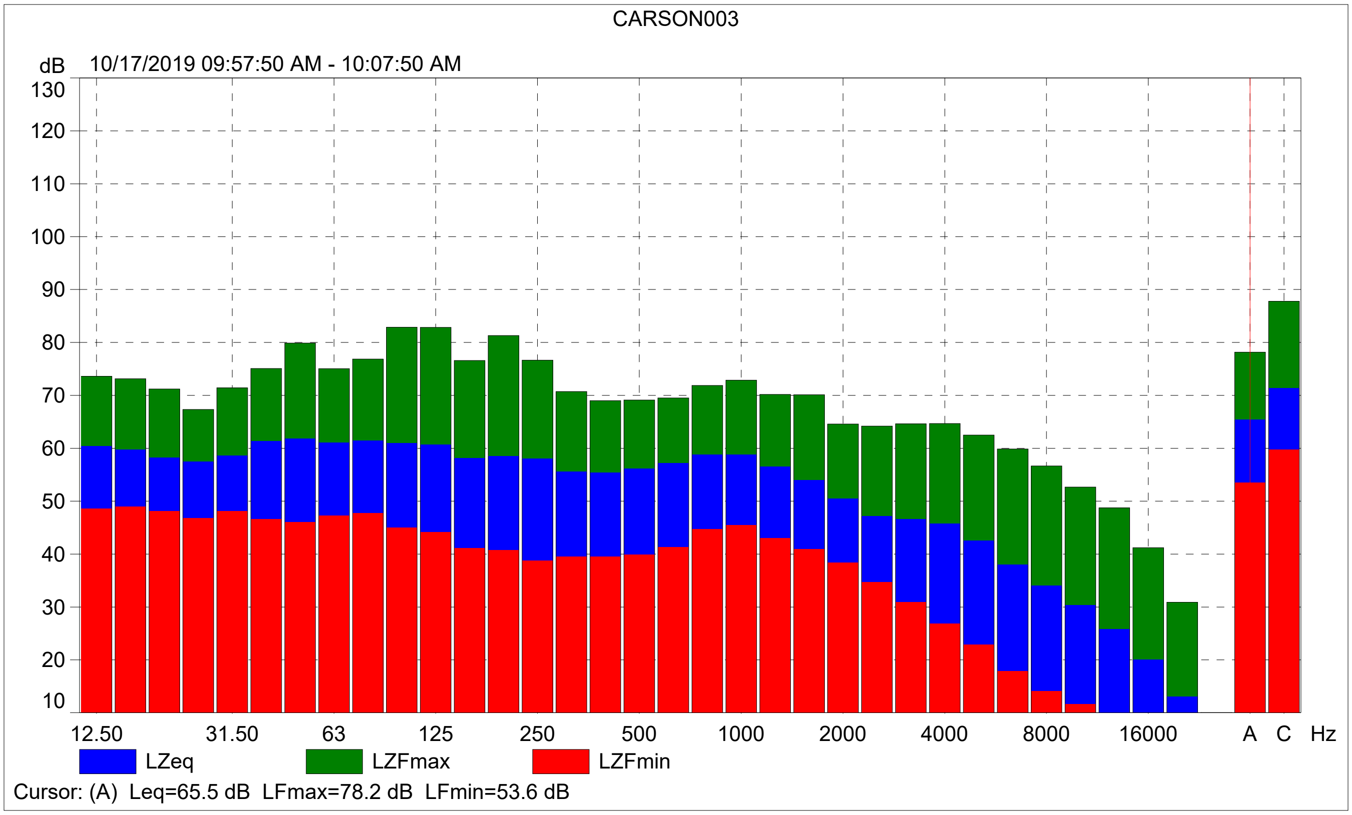
| | Time | Frequency |
|---|---|---|
| Broadband (excl. Peak): | FSI | AC |
| Broadband Peak: | | C |
| Spectrum: | FS | Z |

| | | |
|---|---|---|
| Instrument Serial Number: | | 3011133 |
| Microphone Serial Number: | | 3086765 |
| Input: | | Top Socket |
| Windscreen Correction: | | UA-1650 |
| Sound Field Correction: | | Free-field |

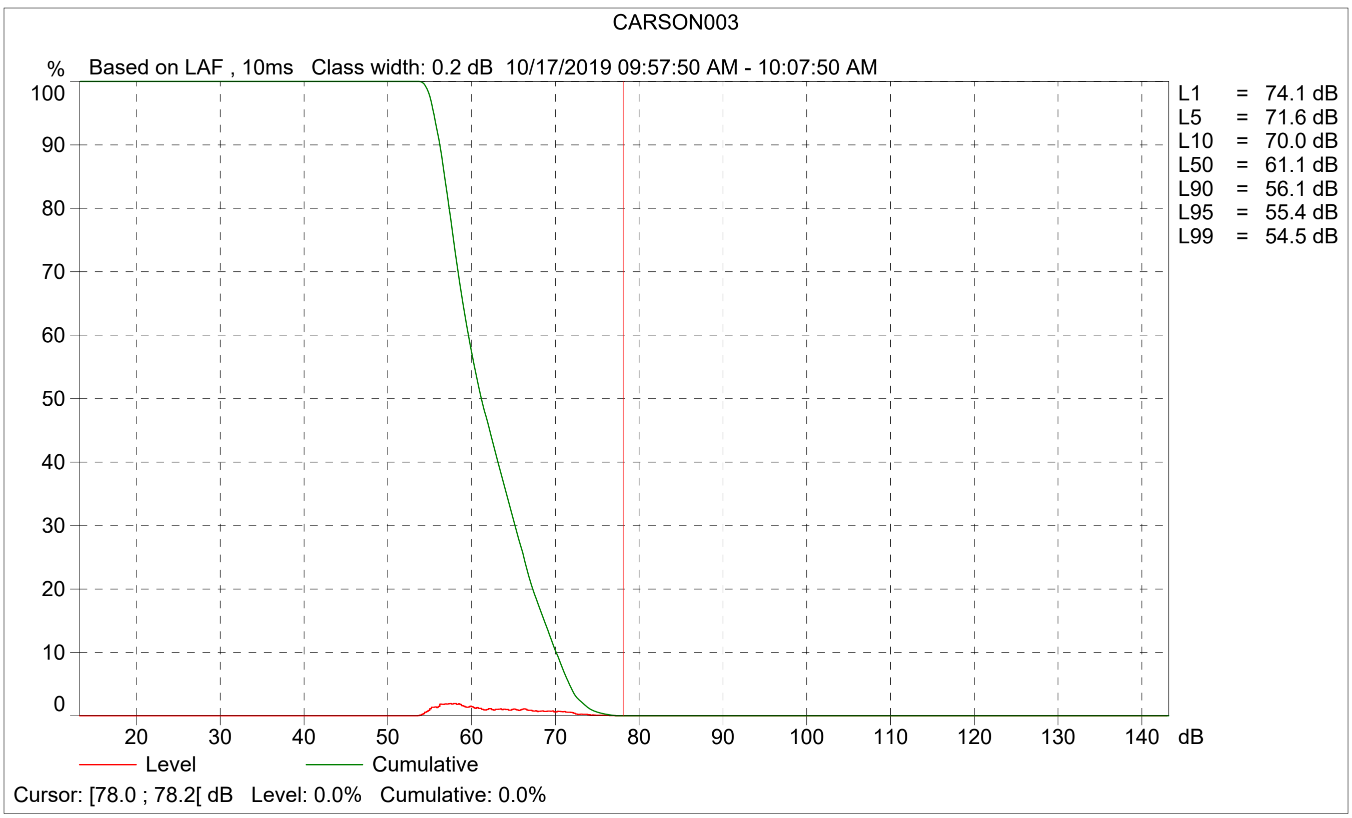
| | | |
|---|---|---|
| Calibration Time: | | 10/17/2019 08:13:12 |
| Calibration Type: | | External reference |
| Sensitivity: | | 43.8202656805515 mV/Pa |

## CARSON003

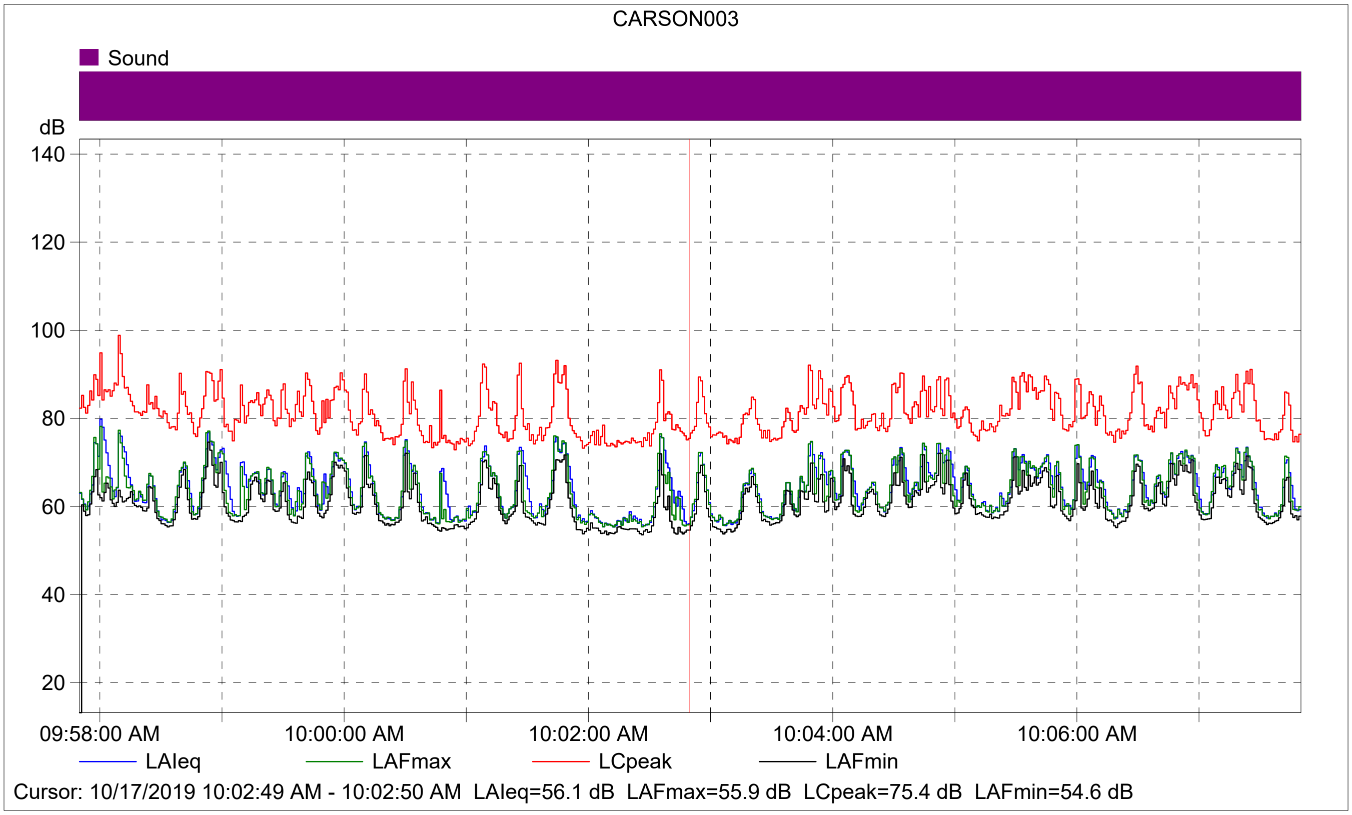
| | Start time | End time | Elapsed time | Overload [%] | LAeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|---|---|
| Value | | | | 0.00 | 65.5 | 78.2 | 53.6 |
| Time | 09:57:50 AM | 10:07:50 AM | 0:10:00 | | | | |
| Date | 10/17/2019 | 10/17/2019 | | | | | |



CARSON003
dB 10/17/2019 09:57:50 AM - 10:07:50 AM
130 120 110 100 90 80 70 60 50 40 30 20 10
12.50 31.50 63 125 250 500 1000 2000 4000 8000 16000 A C Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=65.5 dB LFmax=78.2 dB LFmin=53.6 dB

