

**Date:** September 1, 2023

**To:** Gavin Crescenzo – Keyah Group

**From:** David Kotch, Andy Swerdlow – Criterion Acoustics

**Re:** 1515 Washington Avenue – Cloud One Hotel – Environmental Noise Impact Study

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## 1) Overview

Keyah Group has hired Criterion Acoustics (CA) to perform an Environmental Noise Impact Study for the proposed Cloud One Hotel project located at 1515 Washington Avenue, Miami Beach, FL 33139.

Background, ambient-level music playback is planned for two locations:

1. Level 2 Pool Deck and Restaurant
2. Level 8 Rooftop Lounge

## 2) Environmental Noise Impact Summary

The key points for the project are as follows:

1. **Loudspeakers for audio playback shall use 6" bass drivers or smaller, be mounted as low as possible, and distributed**, keeping individual sound levels low. Subwoofers will not be used on the Pool Deck or Roof Lounge.
2. **A digital tamper-resistant sound level input limiter will be installed and configured after on-site sound level calibration** to ensure that the calibrated level is never exceeded. This limiter and output gain settings will only be accessible by corporate management and will have no local operational access.
3. **Sound will be directed away from the neighbors to the south**, 1455 and 1447 Washington Ave. The sound level in the outdoor areas will kept sufficiently low to not disturb the peace of these buildings.
  - a. See Table i for suggested sound level limits.
  - b. The ambient, environmental background sound level on Washington Ave. is approximately 60 dBA. The audio playback systems will not impact this level. See section 4 for more information.

4. **No sound will impact the environment** or other establishments if the conditions in this report are met
5. Suggested distributed sound level limits are as follows:

<b>Table i – Suggested Sound Level Maximum Level Limitation</b> (Leq “average” sound level)							
<b>Area</b>	<b>31.5 [Hz]</b>	<b>63 [Hz]</b>	<b>125 [Hz]</b>	<b>250 [Hz]</b>	<b>500 [Hz]</b>	<b>Overall [dBA]</b>	<b>Overall [dBC]</b>
<b>Level 2 Pool Deck</b>	-	70	70	70	70	73	77
<b>Level 2 Restaurant</b>	-	72	72	72	72	75	79
<b>Level 8 Rooftop Lounge</b>	-	72	72	72	72	75	79

### 3) Project Images



**1515  
 WASHINGTON  
 AVE**

LOCATION MAP  
 Figure 1 - Key Plan of 1515 Washington Ave. from a satellite view (Arquitectonica)



VIEW 01



VIEW 03

*Figure 2 - Street View of 1509-1515 existing buildings (Arquitectura)*



*Figure 3 – Rendering view of the proposed design (Arquitectura)*

## 4) Model and Measurement Results

### 1. Methodology

- a. A B&K 2270 handheld analyzer was used for on-site acoustical measurements.

The analyzer has the following software packages installed:

- BZ-7223 - Frequency analyzer software
- BZ-7224 - Logging software
- BZ-7225 - Enhanced logging software
- BZ-7226 - Sound recording option

The meter was calibrated by B&K in the past year, in addition to daily calibration with a B&K 4231 ½" microphone calibrator. A windscreen was used during the measurement.

*All measured acoustical data was processed using the L90 calculation, removing the loudest 90% of recorded data.*

- b. Predicted rooftop sound from loudspeakers and talking patrons was modeled using Noisetools dBMap software.

- Patron sound sources were simulated using line sources with 68 dBA sound power per meter using the spectrum in Table ii, derived from ANSI 3.5 "normal" vocal effort. The spectrum was increased by 3dB to allow for two talkers per meter.
- Loudspeaker sound sources were modeled as omnidirectional (accurate for bass sounds), and placed 2m above the surface of the roof. The assumed sound power is listed below in Table iii; and is a typical value for a small outdoor speaker. They are placed in a distributed fashion throughout the outdoor patron areas. The proposed roof audio system has not yet been specified; CA has used this to show an average, typical and unsophisticated loudspeaker deployment.

