EDWARD DUGGER + ASSOCIATES, P.A.
Consultants in Architectural Acoustics

Acoustic Study – ED+A 181070

February 11, 2019

Project:
Voodoo Lounge
928 Ocean Drive
Miami Beach, Florida 33139

Applicant:
Deco Walk Hotel & Golf Club, LLC
928 Ocean Drive
Miami Beach, Florida 33139

Prepared for:
Thomas R. Mooney – Director
City of Miami Beach Planning Department
1700 Convention Center Drive, Second Floor
Miami Beach, Florida 33139

Prepared by:
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ACOUSTIC STUDY

Date: 11 February 2019

To: Thomas R. Mooney, Director
City of Miami Beach Planning Department
1700 Convention Center Drive, 2nd Floor
Miami Beach, Florida 33139

From: Sam Shroyer, ASA INCE
Edward Dugger, FAIA ASA NCAC INCE

Re: **Acoustic Study – City of Miami Beach**
Voodoo Lounge
928 Ocean Drive
Miami Beach, Florida 33139
ED+A 181070

Mr. Mooney,

Edward Dugger + Associates, P.A. (ED+A) has prepared this acoustic study in conjunction with Deco Walk & Hotel Golf Club, LLC's application for a Conditional Use Permit for a Neighborhood Impact Establishment and an Open Air Entertainment Establishment at Voodoo Restaurant & Lounge located at 928 Ocean Drive. The Open Air Entertainment Establishment will be limited to the interior space of the venue's first-floor, with only the east facing doors open. There will be no entertainment, including live entertainment, in any exterior uncovered areas.

Discussed are the results of long-term sound level measurements of the establishment's current operations and the proposed operations. Based on these measurements and subsequent analysis, it is our opinion that the existing sound conditions in the immediate area outside of the property will not increase significantly with the introduction of entertainment on the first floor of the establishment. Properties to the north and south of the establishment should not be negatively impacted as only the east facing doors are to be open, but ED+A has included recommended actions to ensure that this is the case.

Please contact ED+A with any questions or comments pertaining to this study.

Summary

ED+A has assessed the potential effect on the existing acoustic environment in the immediate area of the Voodoo Restaurant & Lounge located at 928 Ocean Drive ("Voodoo Lounge"), which would result from allowing Open Air Entertainment on the first floor of the property through acoustical measurements and analyses of the resulting data. Sound levels resulting from entertainment on the first-floor of the venue were assessed and compared with the measured ambient sound levels to determine its impact on the sound environment. It is ED+A's opinion that operating in this manner would not result in significantly different conditions in the area outside of Voodoo Lounge and at surrounding properties than those which currently exist. Open Air Entertainment at this property would be consistent with the area and surrounding uses.

Project Information

Deco Walk Hotel & Golf Club, LLC (the "Applicant") is seeking a Conditional Use Permit for a Neighborhood Impact Establishment and an Open Air Entertainment Establishment at 928 Ocean Drive (the "Application"). The property consists of Ocean Blue Hostel, a sidewalk gelato stand, a retail space and Voodoo Lounge—a restaurant and bar located on the first-floor and rooftop of the building. Only Voodoo Lounge is the subject of the Application and only the first floor of the venue is proposed for Open Air Entertainment. There will be no entertainment, including live entertainment, in any exterior uncovered areas.

Location

928 Ocean Drive and all properties in the immediate area are within the Mixed Use Entertainment District and are not zoned Residential. The property and both adjacent properties operate as hotels and/or transient residential housing (Ocean Drive Beach Flats at 918 Ocean Drive and Hotel Breakwater South Beach at 940 Ocean Drive). The three properties are similar in use as they all also include first-floor restaurants and bars (Fat Tuesday at 918 Ocean Drive and Havana 1957 and Ocean's Ten at 940 Ocean Drive) which feature live entertainment and/or music. Nightly entertainment is also featured further south at Mango's Tropical Café at 900 Ocean Drive.

Operations

Voodoo Lounge currently opens at 11:00 a.m. and operates until 4:00 a.m. or 5:00 a.m. with background music provided indoors and on the rooftop during all operating hours. The Applicant is requesting to be able to operate with the venue's front doors open with the interior music on the first floor of the venue at entertainment levels.