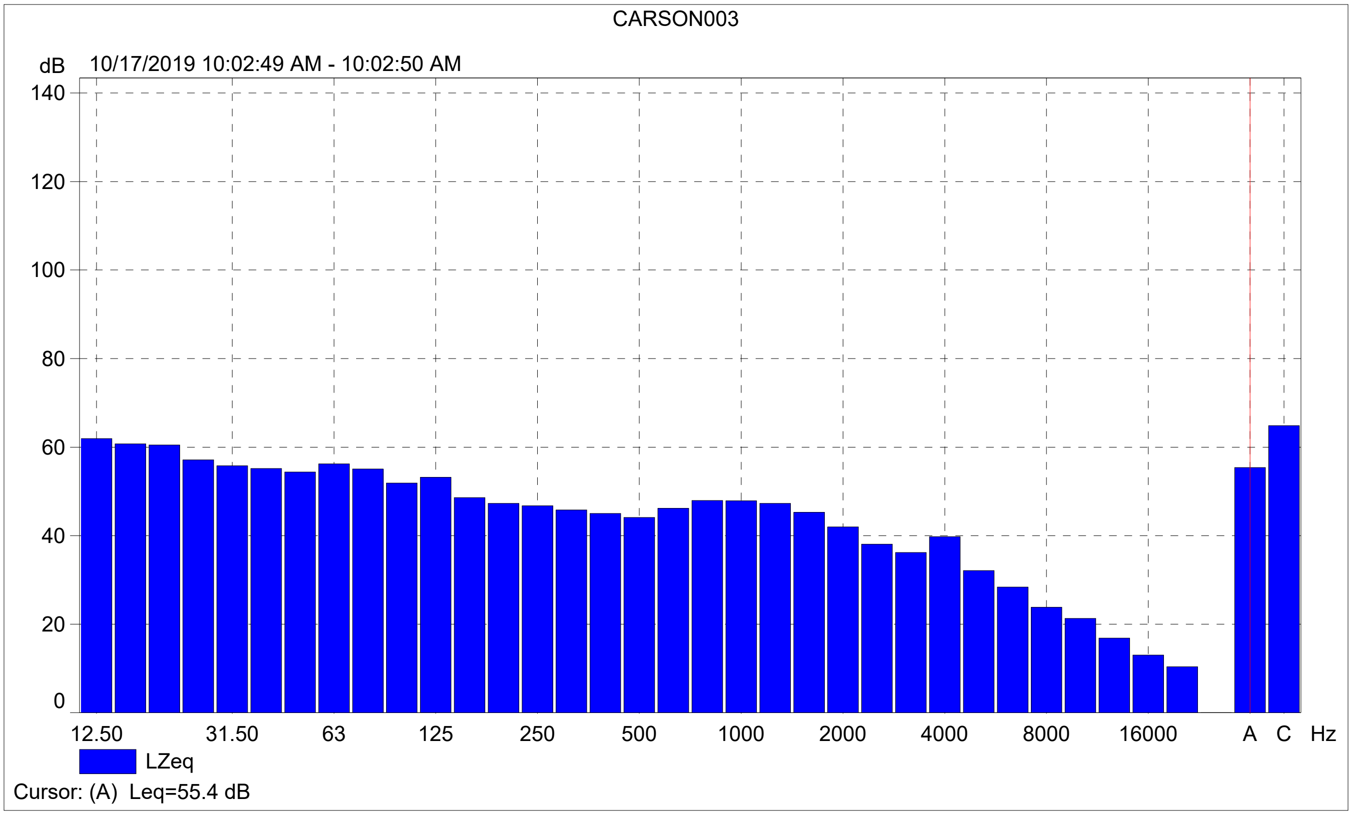



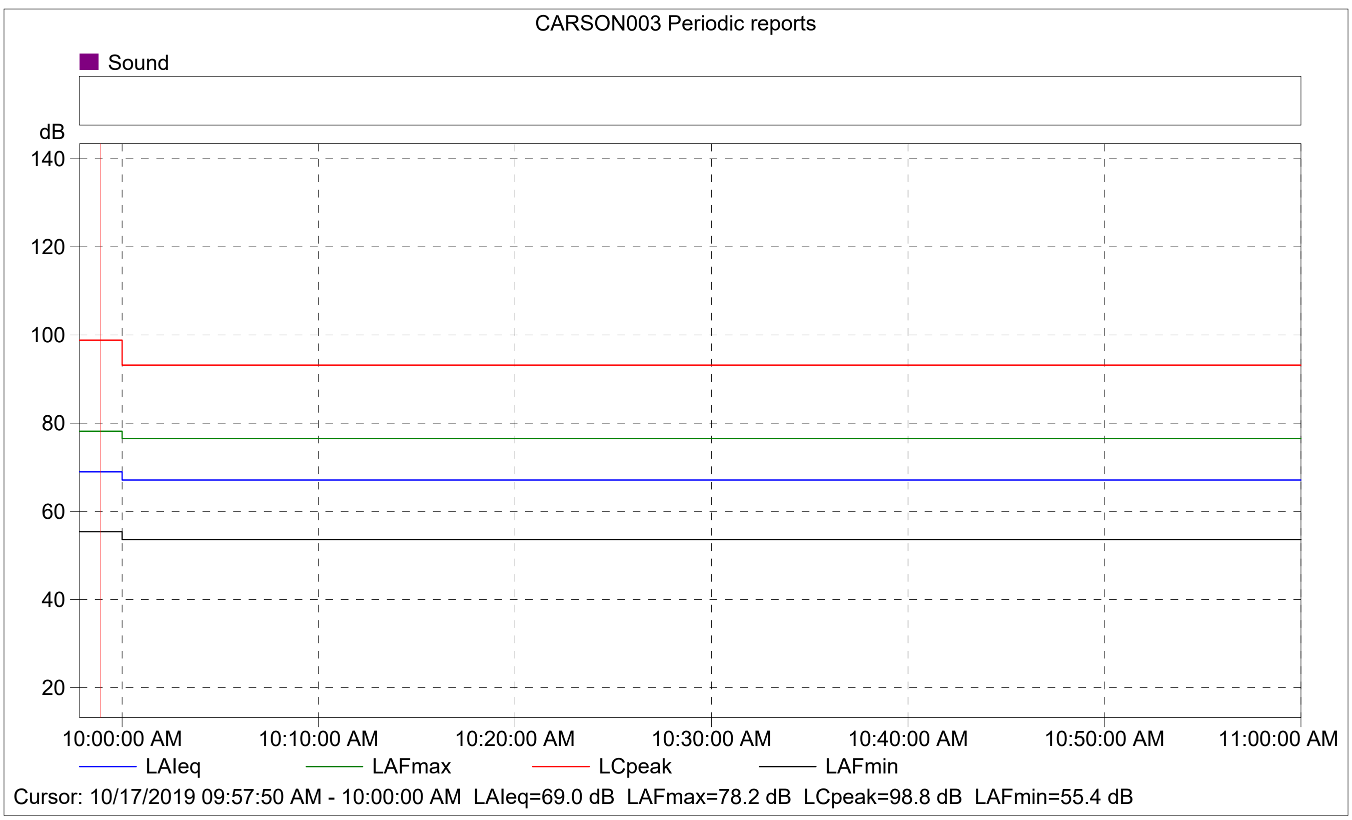
CARSON003
% Based on LAF , 10ms Class width: 0.2 dB 10/17/2019 09:57:50 AM - 10:07:50 AM
100 90 80 70 60 50 40 30 20 10 0
20 30 40 50 60 70 80 90 100 110 120 130 140 dB
L1 = 74.1 dB
L5 = 71.6 dB
L10 = 70.0 dB
L50 = 61.1 dB
L90 = 56.1 dB
L95 = 55.4 dB
L99 = 54.5 dB
Level
Cumulative
Cursor: [78.0 ; 78.2[ dB Level: 0.0% Cumulative: 0.0%




## CARSON003

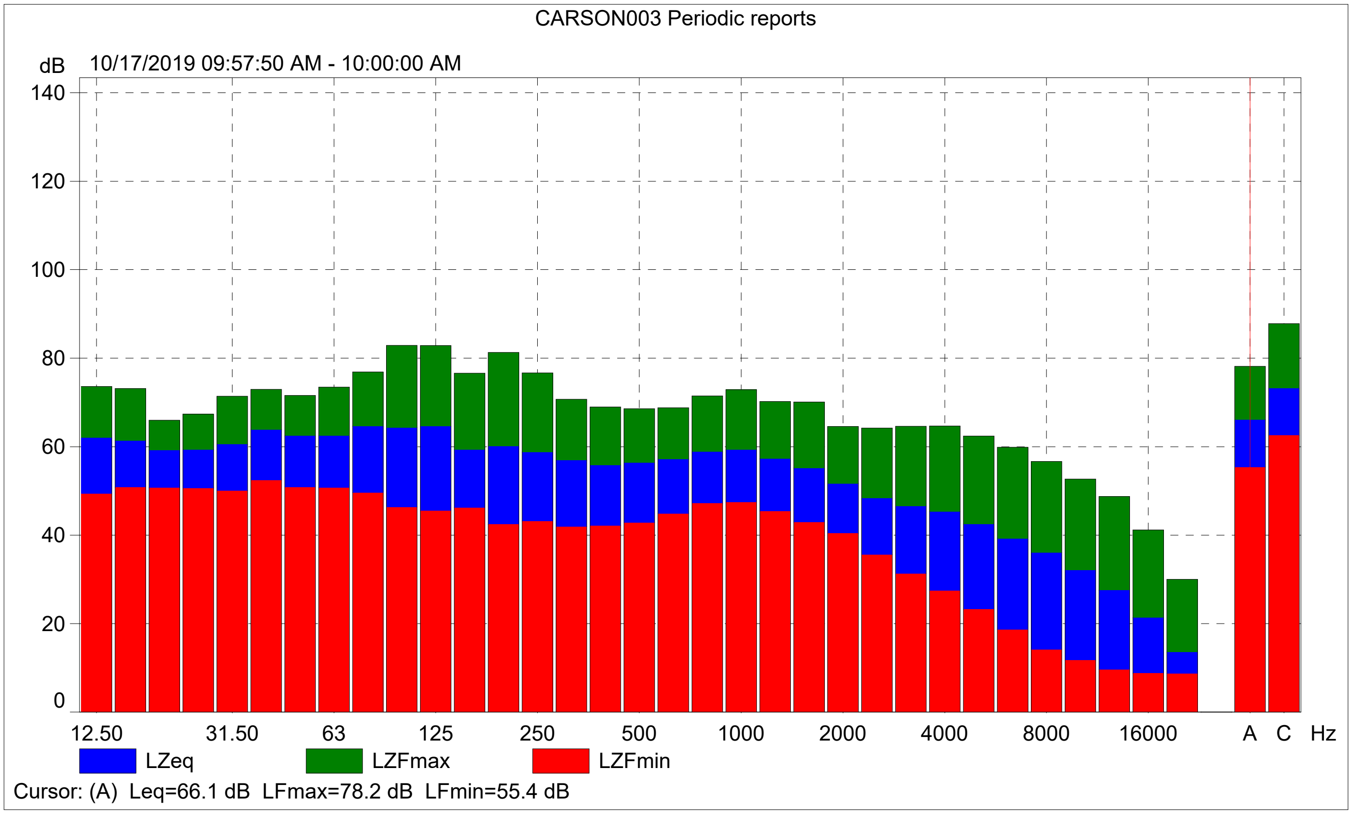
| | Start time | Elapsed time | LAIeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|
| Value | | | 56.1 | 55.9 | 54.6 |
| Time | 10:02:49 AM | 0:00:01 | | | |
| Date | 10/17/2019 | | | | |