<b>Table ii – Sound power level for "normal" vocal effort</b>											
	31.5 [Hz]	63 [Hz]	125 [Hz]	250 [Hz]	500 [Hz]	1000 [Hz]	2000 [Hz]	4000 [Hz]	8000 [Hz]	Overall [dBA]	Overall [dBC]
<b>Sound Level</b>	-	45	55	65	69	63	56	50	45	68	-

<b>Table iii – Modeled sound power level for a single loudspeaker</b>											
	31.5 [Hz]	63 [Hz]	125 [Hz]	250 [Hz]	500 [Hz]	1000 [Hz]	2000 [Hz]	4000 [Hz]	8000 [Hz]	Overall [dBA]	Overall [dBC]
<b>Sound Level</b>	-	80	80	80	80	80	77	74	71	84	88

## 2. On-Site, Ambient Sound Level Measurement Results

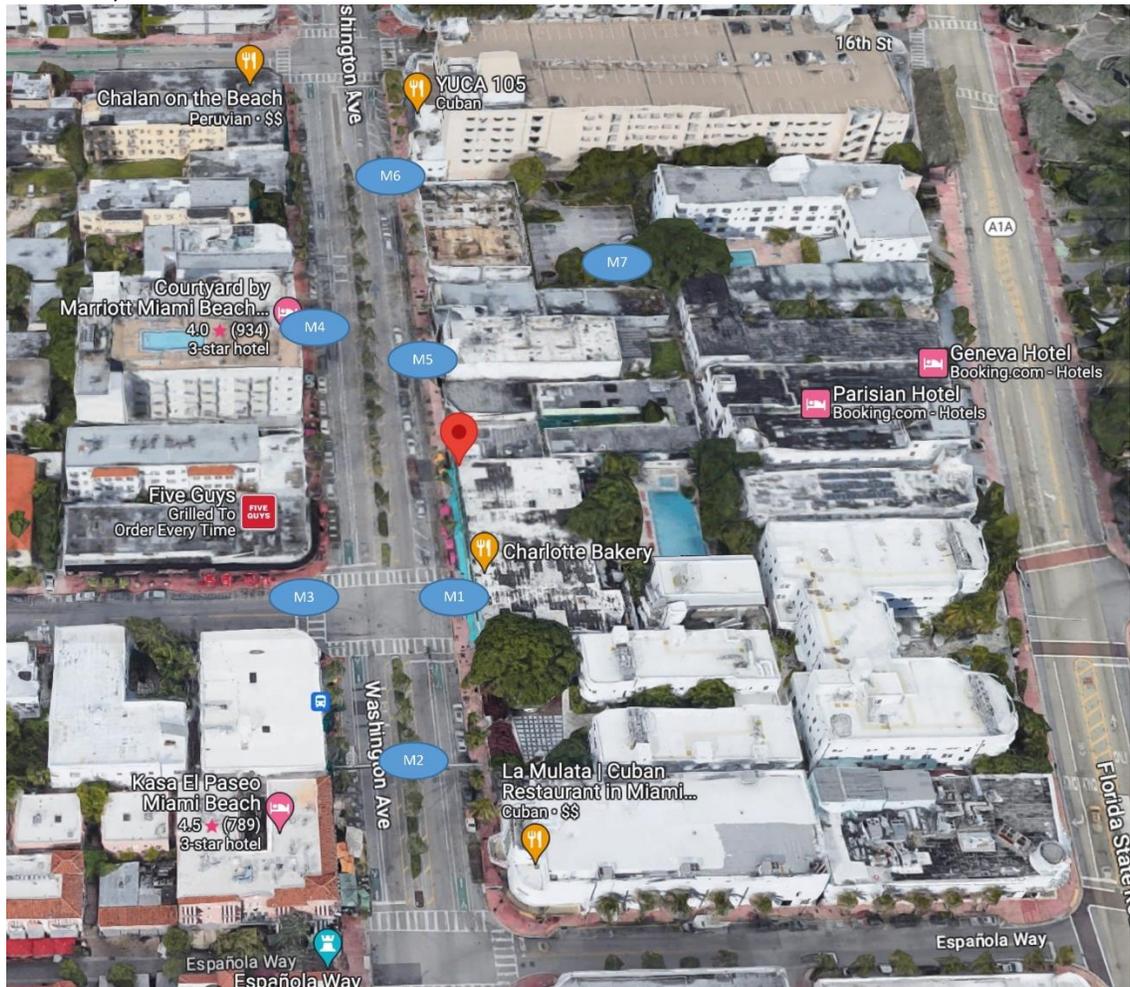


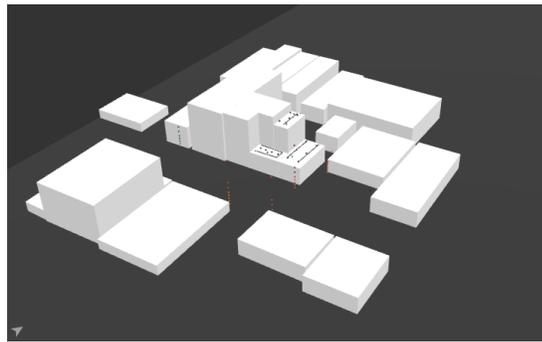
Figure 4 - Map of Ambient Noise Measurement Locations

Table iv – Measurement results for environmental noise testing		
Measurement	Location	Measured Sound Level [dBA, LAF90]
M1	East intersection of Washington and 15th	59
M2	Washington Ave between Espanola and 15th	59
M3	West intersection of Washington and 15th	63
M4	1530 Washington Ave.	59
M5	1527 Washington Ave.	58
M6	1555 Washinton Ave.	59
M7	Parking lot behind 1543 Washington Ave.	54

**Ambient Noise Measurement Notes:**

- a. Measurements were captured between 9:30 PM and 11:30 PM on August 31, 2023 by David Molho of WSDG.
- b. Normal activities such as light traffic and music from nearby establishments occurred during the measurements.
- c. Measurement 7 is the quietest of the group; 54 dBA. CA was not able to access the pool adjacent to 1515 Washington, so the parking lot environmental noise value is assumed to be representative of the pool.

**3. Environmental Noise Impact Model Results**



*Figure 5 - dBMap 3D View*



*Figure 6 - Close up View of sound sources used in dBMap. This is the same view as in Figures 7 and 8 but zoomed in to show detail.*

Speaker sources are indicated with a cross, human speaking sources are indicated with a line (2 people speaking per meter). The sound levels are discussed in Methodology (page 4).

Assumed people: Roof=48; Pool=72; Restaurant=60.

a. Modeled Noise Map Results at Ground Level 1.5m

Receiver results are in dBA. This map is representative of sound heard when standing on the ground.

