THE AUDIO BUG, INC.
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June 20, 2016

Thomas R. Mooney, Director
City of Miami Beach Planning Department
1700 Convention Center Drive, 2nd Floor
Miami Beach, Florida 33139
Phone: (305) 673-7550, Fax: (786) 394-4799

Reference: Conditional Use Permit Application
Moxy Hotel South Beach
915 - 955 Washington Avenue
Miami Beach, Florida 33139

Dear Mr. Mooney,

This report provides an assessment of potential noise and sound impact at the above referenced property in conjunction with the Applicant's request for a conditional use permit for a Neighborhood Impact Establishment. This study is based on two site visits during which we were able to inspect the neighborhood, take photographs and gather acoustical measurement data for analysis.

Satellite images, architectural drawings, photographs and acoustical measurements in graphic format are provided to support our findings and recommendations. I welcome any comments or questions you and your staff may have pertaining to our sound study and look forward to assisting in any way possible.

Respectfully submitted,

Donald J. Washburn

Donald J. Washburn
President

915 - 955 Washington Avenue

Property Analysis

The subject property consists of a set of structures constructed between 1936 and 1942, occupying the entire block, with the exception of the northernmost and southernmost sites, along the East side of Washington Avenue between 9th and 10th Streets. These structures will serve as the footprint for the new Hotel property which will encompass the entire block.

The Applicant is seeking a Conditional Use Permit four venues, including a ground floor outdoor Café, a 2nd level bar, a 2nd level outdoor pool deck and a 7th level rooftop pool. A mixture of DJ / live entertainment level music is planned for some of the venues while the 7th level rooftop pool deck will present ambient background music only. Floor plans with hours of operation are provided below showing details for all venues. A Food and Beverage Operations Plan is included as well.

The surrounding neighborhood is in great part commercial in nature. Records obtained from the Miami-Dade Property Appraiser's web site have been utilized to assist in our analysis of potential noise impact on nearby residential properties. The properties most potentially affected are two hotels located on the west side of Washington Avenue.

Acoustical Data Analysis

Outdoor entertainment-level music represents a significant acoustical challenge. Unless the sound system is well-controlled, music will likely be heard at some distance from the source. A carefully designed and adjusted sound system will be critical to a successful outcome. Sound system performance specifications are provided for the various venues to ensure that music reproduced at the venues will have no adverse impact on neighboring properties.

The Washington Avenue corridor exhibits moderately high noise levels, even during the late hours of the evening and early morning. This condition can have a positive masking effect on music emanating from the rooftop pool deck and restaurant. We conducted a site survey on Saturday, June 19, 2016, beginning just after 1:00 a.m. Sound level measurements were taken along Washington Avenue between 9th and 10th Streets to quantify ambient noise levels. These measurements confirm that the most significant acoustical impact on the area is that of traffic noise.

The results of an Equivalent Sound Level measurement are presented below, including both A-weighted and C-weighted data. This provides an excellent sense of the existing soundscape as observed from the west side of Washington Avenue. The data represents a 62-minute period measured on the west side of Washington Avenue outside the Bank of America branch beginning at 1:04 a.m. The following levels were measured: LA_{eq} 56.2 and LC_{eq} 73.2 with peak levels (L_{max}) of 83.5 dBA and 90.7 dBC. The ambient noise level (LA_{90}) registered 50.1 dBA.

The second measurement was recorded over a 6-minute period starting at 5:00 p.m on June 4, 2016. It represents sound levels observed while walking south along the west side of Washington Avenue between 14th and 10th Streets. The graph clearly illustrates the ebb and flow of traffic. LA_{eq} registered 68.8 dBA with a peak level (LA_{max}) of 93.2 dBA The higher levels represent louder sounds typical of buses and motorcycles which regularly traverse this busy roadway.

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Summary

Sound generated by the outdoor venues' music systems must be tightly controlled to prevent excessive spill into the environment. Utilization of the attached sound system design specification will ensure that levels can be maintained consistent with the concept of "entertainment level music." Maximum sound levels of 82 dBC will result in sound levels on the west side of Washington Avenue at or close to local long-term ambient noises levels (L_{90}) of 50.1 dBA. Traffic noise will introduce substantial masking of any music heard at this distance.