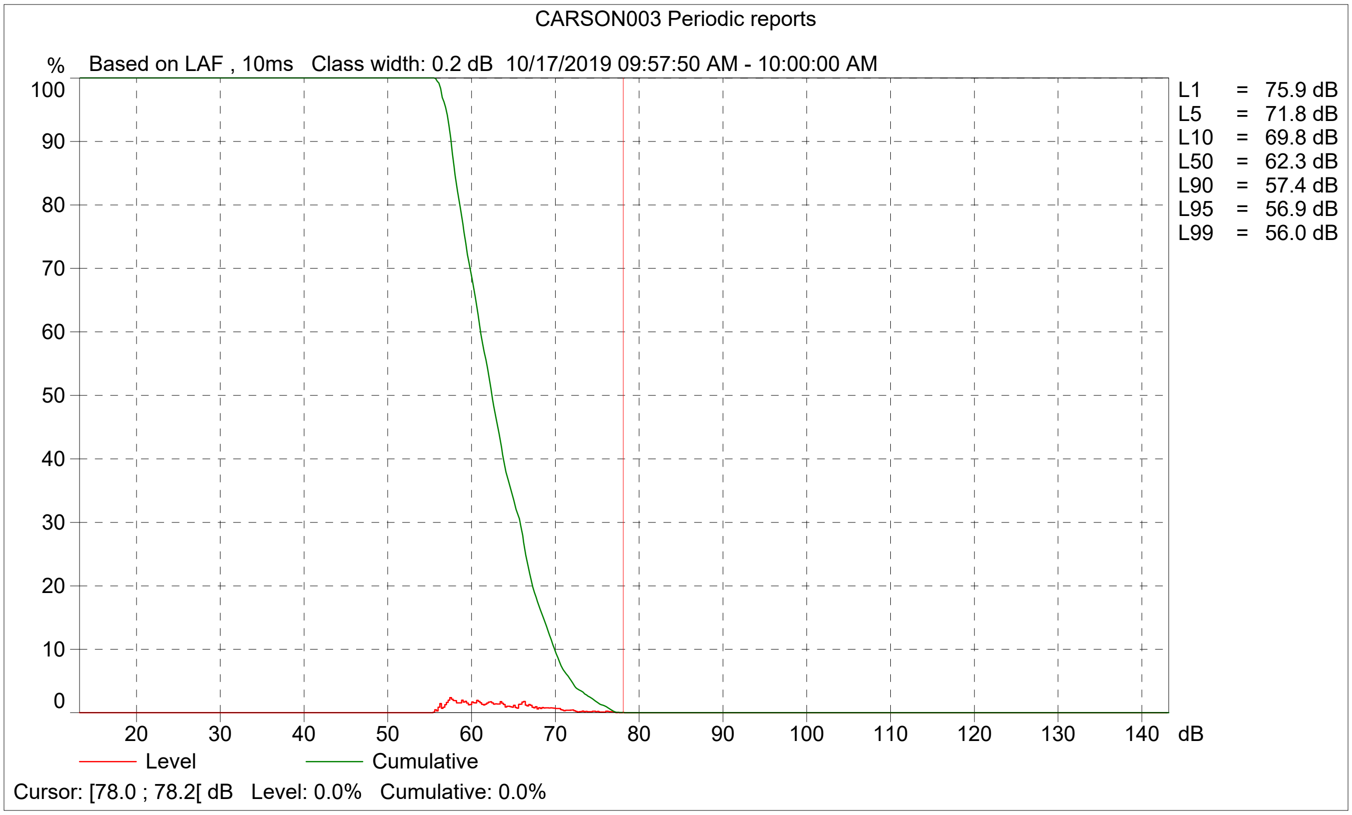

CARSON003
dB 10/17/2019 10:02:49 AM - 10:02:50 AM
140
120
100
80
60
40
20
0
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
Cursor: (A) Leq=55.4 dB


CARSON003 Periodic reports
Sound
dB
140
120
100
80
60
40
20
10:00:00 AM
10:10:00 AM
10:20:00 AM
10:30:00 AM
10:40:00 AM
10:50:00 AM
11:00:00 AM
LAIeq
LAFmax
LCpeak
LAFmin
Cursor: 10/17/2019 09:57:50 AM - 10:00:00 AM LAIeq=69.0 dB LAFmax=78.2 dB LCpeak=98.8 dB LAFmin=55.4 dB

# CARSON003 Periodic reports

| | Start time | Elapsed time | Overload [%] | LAIeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|---|
| Value | | | 0.00 | 69.0 | 78.2 | 55.4 |
| Time | 09:57:50 AM | 0:02:10 | | | | |
| Date | 10/17/2019 | | | | | |





CARSON003 Periodic reports
% Based on LAF , 10ms Class width: 0.2 dB 10/17/2019 09:57:50 AM - 10:00:00 AM
100
90
80
70
60
50
40
30
20
10
0
20 30 40 50 60 70 80 90 100 110 120 130 140 dB
L1 = 75.9 dB
L5 = 71.8 dB
L10 = 69.8 dB
L50 = 62.3 dB
L90 = 57.4 dB
L95 = 56.9 dB
L99 = 56.0 dB
Level
Cumulative
Cursor: [78.0 ; 78.2[ dB Level: 0.0% Cumulative: 0.0%

| | |
|---|---|
| **Site Number:** Imperial Avalon Site #4 | |
| **Recorded By:** Pierre Glaize and Winnie Woo | |
| **Job Number:** 175510 | |
| **Date:** 10/17/2019 | |
| **Time:** 10:14 a.m. | |
| **Location:** Along Avalon Boulevard, adjacent to the existing mobile homes estate. | |
| **Source of Peak Noise:** Traffic along Avalon Boulevard and Interstate 405. | |

| Noise Data | | | |
|---|---|---|---|
| **Leq (dB)** | **Lmax(dB)** | **Lmin (dB)** | **Peak (dB)** |
| 68.3 | 85.3 | 61.4 | 100.4 |

| Equipment | | | | | | |
|---|---|---|---|---|---|---|
| **Category** | **Type** | **Vendor** | **Model** | **Serial No.** | **Cert. Date** | **Note** |
| Sound | Sound Level Meter | **Brüel & Kjær** | **2250** | **3011133** | **04/08/2019** | |
| | Microphone | **Brüel & Kjær** | **4189** | **3086765** | **04/08/2019** | |
| | Preamp | **Brüel & Kjær** | **ZC 0032** | **25380** | **04/08/2019** | |
| | Calibrator | **Brüel & Kjær** | **4231** | **2545667** | **04/08/2019** | |

| Weather Data | | | |
|---|---|---|---|
| **Est.** | **Duration:** 10 minutes | | **Sky:** partially cloudy |
| | **Note:** dBA Offset = -0.01 | | **Sensor Height (ft):** 5 ft |
| | **Wind Ave Speed (mph / m/s)** | **Temperature (degrees Fahrenheit)** | **Barometer Pressure (inches)** |
| | 6 mph | 68° | 29.83 |

## Photo of Measurement Location

## 2250

| | | |
|---|---|---|
| Instrument: | | 2250 |
| Application: | | BZ7225 Version 4.7.4 |
| Start Time: | | 10/17/2019 10:14:27 |
| End Time: | | 10/17/2019 10:24:27 |
| Elapsed Time: | | 00:10:00 |
| Bandwidth: | | 1/3-octave |
| Max Input Level: | | 142.08 |

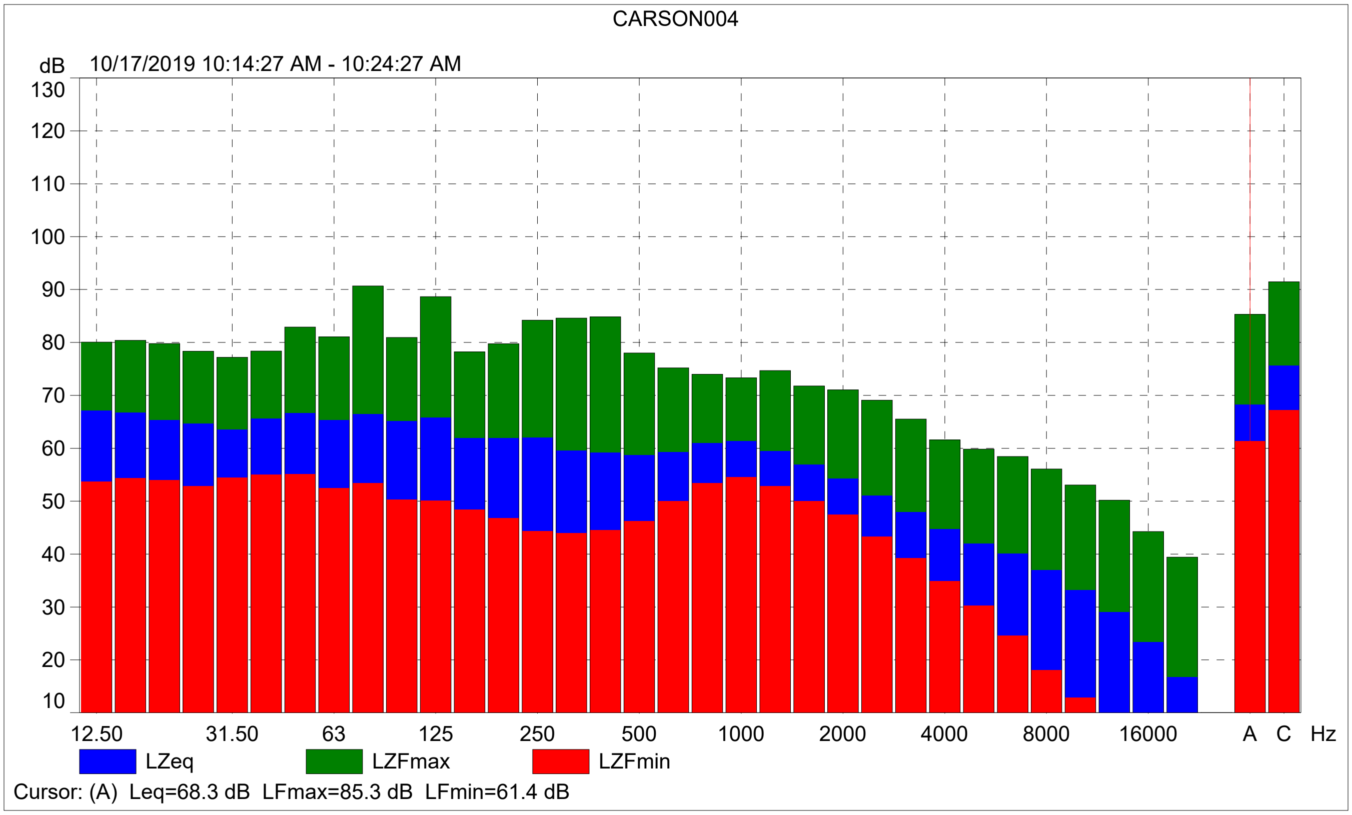
| | Time | Frequency |
|---|---|---|
| Broadband (excl. Peak): | FSI | AC |
| Broadband Peak: | | C |
| Spectrum: | FS | Z |