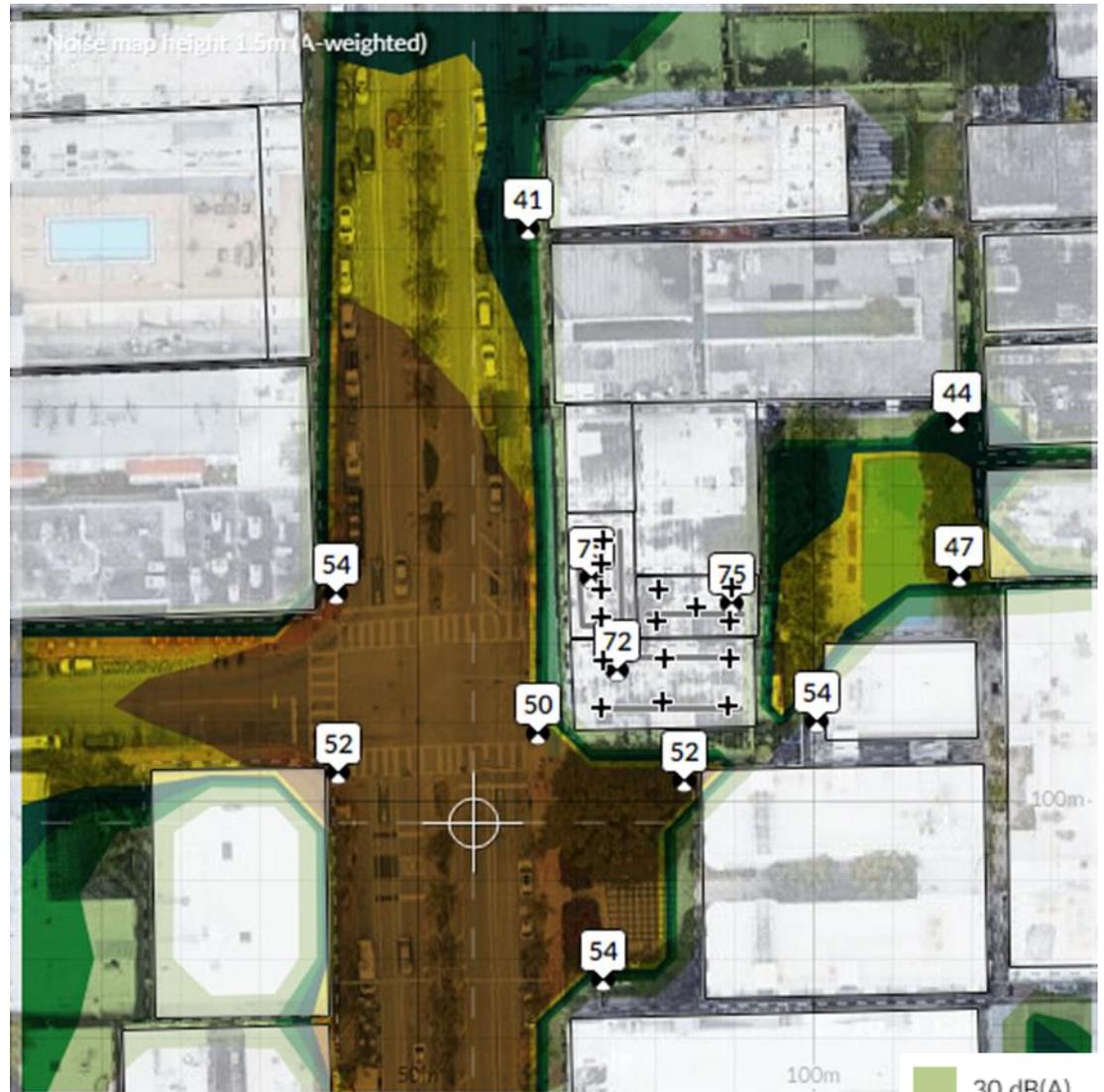
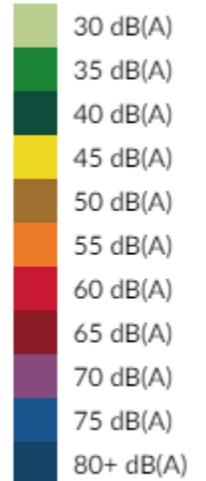


Figure 7 - dBMap Results (Receiver values shown in dBA)



b. Modeled Noise Map Results at 6m

Receiver results are in dBA. This noise map is representative of sound outside a second level window. This is the top level of the closest buildings.