Methodology

Long-term acoustical measurements were performed near the southeastern boundary of the property from Monday, January 14, 2019 until Friday, January 19, 2019. The microphone was oriented vertically roughly 5 to 6 ft above the ground and was positioned at a distance from the building façades sufficient to ensure that the measured sound levels were not significantly affected by reflected sound at most frequencies. However, it is likely that sound levels measured at low-frequencies were increased due to acoustical reflections at the measurement location. The system measured sound levels continuously without interruption and was calibrated immediately before and after the measurement. The equipment used for measurements and calibration is listed in Table 1.

Acoustical Quantities

The measurement system calculated A-weighted equivalent-continuous sound levels (L_{Aeq}), a time-average metric, in one-second, one-minute, and one-hour intervals. A-weighted percentile-exceeded sound levels (L_{A10}, L_{A50}, L_{A90}) were also measured and evaluated for the same observation periods. A-weighted levels were assessed as the A-weighting network corresponds best with human sensitivity to sound for the majority of community noise assessments.

L_{Aeq} are the time-average values measured within a given observation period and the L_{A10}, L_{A50}, and L_{A90} are the sound levels exceeded for ten-, fifty-, and ninety-percent of an observation period. Thus, L_{A90} is typically indicative of “baseline” or residual sound levels and constant sound levels at a location while L_{A10} demonstrates the influence of more intermittent sounds (e.g. sound generated by passing pedestrians and/or vehicles). Evaluation of L_{A90} and L_{A10} in conjunction with L_{Aeq} provides valuable information as the L_{Aeq} alone does not always result in an accurate portrayal of a sound environment.

Results and Discussion

One-hour L_{Aeq} are included in Table 2 and plotted in Figure 1 to demonstrate temporal patterns over the measurement period. The measured one-minute L_{Aeq}, L_{A10}, and L_{A90} are illustrated in Figures 2, 3, 4, 5 and 6.

Sound Levels Before Operating Hours

Ambient sound levels after entertainment establishments closed (5:00 a.m.) consisted of sound generated by what appears to be mechanical equipment and maintenance activity in the area. ED+A do not believe either of these noise sources to be associated with 928 Ocean Drive. One-minute L_{Aeq} gradually increased between 7:00 a.m. and Voodoo Lounge's opening time at 11:00 a.m.

Sound Levels During Operating Hours

Measured L_{Aeq}, L_{A90}, and L_{A10} remained mostly constant throughout the afternoon hours before increasing around 6:00 p.m. The measured sound levels increased throughout the evenings with increased patron, pedestrian, and traffic activity (i.e. persons visiting Voodoo Lounge, the gelato stand, and/or other venues) along with increased activity at other nearby venues, some of which provide nighttime entertainment that also contributed to the sound levels measured. These sound sources and their prominence were confirmed via review of audio files recorded by the measurement system.

Influence of Intermittent Sound on Time-Average Quantities

The influence of the individual sources which comprised the sound level was further investigated through analysis of the relationship between the measured one-minute L_{Aeq} and the L_{A10} and L_{A90} percentile-exceeded sound levels. L_{A90} is commonly associated with the residual sound level, or the baseline ambient sound level at a given location whereas the L_{A10} is more representative of intermittent sounds, such as those produced by pedestrians and vehicles. As L_{Aeq} is a time-average quantity and is comparable to what the sound level would be were one continuous source to be operating during an observation period, its relationship with the L_{A10} and the L_{A90} can provide insight as to the sources which had the most influence over the L_{Aeq}.

For much of the nighttime periods, the L_{Aeq} are closest in value to the L_{A10}, indicating that these sound levels are more influenced by intermittent sounds than any continuous source affecting the sound environment at the measurement location.

Similar temporal changes are observed in the measured L_{A90}, but the differences between the one-minute L_{Aeq} and L_{A90} are much greater than those between the L_{Aeq} and L_{A10}. Since music mostly consists of continuous sound levels with slight variation,

the L_{A90} would be expected to be more associated with the music at Voodoo Lounge than the other quantities. This is not to say that the measured L_{A90} are fully representative of Voodoo Lounge's music levels but it does support the notion that the measured L_{Aeq} are not fully representative of and are likely greater than the sound levels generated by Voodoo Lounge at the measurement location.

Thus, ED+A believe the measured L_{A90} to be a more appropriate quantity for the evaluation of the ambient sound levels and those produced by Voodoo Lounge than the measured L_{Aeq}.