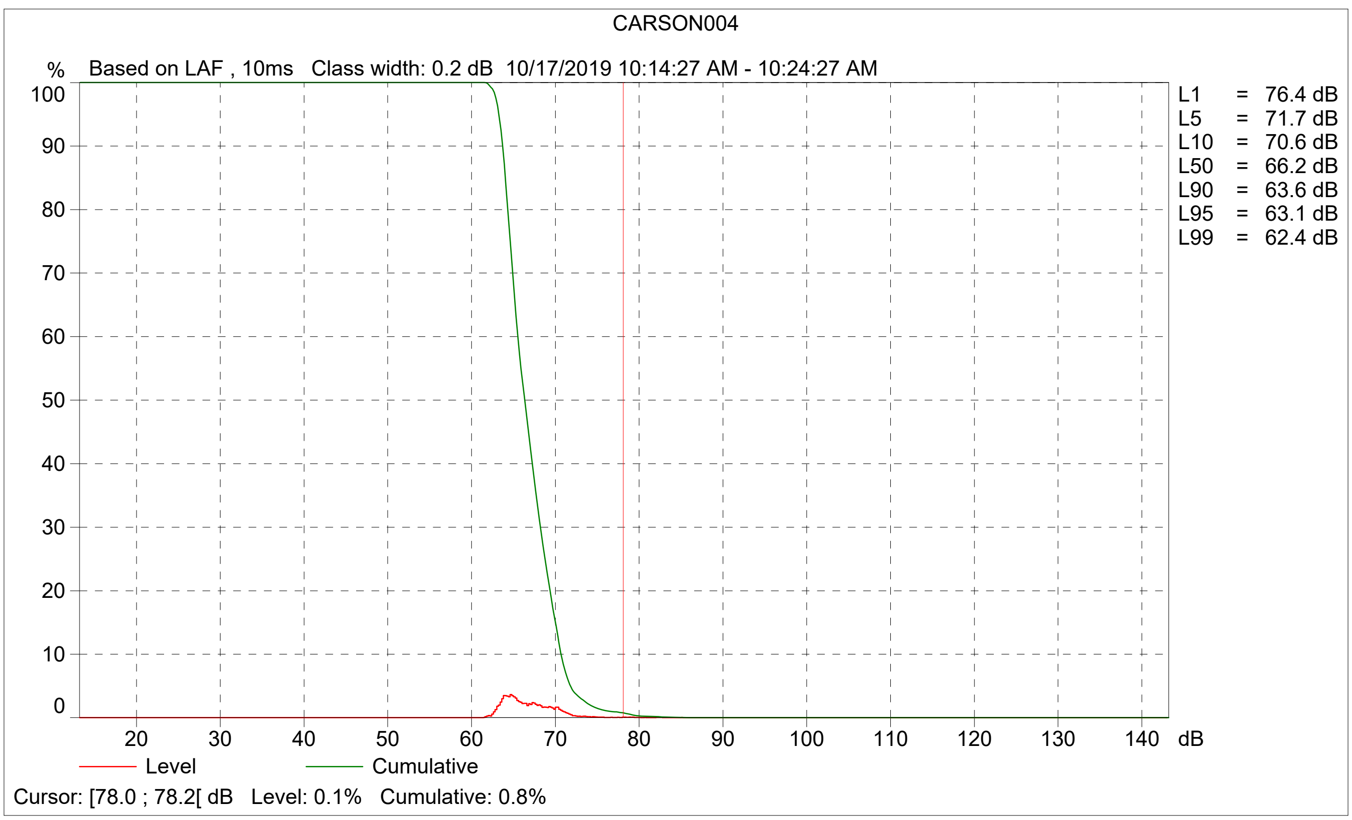
| | | |
|---|---|---|
| Instrument Serial Number: | | 3011133 |
| Microphone Serial Number: | | 3086765 |
| Input: | | Top Socket |
| Windscreen Correction: | | UA-1650 |
| Sound Field Correction: | | Free-field |

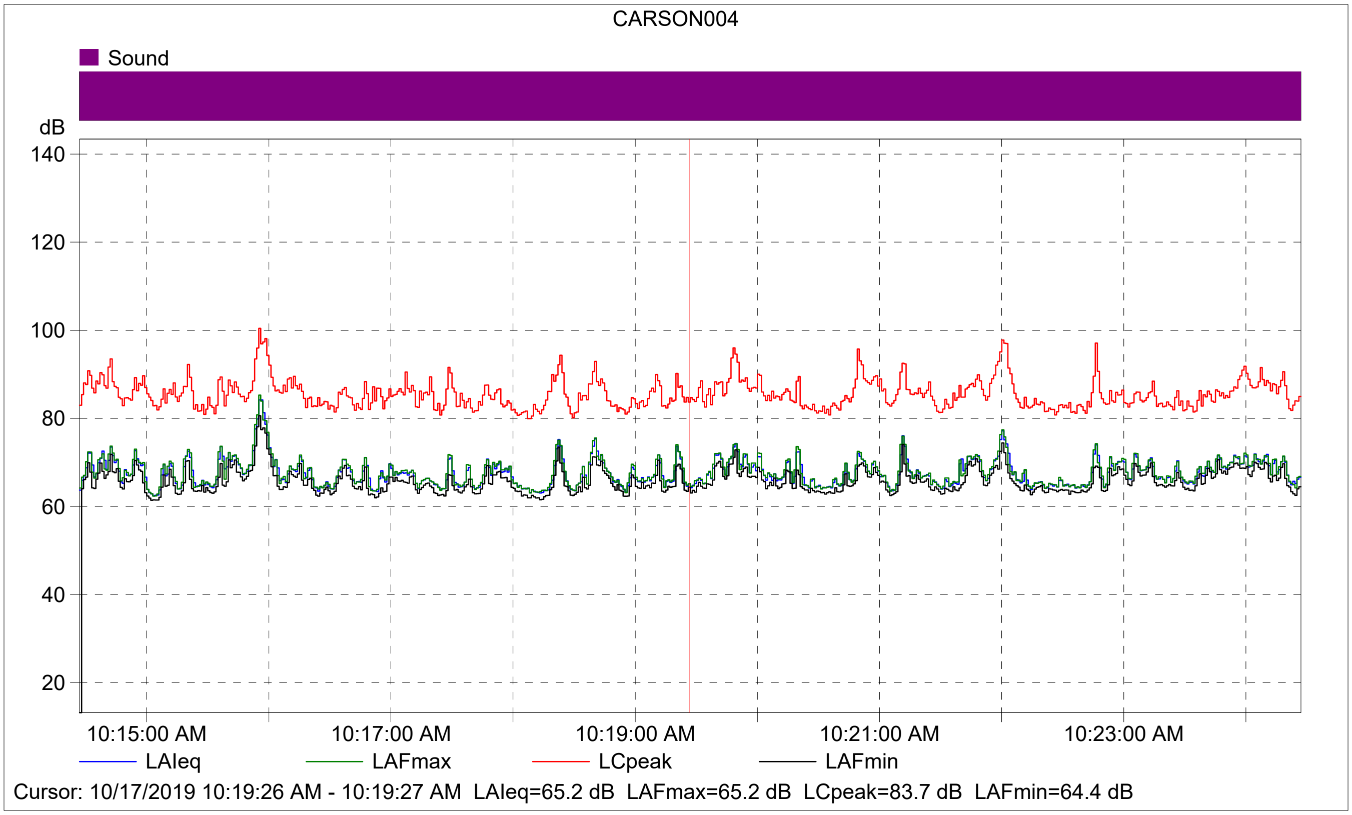
| | | |
|---|---|---|
| Calibration Time: | | 10/17/2019 08:13:12 |
| Calibration Type: | | External reference |
| Sensitivity: | | 43.8202656805515 mV/Pa |

## CARSON004

| | Start time | End time | Elapsed time | Overload [%] | LAeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|---|---|
| Value | | | | 0.00 | 68.3 | 85.3 | 61.4 |
| Time | 10:14:27 AM | 10:24:27 AM | 0:10:00 | | | | |
| Date | 10/17/2019 | 10/17/2019 | | | | | |

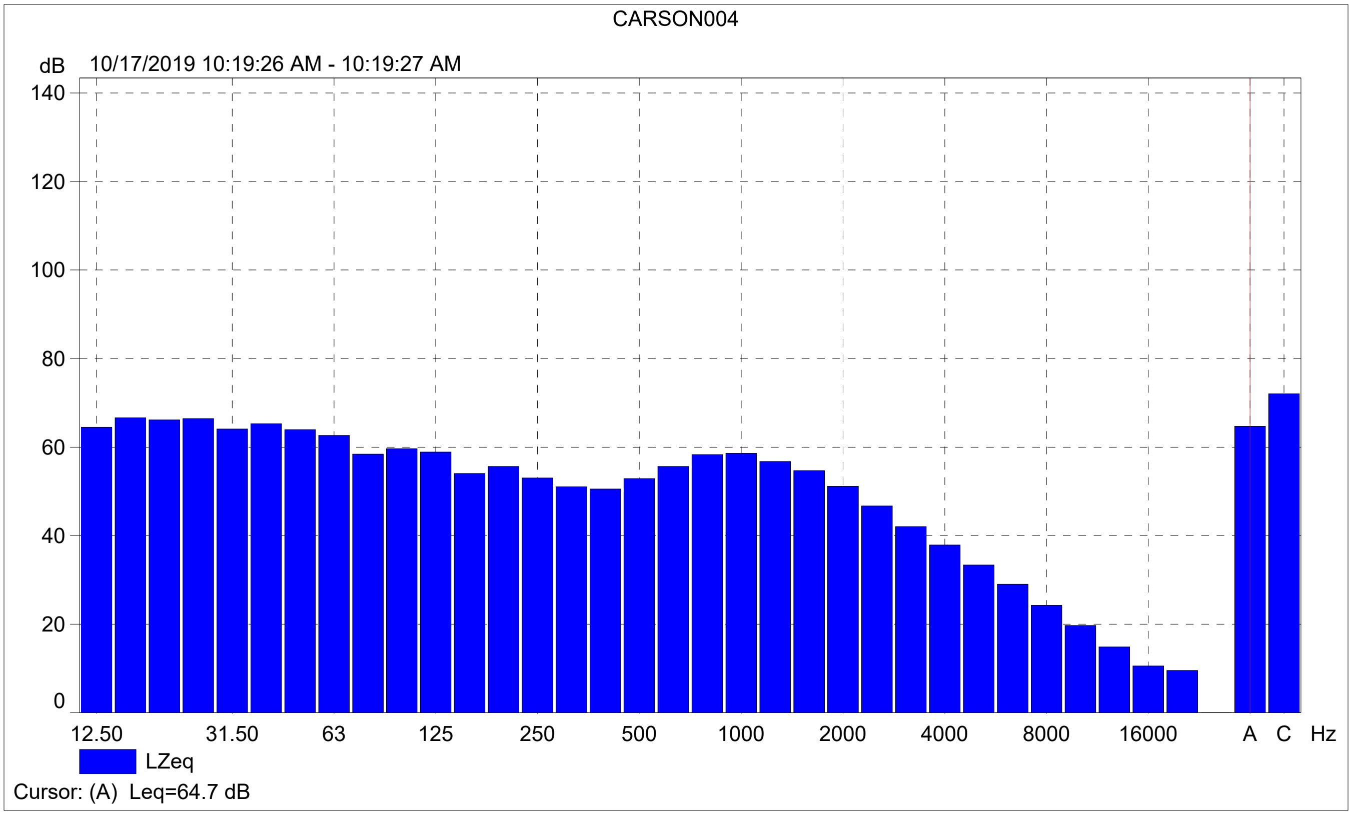

CARSON004
dB 10/17/2019 10:14:27 AM - 10:24:27 AM
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=68.3 dB LFmax=85.3 dB LFmin=61.4 dB