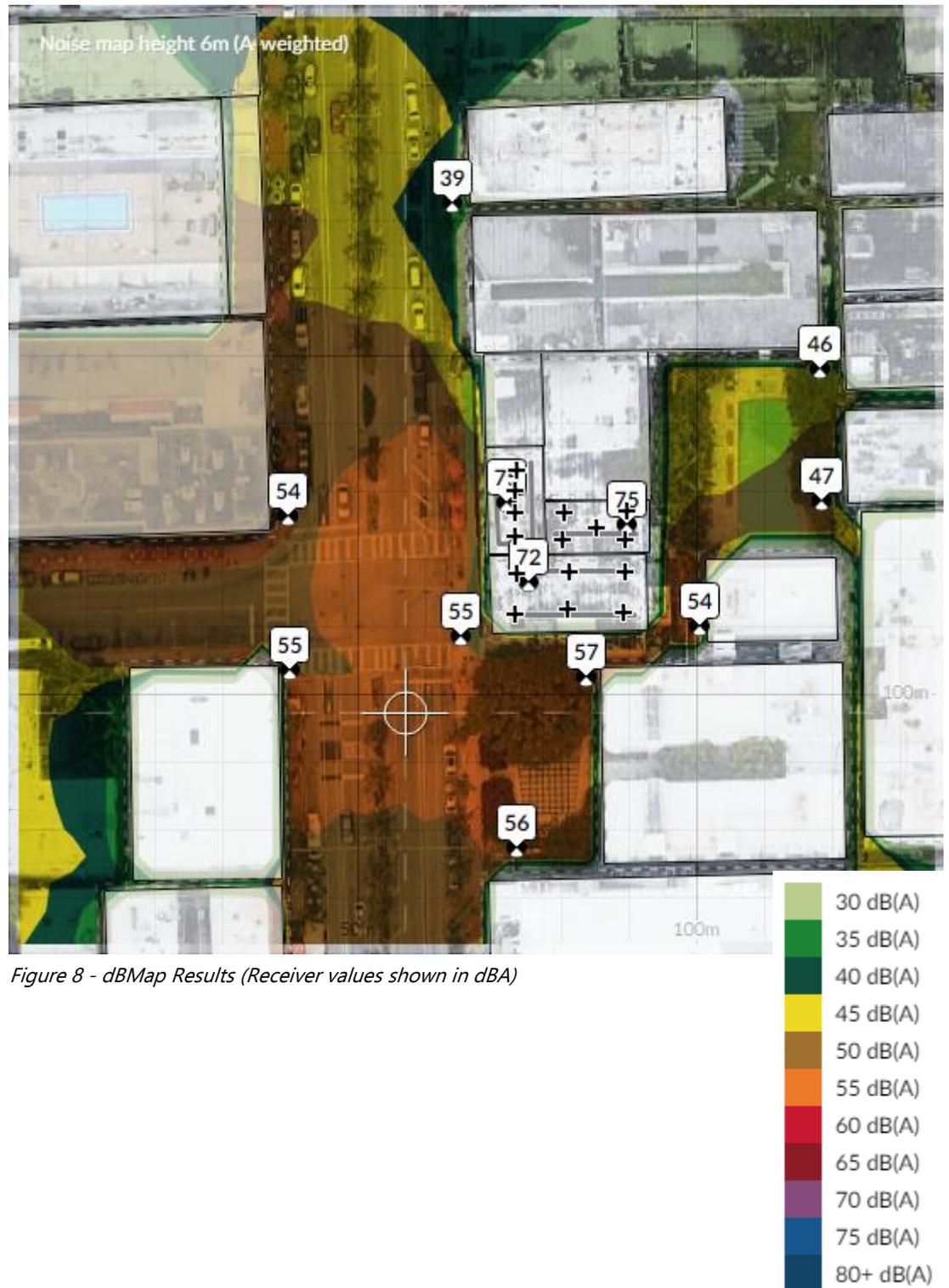


Figure 8 - dBMap Results (Receiver values shown in dBA)

## 5) Noise Code

The applicable section of the Miami Beach noise code is excerpted below in italics.

***Sec. 46-152. - Noises; unnecessary and excessive prohibited.***

*It shall be unlawful for any person to make, continue or cause to be made or continued any unreasonably loud, excessive, unnecessary or unusual noise. The following acts, among others, are declared to be unreasonably loud, excessive, unnecessary or unusual noises in violation of this section, but this enumeration shall not be deemed to be exclusive, namely:*

- (b) *Radios, televisions, phonographs, etc. The using, operating, or permitting to be played, used or operated any radio receiving set, television set, musical instrument, phonograph, or other machine or device for the producing or reproducing of sound in such manner as to disturb the peace, quiet and comfort of the neighboring inhabitants, or at any time with louder volume than is necessary for convenient hearing for the person or persons who are in the room, vehicle or chamber in which such machine or device is operated and who are voluntary listeners thereto. The operation of any such set, instrument, phonograph, machine or device between the hours of 11:00 p.m. and 7:00 a.m. in such manner as to be plainly audible at a distance of 100 feet from the building, structure or vehicle in which it is located shall be prima facie evidence of a violation of this section.*

Please call to further discuss.

Sincerely,



David Kotch.

## **APPENDIX OF ACOUSTIC TERMS AND DEFINITIONS**

### Ambient:

Ambient noise includes all sounds present in an environment. The ambient noise level may be measured at any moment, but it will vary widely with time, e.g., with the coming and going of trucks, cars, aircraft, sirens, etc.

### Decibel (dB):

A unit of the intensity of sound. The decibel (abbreviated dB) is a relational measure, expressing the relative intensity of the described sound to a reference sound. The decibel is a logarithmic measure, specifically 10 times the logarithm of the ratio of two voltages, currents, or sound pressures. Decibels are a logarithmic scale, so every 3dB increase is a doubling of sound pressure and subjectively it requires 10dB for a perceived doubling of loudness. See Figure A for a chart illustrating comparative dB & SPL values.