Impact of Open Air Entertainment on Ambient Sound Levels

Review of the measured L_{A90} suggests the ambient sound level during nighttime hours to be between 70 dBA and 73 dBA on most nights of the measurement period. These sound levels are just slightly above those observed during afternoon operating hours with background music provided in the venue. With entertainment on the first-floor of Voodoo Lounge with the east doors open, sound levels increased to roughly 77 to 79 dBA, suggesting an increase of 6 to 9 dBA above the ambient sound conditions directly east of the venue. ED+A are of the opinion that these levels are consistent with what would be expected from Open Air Entertainment and do not believe that music at these levels—when observed directly in front of the establishment—would negatively affect the ambient sound conditions at properties to the north or south of Voodoo Lounge. These levels would dissipate as the sound moves further north or south from the venue.

Recommended Mitigation Actions

Analysis of the sound levels measured at 928 Ocean Drive over several days has led ED+A to conclude that allowing Open Air Entertainment on the first floor of this property would not yield any significant change to the existing sound environment in proximity of the venue. However, several actions can be taken to further mitigate the potential for noise impacts. Note that not all of these suggestions are crucial in achieving this but are presented for the Applicant to consider should they believe them to be useful.

Open Doors

The first-floor of the property has doors on its east, south, and west façades, but only the east-facing doors are used by patrons for ingress and egress. Patrons do not have access to the south-facing doors as the path along the south side of the building is gated, but ED+A recommends that staff ensure these doors are closed at all times during entertainment hours to prevent entertainment noise from emanating out of Voodoo Lounge toward the adjacent property to its south.

Audio System Components and Control

The Applicant has already incorporated a “house” audio system and a digital signal processor (DSP) with the intention of providing all music through this system, including music provided by performers and/or DJ’s. The system can be configured to include overall and frequency-specific sound level limits for all areas of the venue and ED+A recommends that the system be set as deemed to be appropriate. Separate limits should be set for the low-frequency output of the system to prevent sound at these frequencies from emanating to neighboring properties. It may also be useful to allow for the overall sound level produced by the system to be set so that staff can adjust levels as necessary, but never beyond the predetermined limit, which is only accessible to management. ED+A can assist in this process at the Applicant’s request.

Loudspeakers

In conjunction with the recommended audio system configuration, the location of loudspeakers in relation to Voodoo Lounge’s entrance and the directional characteristics of the loudspeakers will aid in maintaining appropriate sound levels at the building’s exterior. Therefore, ED+A recommends that loudspeakers (particularly subwoofers) be placed away from the entrance. The loudspeakers should be placed to direct sound inward and not toward the entrance. Though they are not used for patron ingress or egress, any doors on the north and south building façades should remain closed so as not to allow sound to propagate out of Voodoo Lounge and toward adjacent properties.

Additional Actions

Though not necessary to operate as intended, a real-time sound level monitoring system could be beneficial for management to be able to monitor the sound levels within and outside of Voodoo Lounge. This is also not necessary to maintain compliance but may prove useful. At the Applicant’s request, ED+A will assist in the selection, installation, and configuration of these systems. It is ED+A’s understanding that the existing DSP can perform similar functions and will assist in the setup and configuration of those components if requested to do so.

Figures and Tables

Table 1. ED+A Measurement Equipment			
Manufacturer	**Model**	**Serial No.**	**Laboratory Calibration Date**
Brüel and Kjær	Type 2250-L Analyzer	3008039	5/18/2018
Brüel and Kjær	Type 4952 Outdoor Microphone	3017882	5/10/2018
Brüel and Kjær	Type 4231 Sound Calibrator	2394124	8/2/2018

Table 2. One-Hour L_{Aeq}					
Date	Monday, 14-Jan-19	Tuesday, 15-Jan-19	Wednesday, 16-Jan-19	Thursday, 17-Jan-19	Friday, 18-Jan-19
L_{0000}		78	81	83	83
L_{0100}		79	80	82	81
L_{0200}		77	78	81	78
L_{0300}		76	77	78	78
L_{0400}		67	64	72	76
L_{0500}		61	63	63	64
L_{0600}		64	66	64	62
L_{0700}		78	72	76	72
L_{0800}		67	65	63	63
L_{0900}		64	65	64	64
L_{1000}		68	66	72	70
L_{1100}		68	68	73	71
L_{1200}		70	71	73	73
L_{1300}		71	72	75	
L_{1400}		71	73	75	
L_{1500}		71	73	73	
L_{1600}	76	74	74	74	
L_{1700}	75	73	76	75	
L_{1800}	76	73	72	78	
L_{1900}	75	72	73	77	
L_{2000}	83	75	76	82	
L_{2100}	78	77	79	82	
L_{2200}	80	77	82	82	
L_{2300}	80	77	83	82	