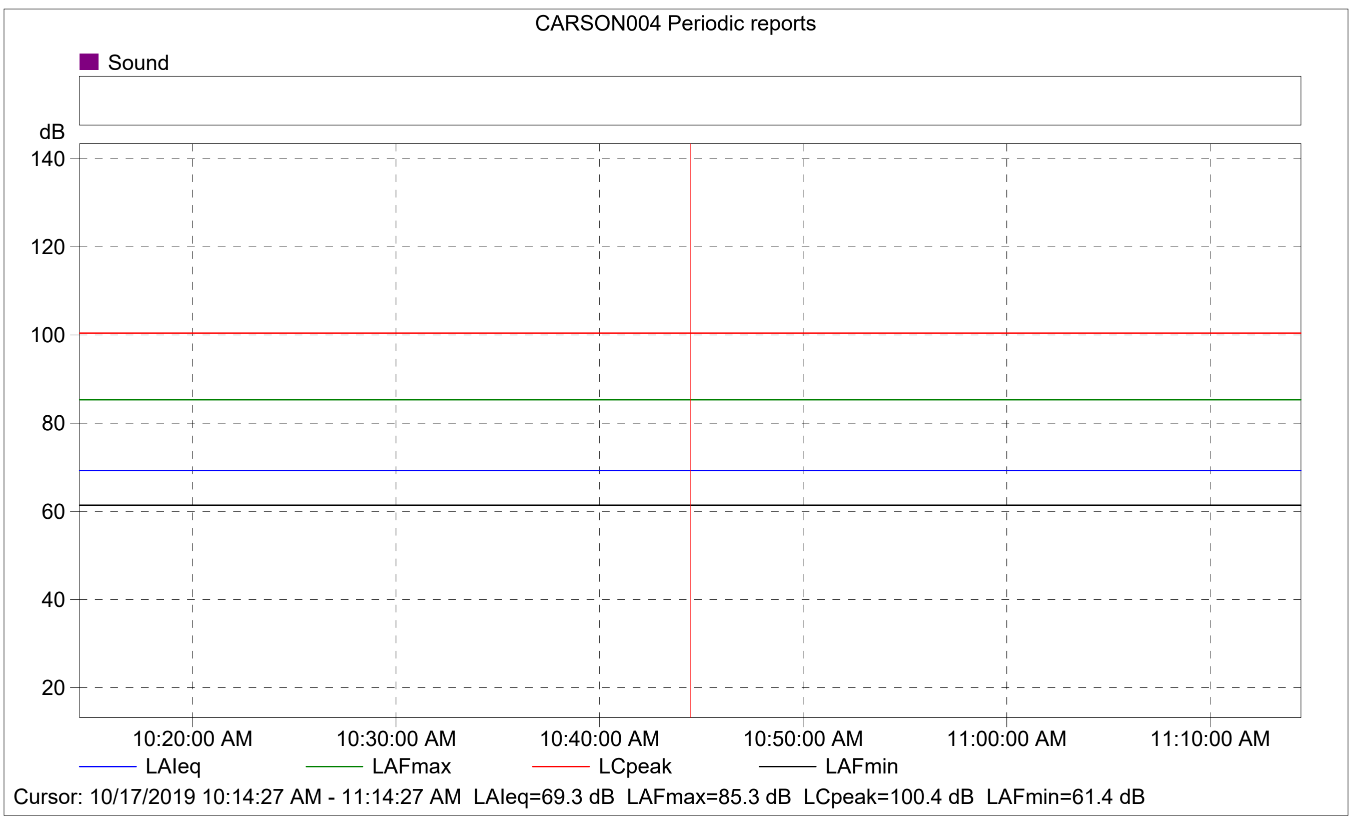

CARSON004
% Based on LAF , 10ms Class width: 0.2 dB 10/17/2019 10:14:27 AM - 10:24:27 AM
100
90
80
70
60
50
40
30
20
10
0
20
30
40
50
60
70
80
90
100
110
120
130
140
dB
L1 = 76.4 dB
L5 = 71.7 dB
L10 = 70.6 dB
L50 = 66.2 dB
L90 = 63.6 dB
L95 = 63.1 dB
L99 = 62.4 dB
Level
Cumulative
Cursor: [78.0 ; 78.2[ dB Level: 0.1% Cumulative: 0.8%




## CARSON004

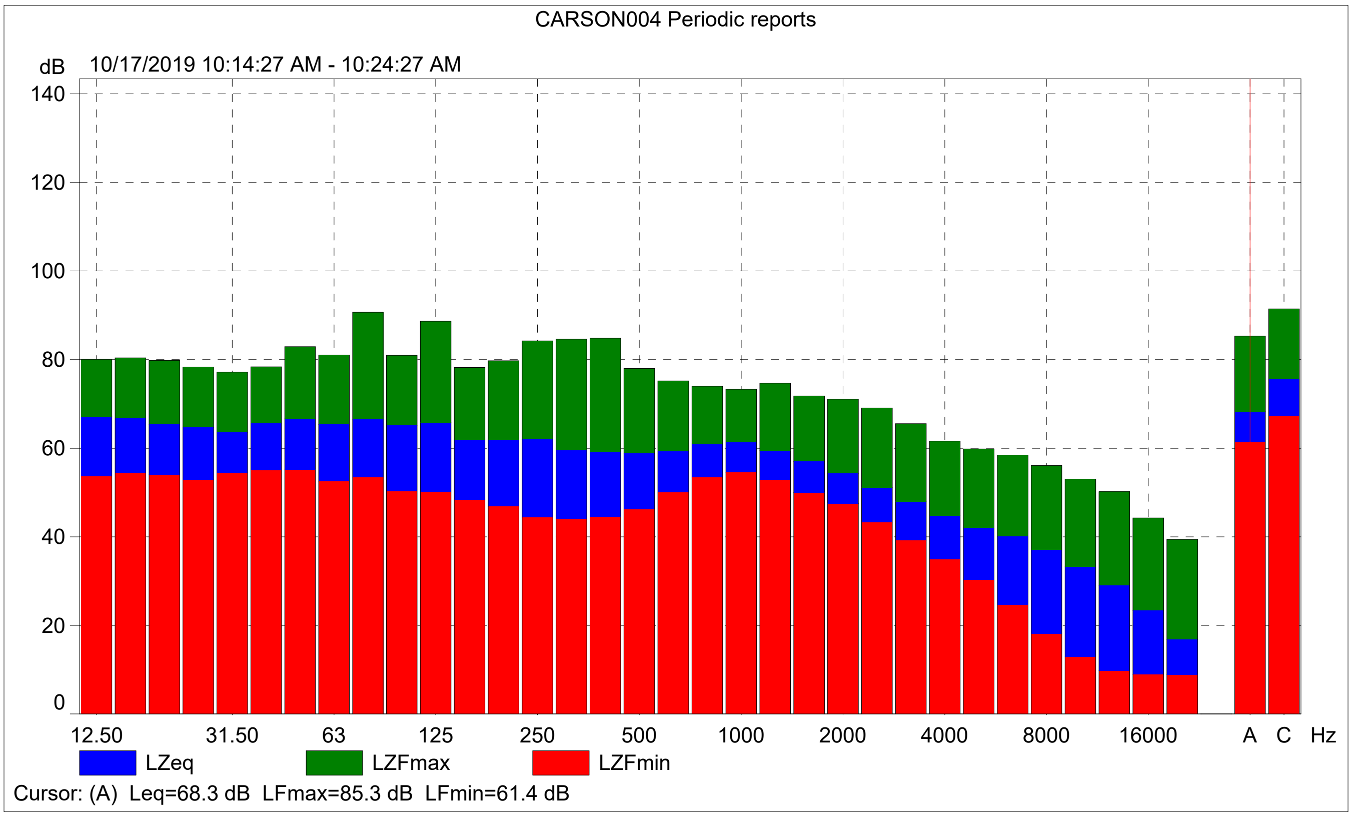
| | Start time | Elapsed time | LAIeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|
| Value | | | 65.2 | 65.2 | 64.4 |
| Time | 10:19:26 AM | 0:00:01 | | | |
| Date | 10/17/2019 | | | | |

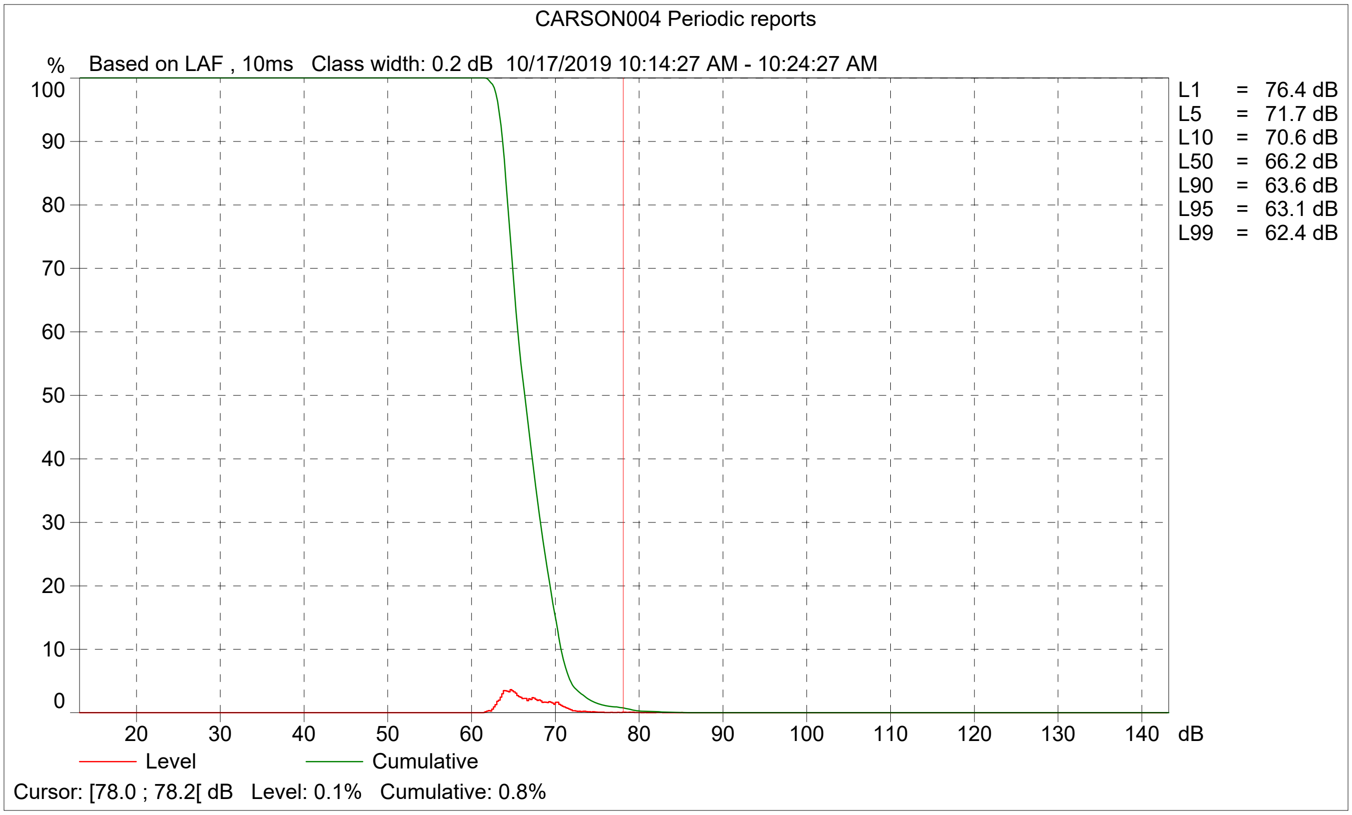

CARSON004
dB
10/17/2019 10:19:26 AM - 10:19:27 AM
140
120
100
80
60
40
20
0
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
C
Hz
LZeq
Cursor: (A) Leq=64.7 dB


CARSON004 Periodic reports
Sound
dB
140
120
100
80
60
40
20
10:20:00 AM
10:30:00 AM
10:40:00 AM
10:50:00 AM
11:00:00 AM
11:10:00 AM
LAIeq
LAFmax
LCpeak
LAFmin
Cursor: 10/17/2019 10:14:27 AM - 11:14:27 AM LAIeq=69.3 dB LAFmax=85.3 dB LCpeak=100.4 dB LAFmin=61.4 dB

# CARSON004 Periodic reports

| | Start time | Elapsed time | Overload [%] | LAIeq [dB] | LAFmax [dB] | LAFmin [dB] |
|---|---|---|---|---|---|---|
| Value | | | 0.00 | 69.3 | 85.3 | 61.4 |
| Time | 10:14:27 AM | 0:10:00 | | | | |
| Date | 10/17/2019 | | | | | |




CARSON004 Periodic reports
% Based on LAF , 10ms Class width: 0.2 dB 10/17/2019 10:14:27 AM - 10:24:27 AM
100
90
80
70
60
50
40
30
20
10
0
20 30 40 50 60 70 80 90 100 110 120 130 140 dB
L1 = 76.4 dB
L5 = 71.7 dB
L10 = 70.6 dB
L50 = 66.2 dB
L90 = 63.6 dB
L95 = 63.1 dB
L99 = 62.4 dB
Level
Cumulative
Cursor: [78.0 ; 78.2[ dB Level: 0.1% Cumulative: 0.8%

## TRAFFIC NOISE LEVELS AND NOISE CONTOURS

**Project Number:** 175510
**Project Name:** Imperial Avalon
**Scenario:** Existing

**Background Information**

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Fehr and Pehrs (2020)
Community Noise Descriptor: $L_{dn}$: ____ CNEL: x