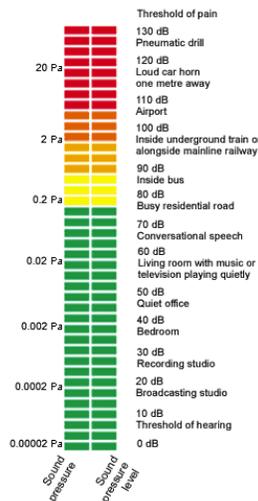


Figure A – Chart illustrating comparative dB & SPL values.

### A-Weighting:

The A-contour filters out a significant amount of the bass in order to approximate the way humans hear at the 40 phon level. It is useful for eliminating inaudible low frequencies and is commonly used at SPLs below 70 dB. Sound pressure level values obtained using this weighting are referred to as A-weighted sound pressure levels and are signified by the identifier dBA. See Figure B for a visual comparison of weighting curves.

### C-Weighting:

The C-contour is nearly flat, with only a slight reduction at the high and low frequencies. It approximates the way humans hear at very high sound levels and is commonly used for SPLs above 70 dB. Sound pressure level values obtained using this weighting are referred to as C-weighted sound pressure levels and are signified by the identifier dBC. See Figure B for a visual comparison of weighting curves.

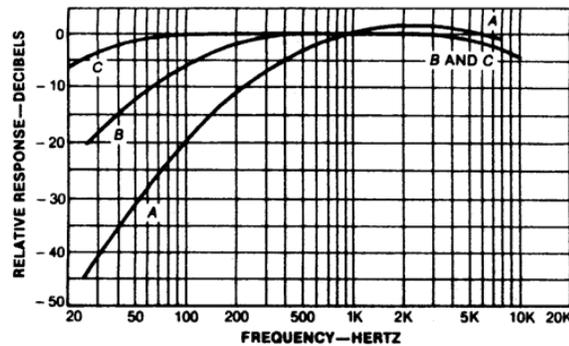


Figure B – A visual comparison of weighting curves.

L<sub>EQ</sub>:

Equivalent continuous sound level. The steady level which would produce the same sound energy over the test period as the specified time-varying sound. This figure is useful for studying long-term trends in environmental noise.

L<sub>MAX</sub>:

Highest, or loudest, Sound Pressure Level (in dBA, dBC, or dBZ) measured during the test period.

L<sub>MIN</sub>:

Lowest, or quietest, Sound Pressure Level (in dBA, dBC, or dBZ) measured during the test period.

L<sub>n</sub>:

L<sub>n</sub> values are statistical noise levels (sometimes called percentiles) used to assess noise levels (sound pressure levels) from fluctuating noise sources over time. Any statistical value between 0.01% and 99.99% may be calculated where 'n' is the percent exceeded noise level over a timed measurement period (T).

L<sub>5.0</sub>:

L<sub>5.0</sub> is the level exceeded for 5% of the time. For 5% of the time, the sound or noise has a sound pressure level above L<sub>5.0</sub>. For the rest of the time, the sound or noise has a sound pressure level at or below L<sub>5.0</sub>. These higher sound pressure levels are due to sporadic or intermittent events. L<sub>5.0</sub> is often used when assessing environmental noise and in planning applications.

L<sub>95</sub>:

L<sub>95</sub> is the level exceeded 95% of the time. For 95% of the time, the noise level is above this level. It is generally considered to be representing the background or ambient level of an environment. L<sub>95</sub> is often used to quantify the background noise levels in assessments of noise pollution and nuisance noise from industrial sources.

Perception of Sound:

The threshold of perception of the human ear is approximately three decibels and a five-decibel change is considered to be clearly noticeable to the ear. This is

primarily due to the logarithmic measuring metric typically associated with decibels. See Chart 1 for perceived change in decibel levels.

<b>Perceived Change in Decibel Levels</b>	
<b>Change in sound level</b>	<b>Perceived change to the human ear</b>
± 1dB	Not perceptible
± 3dB	Threshold of perception
± 5dB	Clearly noticeable
±10dB	Twice (or half) as Loud
± 20dB	Fourfold (4x) change

*Chart 1 - Perceived change in decibel levels.*

Subtracting Sound Levels:

Sometimes it is necessary to subtract the background noise from the total SPL. The correction for background noise can be done by subtracting background noise from the total noise level using logarithmic subtraction.

If change is less than 3 dB(A), the background noise is too high for an accurate measurement and the correct noise level cannot be found until the background noise has been reduced. If the difference is more than 10 dB(A), the background noise can be ignored.