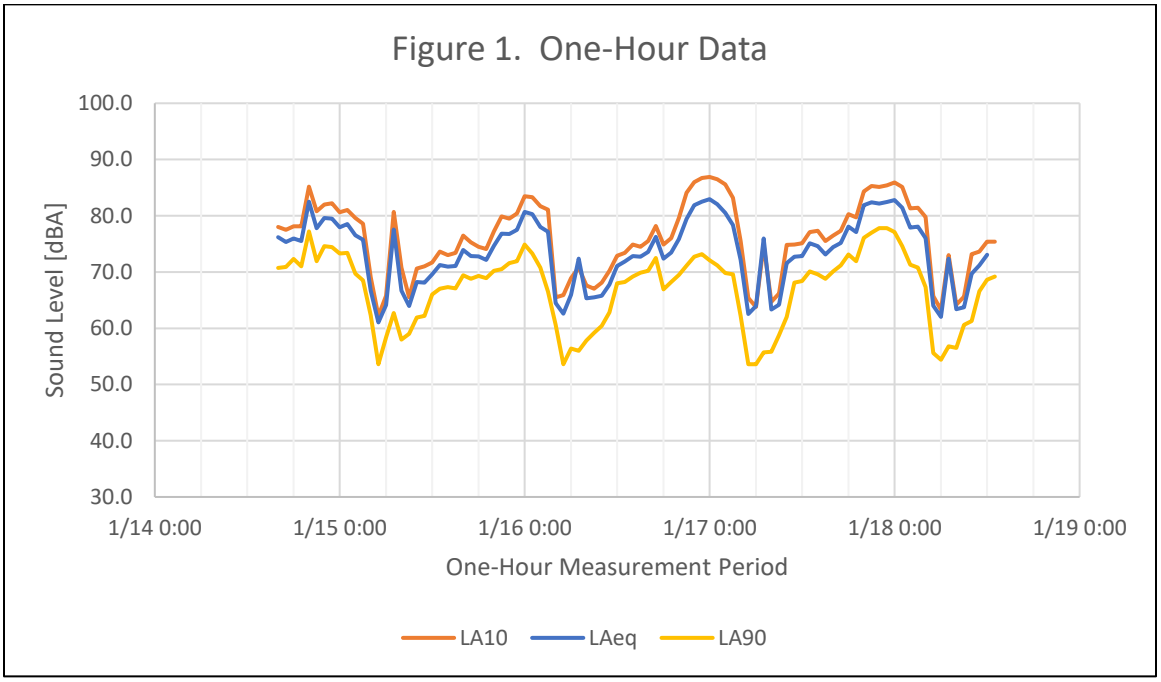
Figure 1. One-Hour Data
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
Sound Level [dBA]
1/14 0:00
1/15 0:00
1/16 0:00
1/17 0:00
1/18 0:00
1/19 0:00
One-Hour Measurement Period
LA10
LAeq
LA90