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 77.50% | 12.90% | 9.60% |
| Medium-Duty Trucks | 84.80% | 4.90% | 10.30% |
| Heavy-Duty Trucks | 86.50% | 2.70% | 10.80% |

| **Analysis Condition** Roadway, Segment | Lanes | Median Width | ADT Volume | Design Speed (mph) | Alpha Factor | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks | CNEL at 50 Feet | Distance to Contour 70 CNEL | Distance to Contour 65 CNEL | Distance to Contour 60 CNEL | Distance to Contour 55 CNEL | Calc Dist |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Avalon Boulevard** | | | | | | | | | | | | | |
| Albertoni Street To Victoria Street | 6 | 15 | 25,100 | 35 | 0.5 | 1.8% | 0.7% | 70.1 | - | 109 | 234 | 504 | 50 |
| Victoria Street to MLK Jr Street | 6 | 30 | 25,190 | 35 | 0.5 | 1.8% | 0.7% | 72.8 | 77 | 165 | 356 | 768 | 50 |
| MLK Jr Street to Del Amo Boulevard | 6 | 32 | 28,380 | 35 | 0.5 | 1.8% | 0.7% | 74.0 | 93 | 199 | 429 | 925 | 50 |
| Del Amo Boulevard to I-405 | 6 | 14 | 33,880 | 35 | 0.5 | 1.8% | 0.7% | 71.2 | - | 130 | 281 | 606 | 50 |
| I-405 to Imperial Avalon Main Entrace | 6 | 16 | 27,180 | 35 | 0.5 | 1.8% | 0.7% | 70.5 | - | 117 | 251 | 541 | 50 |
| Imperial Avalon Main Entrace to 213th Street | 6 | 16 | 27,590 | 35 | 0.5 | 1.8% | 0.7% | 70.6 | - | 118 | 254 | 547 | 50 |
| 213th Street to Carson Street | 6 | 16 | 22,710 | 35 | 0.5 | 1.8% | 0.7% | 69.7 | - | 103 | 223 | 480 | 50 |
| Carson Street to 220th Street | 6 | 16 | 26,280 | 35 | 0.5 | 1.8% | 0.7% | 70.4 | - | 114 | 246 | 529 | 50 |
| **Grace Avenue** | | | | | | | | | | | | | |
| North of 213th Street | 2 | 0 | 490 | 30 | 0.5 | 1.8% | 0.7% | 49.3 | - | - | - | - | 50 |
| **Main Street** | | | | | | | | | | | | | |
| Torrance Boulevard to 213th Street | 4 | 14 | 22,460 | 45 | 0.5 | 1.8% | 0.7% | 70.3 | 53 | 113 | 244 | 526 | 50 |
| 213th Street to Carson Street | 4 | 14 | 20,690 | 45 | 0.5 | 1.8% | 0.7% | 70.0 | - | 107 | 231 | 498 | 50 |
| Carson Street to 220th Street | 4 | 14 | 20,100 | 45 | 0.5 | 1.8% | 0.7% | 69.8 | - | 105 | 227 | 488 | 50 |
| **Del Amo Boulevard** | | | | | | | | | | | | | |
| Avalon Boulevard to Central Avenue | 6 | 15 | 23,120 | 45 | 0.5 | 1.8% | 0.7% | 72.2 | 70 | 151 | 326 | 702 | 50 |
| **213th Street** | | | | | | | | | | | | | |
| Grave Avenue to Avalon Boulevard | 2 | 12 | 10,350 | 30 | 0.5 | 1.8% | 0.7% | 62.7 | - | - | 76 | 163 | 50 |
| **Carson Street** | | | | | | | | | | | | | |
| Figueroa Street to Main Street | 4 | 15 | 21,090 | 40 | 0.5 | 1.8% | 0.7% | 68.9 | - | 91 | 196 | 422 | 50 |
| Main Street to Grave Avenue | 4 | 15 | 19,810 | 40 | 0.5 | 1.8% | 0.7% | 68.6 | - | 87 | 188 | 405 | 50 |
| Grave Avenue to Avalon Boulevard | 4 | 15 | 20,670 | 40 | 0.5 | 1.8% | 0.7% | 68.8 | - | 90 | 193 | 416 | 50 |
| Avalon Boulevard to I-405 | 4 | 15 | 31,700 | 40 | 0.5 | 1.8% | 0.7% | 70.7 | 55 | 119 | 257 | 554 | 50 |

Distance from Centerline of Roadway

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

## TRAFFIC NOISE LEVELS AND NOISE CONTOURS

**Project Number:** 175510
**Project Name:** Imperial Avalon
**Scenario:** Future Without Project

**Background Information**

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Fehr and Pehrs (2020)
Community Noise Descriptor: $L_{dn}$: ______ CNEL: x

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 77.50% | 12.90% | 9.60% |
| Medium-Duty Trucks | 84.80% | 4.90% | 10.30% |
| Heavy-Duty Trucks | 86.50% | 2.70% | 10.80% |

| Analysis Condition<br>Roadway, Segment | Lanes | Median Width | ADT Volume | Design Speed (mph) | Alpha Factor | Vehicle Mix<br>Medium Trucks | Vehicle Mix<br>Heavy Trucks | Distance from Centerline of Roadway<br>CNEL at 50 Feet | Distance to Contour<br>70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL | Calc Dist |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Avalon Boulevard** | | | | | | | | | | | | | |
| Albertoni Street To Victoria Street | 6 | 15 | 29,970 | 35 | 0.5 | 1.8% | 0.7% | 70.8 | - | 122 | 263 | 568 | 50 |
| Victoria Street to MLK Jr Street | 6 | 30 | 33,250 | 35 | 0.5 | 1.8% | 0.7% | 74.0 | 92 | 199 | 429 | 924 | 50 |
| MLK Jr Street to Del Amo Boulevard | 6 | 32 | 36,910 | 35 | 0.5 | 1.8% | 0.7% | 75.1 | 110 | 237 | 512 | 1,102 | 50 |
| Del Amo Boulevard to I-405 | 6 | 14 | 38,170 | 35 | 0.5 | 1.8% | 0.7% | 71.8 | 66 | 141 | 304 | 656 | 50 |
| I-405 to Impervial Avalon Main Entrace | 6 | 16 | 38,570 | 35 | 0.5 | 1.8% | 0.7% | 72.0 | 68 | 147 | 317 | 683 | 50 |
| Imperial Avalon Main Entrance to 213th Street | 6 | 16 | 34,760 | 35 | 0.5 | 1.8% | 0.7% | 71.6 | - | 137 | 296 | 638 | 50 |
| 213th Street to Carson Street | 6 | 16 | 29,760 | 35 | 0.5 | 1.8% | 0.7% | 70.9 | - | 124 | 267 | 575 | 50 |
| Carson Street to 220th Street | 6 | 16 | 30,150 | 35 | 0.5 | 1.8% | 0.7% | 71.0 | - | 125 | 269 | 580 | 50 |
| **Grace Avenue** | | | | | | | | | | | | | |
| North of 213th Street | 2 | 0 | 500 | 30 | 0.5 | 1.8% | 0.7% | 49.4 | - | - | - | - | 50 |
| **Main Street** | | | | | | | | | | | | | |
| Torrance Boulevard to 213th Street | 4 | 14 | 25,950 | 45 | 0.5 | 1.8% | 0.7% | 71.0 | 58 | 125 | 269 | 579 | 50 |
| 213th Street to Carson Street | 4 | 14 | 24,440 | 45 | 0.5 | 1.8% | 0.7% | 70.7 | 56 | 120 | 258 | 556 | 50 |
| Carson Street to 220th Street | 4 | 14 | 22,700 | 45 | 0.5 | 1.8% | 0.7% | 70.4 | 53 | 114 | 246 | 529 | 50 |
| **Del Amo Boulevard** | | | | | | | | | | | | | |
| Avalon Boulevard to Central Avenue | 6 | 15 | 26,250 | 45 | 0.5 | 1.8% | 0.7% | 72.8 | 76 | 165 | 355 | 764 | 50 |
| **213th Street** | | | | | | | | | | | | | |
| Grave Avenue to Avalon Boulevard | 2 | 12 | 11,700 | 30 | 0.5 | 1.8% | 0.7% | 63.2 | - | 38 | 82 | 177 | 50 |
| **Carson Street** | | | | | | | | | | | | | |
| Figueroa Street to Main Street | 4 | 15 | 25,110 | 40 | 0.5 | 1.8% | 0.7% | 69.7 | - | 102 | 220 | 474 | 50 |
| Main Street to Grave Avenue | 4 | 15 | 22,660 | 40 | 0.5 | 1.8% | 0.7% | 69.2 | - | 95 | 206 | 443 | 50 |
| Grave Avenue to Avalon Boulevard | 4 | 15 | 25,270 | 40 | 0.5 | 1.8% | 0.7% | 69.7 | - | 103 | 221 | 476 | 50 |
| Avalon Boulevard to I-405 | 4 | 15 | 36,480 | 40 | 0.5 | 1.8% | 0.7% | 71.3 | 61 | 131 | 282 | 608 | 50 |

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

## TRAFFIC NOISE LEVELS AND NOISE CONTOURS

**Project Number:** 175510
**Project Name:** Imperial Avalon
**Scenario:** Future With Project

**Background Information**

| | |
|---|---|
| Model Description: | FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels. |
| Source of Traffic Volumes: | Fehr and Pehrs (2020) |
| Community Noise Descriptor: | $L_{dn}$: ______ CNEL: x |

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 77.50% | 12.90% | 9.60% |
| Medium-Duty Trucks | 84.80% | 4.90% | 10.30% |
| Heavy-Duty Trucks | 86.50% | 2.70% | 10.80% |

| Analysis Condition | | | | Design | | Vehicle Mix | | Distance from Centerline of Roadway | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Median | ADT | Speed | Alpha | Medium | Heavy | CNEL at | Distance to Contour | | | | Calc |
| Roadway, Segment | Lanes | Width | Volume | (mph) | Factor | Trucks | Trucks | 50 Feet | 70 CNEL | 65 CNEL | 60 CNEL | 55 CNEL | Dist |
| **Avalon Boulevard** | | | | | | | | | | | | | |
| Albertoni Street To Victoria Street | 6 | 15 | 30,020 | 35 | 0.5 | 1.8% | 0.7% | 70.8 | - | 122 | 264 | 568 | 50 |
| Victoria Street to MLK Jr Street | 6 | 30 | 33,350 | 35 | 0.5 | 1.8% | 0.7% | 74.0 | 93 | 199 | 430 | 926 | 50 |
| MLK Jr Street to Del Amo Boulevard | 6 | 32 | 37,090 | 35 | 0.5 | 1.8% | 0.7% | 75.2 | 111 | 238 | 513 | 1,106 | 50 |
| Del Amo Boulevard to I-405 | 6 | 14 | 38,430 | 35 | 0.5 | 1.8% | 0.7% | 71.8 | 66 | 142 | 306 | 659 | 50 |
| I-405 to Impervial Avalon Main Entrace | 6 | 16 | 41,860 | 35 | 0.5 | 1.8% | 0.7% | 72.4 | 72 | 155 | 335 | 722 | 50 |
| Imperial Avalon Main Entrace to 213th Street | 6 | 16 | 35,530 | 35 | 0.5 | 1.8% | 0.7% | 71.7 | 65 | 139 | 300 | 647 | 50 |
| 213th Street to Carson Street | 6 | 16 | 30,230 | 35 | 0.5 | 1.8% | 0.7% | 71.0 | - | 125 | 270 | 581 | 50 |
| Carson Street to 220th Street | 6 | 16 | 30,380 | 35 | 0.5 | 1.8% | 0.7% | 71.0 | - | 126 | 271 | 583 | 50 |
| **Grace Avenue** | | | | | | | | | | | | | |
| North of 213th Street | 2 | 0 | 1,010 | 30 | 0.5 | 1.8% | 0.7% | 52.5 | - | - | - | 34 | 50 |
| **Main Street** | | | | | | | | | | | | | |
| Torrance Boulevard to 213th Street | 4 | 14 | 26,000 | 45 | 0.5 | 1.8% | 0.7% | 71.0 | 58 | 125 | 269 | 580 | 50 |
| 213th Street to Carson Street | 4 | 14 | 24,490 | 45 | 0.5 | 1.8% | 0.7% | 70.7 | 56 | 120 | 259 | 557 | 50 |
| Carson Street to 220th Street | 4 | 14 | 22,700 | 45 | 0.5 | 1.8% | 0.7% | 70.4 | 53 | 114 | 246 | 529 | 50 |
| **Del Amo Boulevard** | | | | | | | | | | | | | |
| Avalon Boulevard to Central Avenue | 6 | 15 | 26,300 | 45 | 0.5 | 1.8% | 0.7% | 72.8 | 77 | 165 | 355 | 765 | 50 |
| **213th Street** | | | | | | | | | | | | | |
| Grave Avenue to Avalon Boulevard | 2 | 12 | 11,770 | 30 | 0.5 | 1.8% | 0.7% | 63.3 | - | 38 | 83 | 178 | 50 |
| **Carson Street** | | | | | | | | | | | | | |
| Figueroa Street to Main Street | 4 | 15 | 25,370 | 40 | 0.5 | 1.8% | 0.7% | 69.7 | - | 103 | 222 | 477 | 50 |
| Main Street to Grave Avenue | 4 | 15 | 22,870 | 40 | 0.5 | 1.8% | 0.7% | 69.2 | - | 96 | 207 | 446 | 50 |
| Grave Avenue to Avalon Boulevard | 4 | 15 | 25,380 | 40 | 0.5 | 1.8% | 0.7% | 69.7 | - | 103 | 222 | 478 | 50 |
| Avalon Boulevard to I-405 | 4 | 15 | 36,610 | 40 | 0.5 | 1.8% | 0.7% | 71.3 | 61 | 131 | 283 | 610 | 50 |