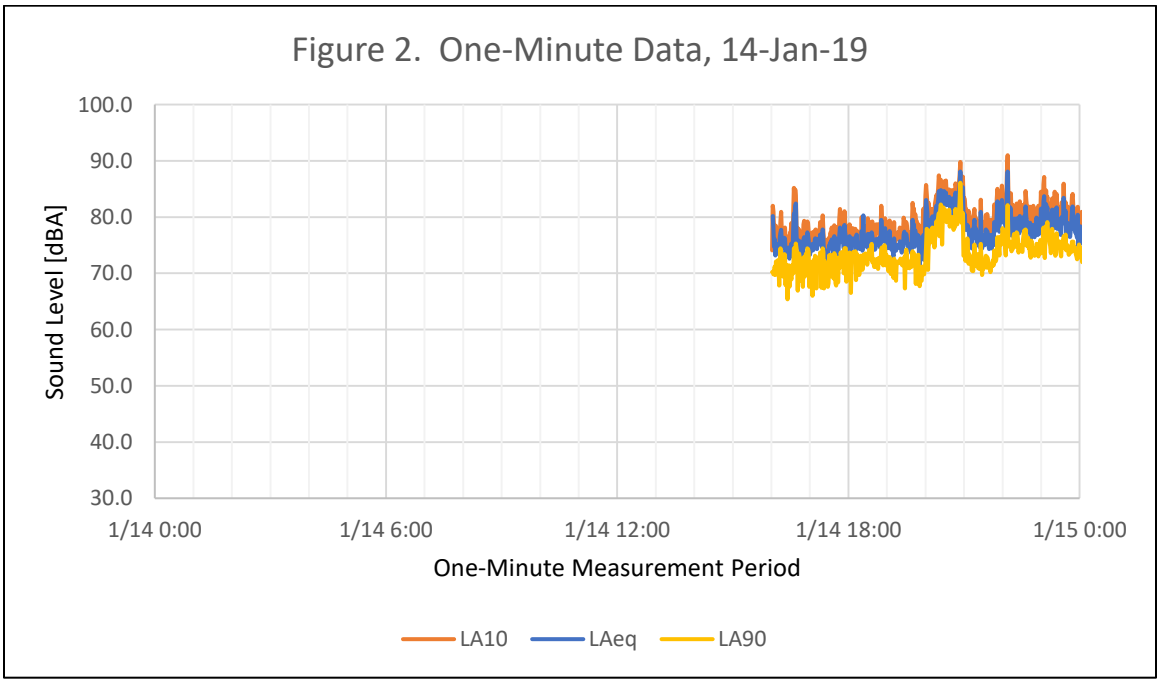
Figure 2. One-Minute Data, 14-Jan-19
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
Sound Level [dBA]
1/14 0:00
1/14 6:00
1/14 12:00
1/14 18:00
1/15 0:00
One-Minute Measurement Period
LA10
LAeq
LA90