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/27/2021
Case Description: Imperial Avalon_650 FT Demolition

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) Daytime | Evening | Night |
|---|---|---|---|---|
| Southern Residences | Residential | 1 | 1 | 1 |

| Description | Impact Device | Usage(%) | Equipment Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| Excavator | No | 40 | | 80.7 | 650 | 0 |
| Dozer | No | 40 | | 81.7 | 650 | 0 |
| Tractor | No | 40 | 84 | | 650 | 0 |
| Shears (on backhoe) | No | 40 | | 96.2 | 650 | 0 |

Results

| | | Calculated (dBA) | | Noise Limits (dBA) | | | | | | Noise Limit Exceedance (dBA) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Day | | Evening | | Night | | Day | | Evening | | Night | |
| Equipment | | *Lmax | Leq | Lmax | Leq | Lmax | Leq | Lmax | Leq | Lmax | Leq | Lmax | Leq | Lmax | Leq |
| Excavator | | 58.4 | 54.5 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Dozer | | 59.4 | 55.4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Tractor | | 61.7 | 57.7 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Shears (on backhoe) | | 73.9 | 69.9 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | Total | 73.9 | 70.4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/27/2021
Case Description: Imperial Avalon_5 FT Grading

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) Daytime | Evening | Night |
|---|---|---|---|---|
| Southern Residences | Residential | 1 | 1 | 1 |

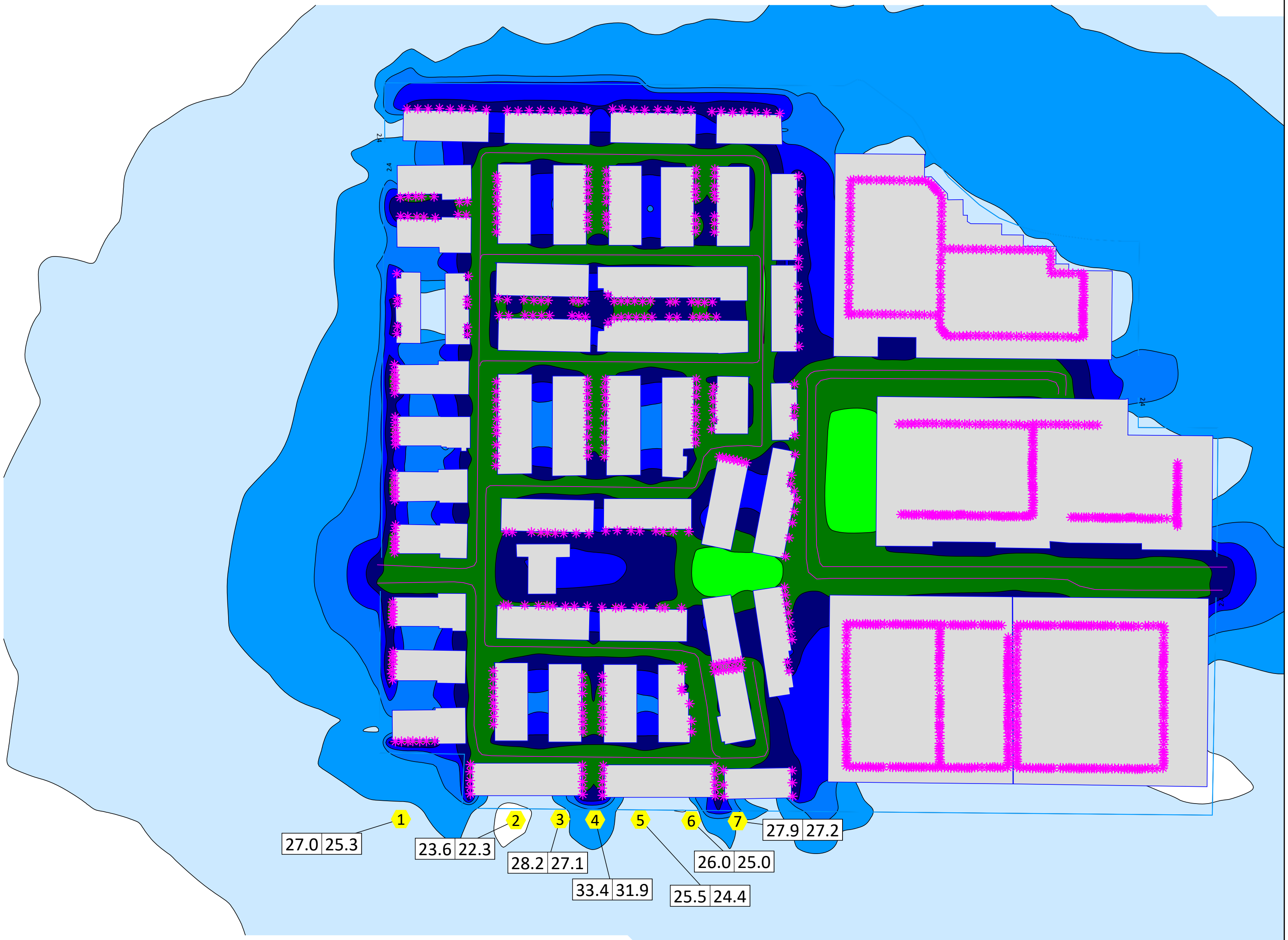
| Description | Impact Device | Usage(%) | Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| | | | Equipment | | | |
| Excavator | No | 40 | | 80.7 | 5 | 0 |
| Grader | No | 40 | 85 | | 5 | 0 |
| Front End Loader | No | 40 | | 79.1 | 5 | 0 |
| Vibratory Pile Driver | No | 20 | | 100.8 | 5 | 0 |

Results

| Equipment | | Calculated (dBA) *Lmax | Leq | Noise Limits (dBA) Day Lmax | Day Leq | Evening Lmax | Evening Leq | Night Lmax | Night Leq | Noise Limit Exceedance (dBA) Day Lmax | Day Leq | Evening Lmax | Evening Leq | Night Lmax | Night Leq |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Excavator | | 100.7 | 96.7 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Grader | | 105 | 101 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Front End Loader | | 99.1 | 95.1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Vibratory Pile Driver | | 120.8 | 113.8 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | Total | 120.8 | 114.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

# Imperial Avalon Cumulative Daytime Stationary Noise Impacts



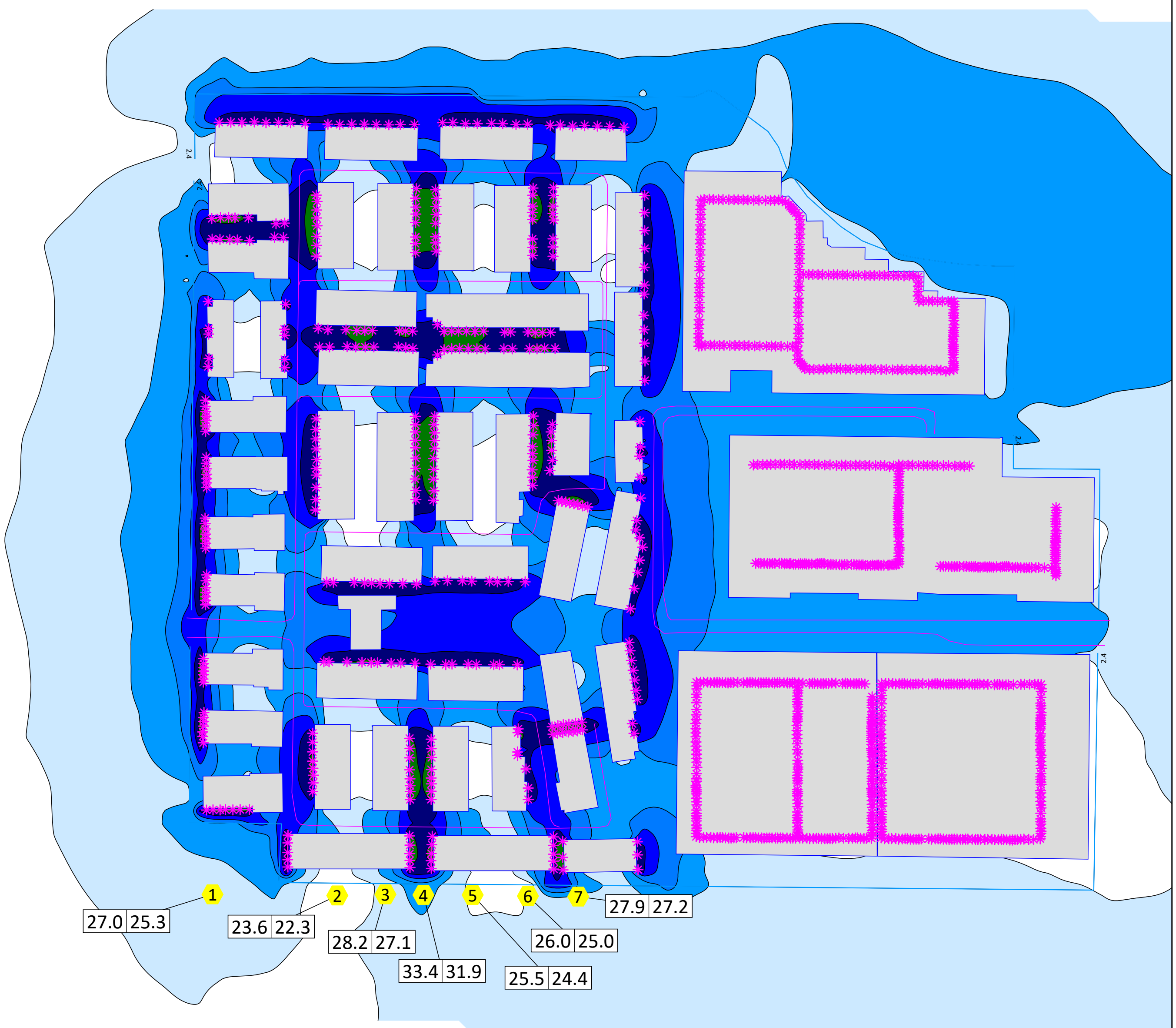

Signs and symbols

- Point source
- Line source
- Area source
- Main building
- Wall
- Receiver
- Level table

Noise level
Day
in dB(A)

24
29
34
39
44
49
54
59

# Imperial Avalon Cumulative Nighttime Stationary Noise Impacts




Signs and symbols

- Point source
- Line source
- Area source
- Main building
- Wall
- Receiver
- Level table

Noise level
Night
in dB(A)

24
29
34
39
44
49
54
59

# Imperial Avalon
# Assessed Receiver Levels



| Receiver | Usage | Fl | Dir | Day,lim dB(A) | Night,lim dB(A) | Day dB(A) | Night dB(A) | Day,diff dB | Night,diff dB |
|---|---|---|---|---|---|---|---|---|---|
| 1 | GR | GF | | | | 27.0 | 25.3 | | |
| 2 | GR | GF | | | | 23.6 | 22.3 | | |
| 3 | GR | GF | | | | 28.2 | 27.1 | | |
| 4 | GR | GF | | | | 33.4 | 31.9 | | |
| 5 | GR | GF | | | | 25.5 | 24.4 | | |
| 6 | GR | GF | | | | 26.0 | 25.0 | | |
| 7 | GR | GF | | | | 27.9 | 27.2 | | |

**TABLE 5**
**IMPERIAL AVALON PROJECT**
**ESTIMATED PROJECT TRIP GENERATION**

| Land Use | ITE Land Use Code | Size | Trip Generation Rates [a] | | | | | | | Estimated Trip Generation | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AM Peak Hour | | | PM Peak Hour | | | | AM Peak Hour Trips | | | PM Peak Hour Trips | | |
| | | | Daily | Rate | In% | Out% | Rate | In% | Out% | Daily | In | Out | Total | In | Out | Total |
| **PROPOSED PROJECT** | | | | | | | | | | | | | | | | |
| Multifamily Housing (Mid-Rise) | 221 | 1,033 DU | 5.44 | 0.36 | 26% | 74% | 0.44 | 61% | 39% | 5,620 | 97 | 275 | 372 | 278 | 177 | 455 |
| *Less: Internal capture* | | | *5%* | | *5%* | *9%* | | *4%* | *7%* | *(281)* | *(5)* | *(25)* | *(30)* | *(11)* | *(12)* | *(23)* |
| *Less: Walk/Bike/Transit Credit [b]* | | | *0%* | *0%* | | | *0%* | | | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| Net External Vehicle Trips | | | | | | | | | | 5,339 | 92 | 250 | 342 | 267 | 165 | 432 |
| Quality Restaurant | 931 | 8.47 KSF | 83.84 | 0.73 | 55% | 45% | 7.8 | 67% | 33% | 710 | 3 | 3 | 6 | 44 | 22 | 66 |
| *Less: Internal capture* | | | *11%* | | *20%* | *4%* | | *14%* | *18%* | *(78)* | *(1)* | *0* | *(1)* | *(6)* | *(4)* | *(10)* |
| *Less: Walk/Bike/Transit Credit [b]* | | | *0%* | *0%* | | | *0%* | | | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| Total Driveway Trips | | | | | | | | | | 632 | 2 | 3 | 5 | 38 | 18 | 56 |
| *Less: Pass-by* | | | *43%* | *43%* | | | *43%* | | | *(272)* | *(1)* | *(1)* | *(2)* | *(16)* | *(8)* | *(24)* |
| Net External Vehicle Trips | | | | | | | | | | 360 | 1 | 2 | 3 | 22 | 10 | 32 |
| Coffee/Donut Shop without Drive-Through Window [c] | 936 | 1.882 KSF | 346.23 | 101.14 | 51% | 49% | 36.31 | 50% | 50% | 652 | 97 | 93 | 190 | 34 | 34 | 68 |
| *Less: Internal capture* | | | *10%* | | *20%* | *4%* | | *14%* | *18%* | *(65)* | *(19)* | *(4)* | *(23)* | *(5)* | *(6)* | *(11)* |
| *Less: Walk/Bike/Transit Credit [b]* | | | *0%* | *0%* | | | *0%* | | | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| Total Driveway Trips | | | | | | | | | | 587 | 78 | 89 | 167 | 29 | 28 | 57 |
| *Less: Pass-by* | | | *43%* | *43%* | | | *43%* | | | *(252)* | *(34)* | *(38)* | *(72)* | *(12)* | *(12)* | *(24)* |
| Net External Vehicle Trips | | | | | | | | | | 335 | 44 | 51 | 95 | 17 | 16 | 33 |
| Senior Adult Housing - Attached | 252 | 180 DU | 3.85 | 0.2 | 35% | 65% | 0.26 | 55% | 45% | 693 | 13 | 23 | 36 | 26 | 21 | 47 |
| *Less: Internal capture* | | | *0%* | | *0%* | *0%* | | *0%* | *0%* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| *Less: Walk/Bike/Transit Credit [b]* | | | *0%* | *0%* | | | *0%* | | | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| Net External Vehicle Trips | | | | | | | | | | 693 | 13 | 23 | 36 | 26 | 21 | 47 |
| **TOTAL DRIVEWAY TRIPS** | | | | | | | | | | 7,251 | 185 | 365 | 550 | 360 | 232 | 592 |
| **TOTAL PROJECT EXTERNAL VEHICLE TRIPS** | | | | | | | | | | 6,727 | 150 | 326 | 476 | 332 | 212 | 544 |
| **EXISTING USE CREDIT** | | | | | | | | | | | | | | | | |
| Mobile Home Park | - | 225 DU | - | - | - | - | - | - | - | 1,141 | 25 | 49 | 74 | 49 | 38 | 87 |
| | - | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | - | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **TOTAL EXISTING DRIVEWAY TRIPS [d]** | | | | | | | | | | 1,141 | 25 | 49 | 74 | 49 | 38 | 87 |
| **NET INCREMENTAL EXTERNAL TRIPS** | | | | | | | | | | 5,586 | 125 | 277 | 402 | 283 | 174 | 457 |

Notes:

[a] Source: Institute of Transportation Engineers (ITE), *Trip Generation, 10th Edition* , 2017 and NCHRP 8-51, Internal Trip Capture Estimation Tool, Texas Transportation Institute.

[b] A 0% Walk/Bike/Transit Credit was used based on the site's general suburban context.

[c] ITE use 933 - Fast-Food Restaurant without Drive-Through Window used for daily rate due to lack of daily rate data for ITE use 936 - Coffee/Donut Shop without Drive-Through Window.

[d] 24-hour counts were taken at existing driveways at the proposed Project site in lieu of using estimated existing trips from ITE Trip Generation.

# Existing

| Segment | From | To | PM Volume | Estimated ADT Volume |
|---|---|---|---|---|
| Avalon Blvd | Albertoni St | Victoria St | 2,510 | 25,100 |
| Avalon Blvd | Victoria St | MLK Jr St | 2,519 | 25,190 |
| Avalon Blvd | MLK Jr St | Del Amo Blvd | 2,838 | 28,380 |
| Avalon Blvd | Del Amo Blvd | I-405 | 3,388 | 33,880 |
| Avalon Blvd | I-405 | Imperial Avalon Main Entrance | 2,718 | 27,180 |
| Avalon Blvd | Imperial Avalon Main Entrance | 213th St | 2,759 | 27,590 |
| Avalon Blvd | 213th St | Carson St | 2,271 | 22,710 |
| Avalon Blvd | Carson St | 220th St | 2,628 | 26,280 |
| Main St | Torrance Blvd | 213th St | 2,246 | 22,460 |
| Main St | 213th St | Carson St | 2,069 | 20,690 |
| Main St | Carson St | 220th St | 2,010 | 20,100 |
| Del Amo Blvd | Avalon Blvd | Central Ave | 2,312 | 23,120 |
| 213th St | Grace Ave | Avalon Blvd | 1,035 | 10,350 |
| Carson St | Figueroa St | Main St | 2,109 | 21,090 |
| Carson St | Main St | Grace Ave | 1,981 | 19,810 |
| Carson St | Grace Ave | Avalon Blvd | 2,067 | 20,670 |
| Carson St | Avalon Blvd | I-405 | 3,170 | 31,700 |

# Future Base

| Segment | From | To | PM Volume | Estimated ADT Volume |
|---|---|---|---|---|
| Avalon Blvd | Albertoni St | Victoria St | 2,997 | 29,970 |
| Avalon Blvd | Victoria St | MLK Jr St | 3,325 | 33,250 |
| Avalon Blvd | MLK Jr St | Del Amo Blvd | 3,691 | 36,910 |
| Avalon Blvd | Del Amo Blvd | I-405 | 3,817 | 38,170 |
| Avalon Blvd | I-405 | Imperial Avalon Main Entrance | 3,857 | 38,570 |
| Avalon Blvd | Imperial Avalon Main Entrance | 213th St | 3,476 | 34,760 |
| Avalon Blvd | 213th St | Carson St | 2,976 | 29,760 |
| Avalon Blvd | Carson St | 220th St | 3,015 | 30,150 |
| Main St | Torrance Blvd | 213th St | 2,595 | 25,950 |
| Main St | 213th St | Carson St | 2,444 | 24,440 |
| Main St | Carson St | 220th St | 2,270 | 22,700 |
| Del Amo Blvd | Avalon Blvd | Central Ave | 2,625 | 26,250 |
| 213th St | Grace Ave | Avalon Blvd | 1,170 | 11,700 |
| Carson St | Figueroa St | Main St | 2,511 | 25,110 |
| Carson St | Main St | Grace Ave | 2,266 | 22,660 |
| Carson St | Grace Ave | Avalon Blvd | 2,527 | 25,270 |
| Carson St | Avalon Blvd | I-405 | 3,648 | 36,480 |

# Future + Project

| Segment | From | To | PM Volume | Estimated ADT Volume |
|---|---|---|---|---|
| Avalon Blvd | Albertoni St | Victoria St | 3,002 | 30,020 |
| Avalon Blvd | Victoria St | MLK Jr St | 3,335 | 33,350 |
| Avalon Blvd | MLK Jr St | Del Amo Blvd | 3,709 | 37,090 |
| Avalon Blvd | Del Amo Blvd | I-405 | 3,843 | 38,430 |
| Avalon Blvd | I-405 | Imperial Avalon Main Entrance | 4,186 | 41,860 |
| Avalon Blvd | Imperial Avalon Main Entrance | 213th St | 3,553 | 35,530 |
| Avalon Blvd | 213th St | Carson St | 3,023 | 30,230 |
| Avalon Blvd | Carson St | 220th St | 3,038 | 30,380 |
| Main St | Torrance Blvd | 213th St | 2,600 | 26,000 |
| Main St | 213th St | Carson St | 2,449 | 24,490 |
| Main St | Carson St | 220th St | 2,270 | 22,700 |
| Del Amo Blvd | Avalon Blvd | Central Ave | 2,630 | 26,300 |
| 213th St | Grace Ave | Avalon Blvd | 1,177 | 11,770 |
| Carson St | Figueroa St | Main St | 2,537 | 25,370 |
| Carson St | Main St | Grace Ave | 2,287 | 22,870 |
| Carson St | Grace Ave | Avalon Blvd | 2,538 | 25,380 |
| Carson St | Avalon Blvd | I-405 | 3,661 | 36,610 |

| | |
|---|---|
| **From:** | Drew Heckathorn |
| **To:** | Regimbal, Danielle |
| **Subject:** | EXTERNAL: RE: Imperial Avalon - Grace Avenue ADTs |
| **Date:** | Thursday, September 2, 2021 7:48:28 PM |
| **Attachments:** | image001.png |

Hi Danielle,

Here are the ADT volumes for Grace Avenue using the 10x PM peak hour approach:

- Existing: 49 PM peak hour trips * 10 = **490 ADT**
- Future (2027) Year Without Project: 50 PM peak hour trips * 10 = **500 ADT**
- Future (2027) Year With Project: 101 PM peak hour trips * 10 = **1,010 ADT**

Thanks!

**Drew Heckathorn**
Senior Transportation Planner
Fehr & Peers Transportation Consultants
600 Wilshire Boulevard, Suite 1050 | Los Angeles, CA 90017
T 213.261.3061 | F 310.394.7663 | W FehrandPeers.com

**From:** Regimbal, Danielle <Danielle.Regimbal@mbakerintl.com>
**Sent:** Monday, August 30, 2021 5:02 PM
**To:** Drew Heckathorn <D.Heckathorn@fehrandpeers.com>
**Subject:** Imperial Avalon - Grace Avenue ADTs

Hi Drew,

Can you provide Grace Avenue ADTs for the below scenarios:

- Existing
- Future (2027) Year Without Project
- Future (2027) Year With Project

Thanks,

**Danielle Regimbal** | Senior Air Quality & Noise Specialist
5 Hutton Centre Drive, Suite 500 | Santa Ana, CA 92707 | [O] 949-330-4240
danielle.regimbal@mbakerintl.com | www.mbakerintl.com