Figure 3. One-Minute Data, 15-Jan-19

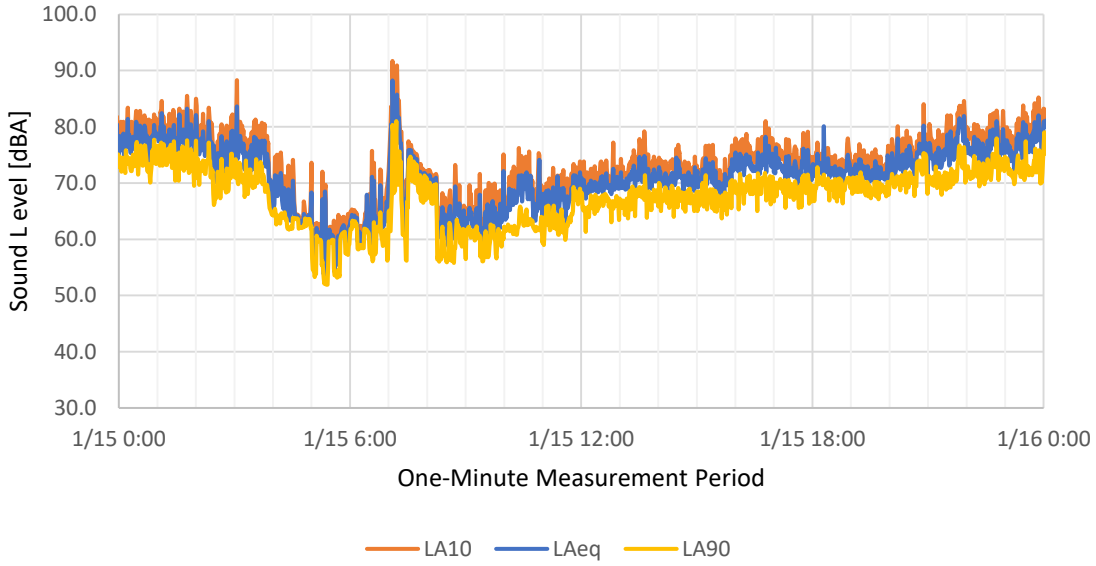

Figure 4. One-Minute Data, 16-Jan-19

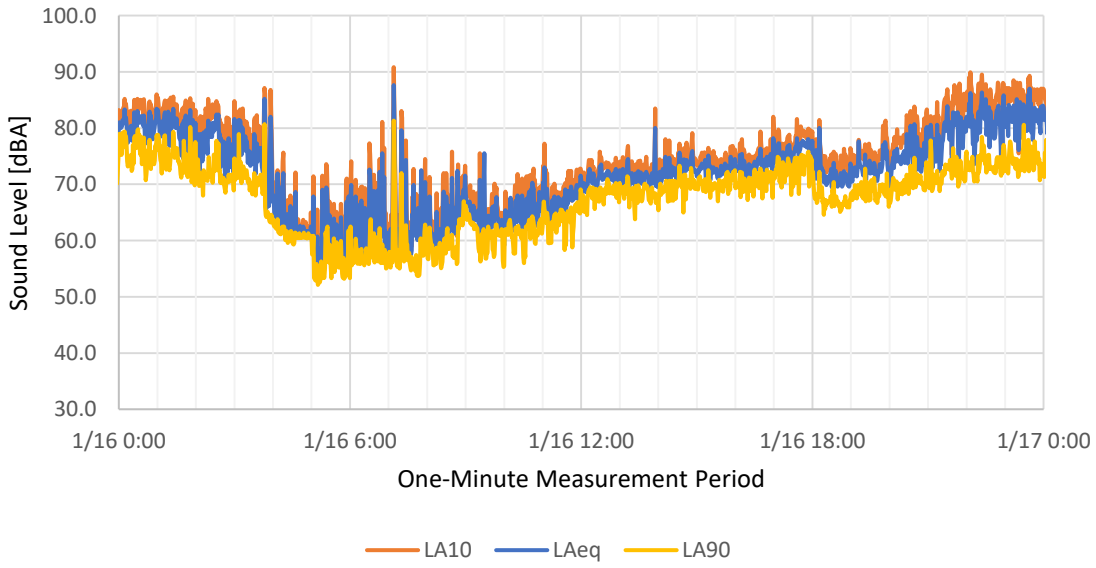

Figure 5. One-Minute Data, 17-Jan-19

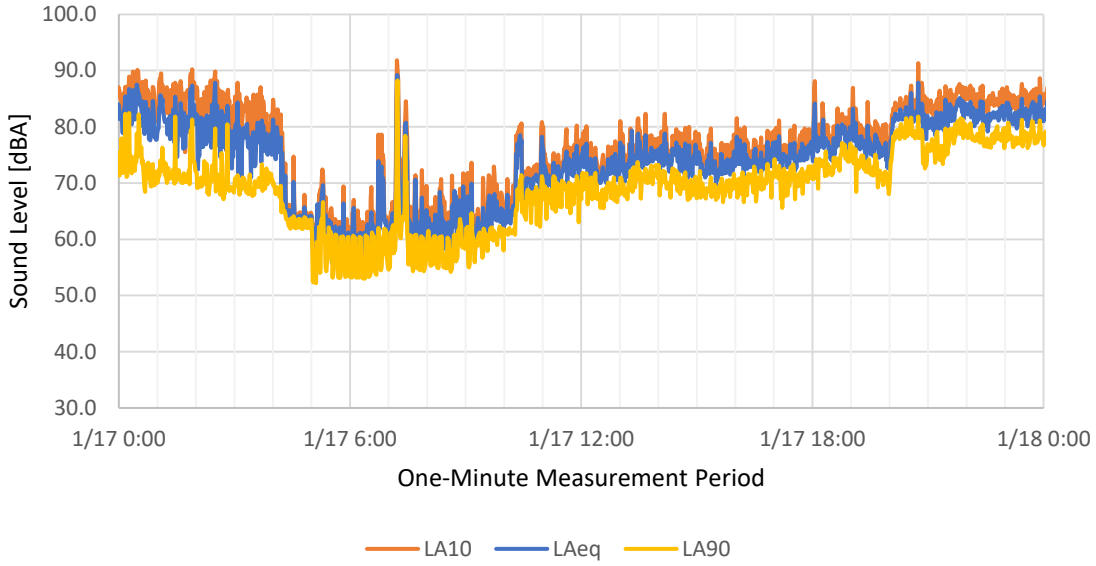

Figure 6. One-Minute Data, 18-Jan-19