With a properly designed and calibrated sound system, the introduction of the outdoor venues into this neighborhood should have little negative noise impact on neighboring residential properties. The size and scale of the hotel should not significantly increase activity in the area. Restricted hours of operation of the sound system and the constant background noise of traffic will contribute to mitigating any impact that might be envisioned.

In my professional opinion, the proposed rooftop pool deck venue will have little adverse impact on neighboring residential properties nor will it present any violations of the City of Miami Beach's Noise Ordinance.

Respectfully submitted,

Donald J. Washburn

Donald J. Washburn
President

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Moxy Hotel, Miami Beach, Florida
Site Photographs

Audio Engineering Society   Syn-Aud-Con Real-World Audio Education   NSCA BUILDING CONNECTIONS   Acoustical Society of America

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Moxy Hotel, Miami Beach, Florida
Site Photographs

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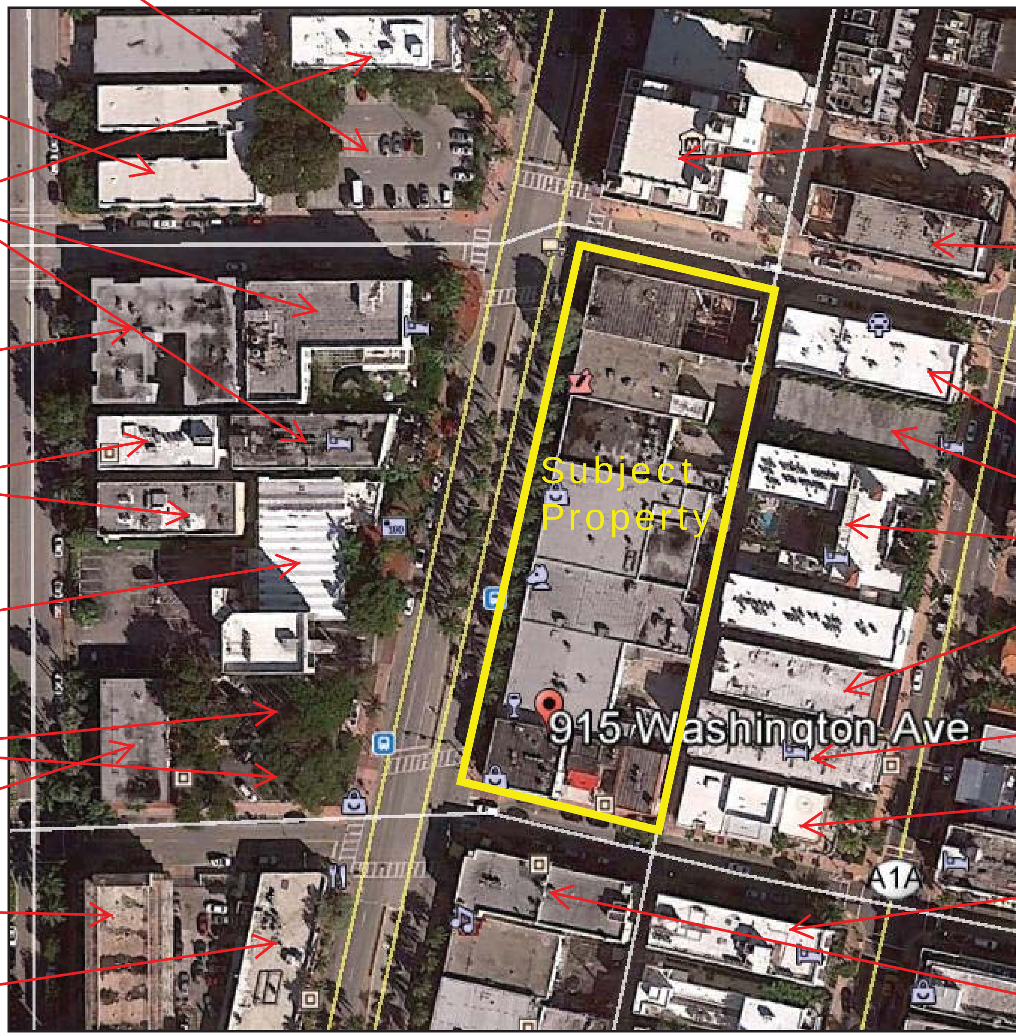
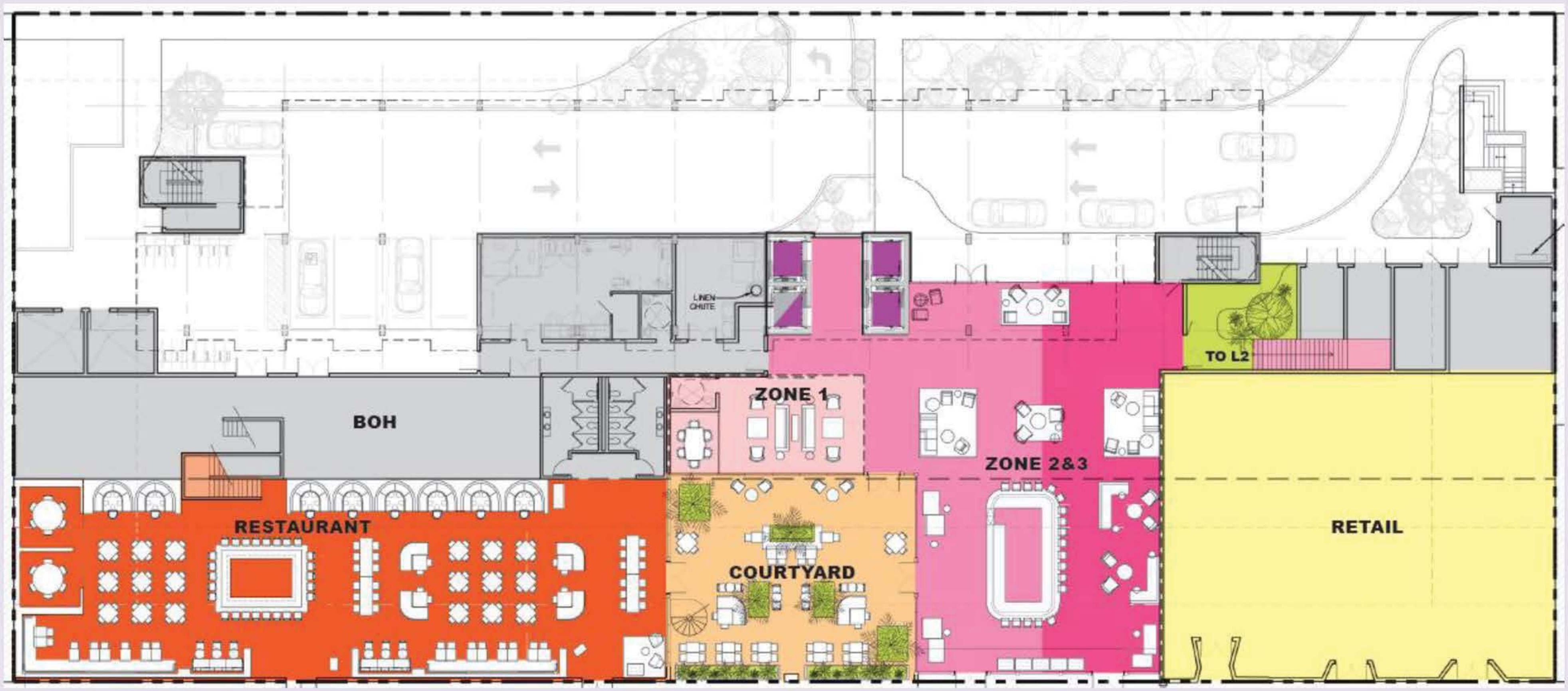
Moxy Hotel, Miami Beach, Florida

Property Identifications



Audio Engineering Society Syn-Aud-Con NSCA Acoustical Society of America

GROUND FLOOR



INDOOR RESTAURANT & OUTDOOR CAFE

OPERATOR : TBD
EMPLOYEES : 35

CONCEPT: TBD
SEATS: RESTAURANT: 234
COURTYARD DINING: 46

HOURS OF OPERATION (RESTAURANT): 7 AM - 5 AM
HOURS OF OPERATION (COURTYARD): 7 AM - 2 AM

HOURS OF ENTERTAINMENT: INDOOR (DJ/LIVE) DURING OPERATING HOURS & OUTDOOR (DJ/LIVE UNTIL 11PM)

THREE MEAL RESTAURANT AND OUTDOOR COURTYARD CAFE SERVING BREAKFAST, LUNCH, DINNER AND LATE NIGHT BITES.
ENTRY THROUGH HOTEL LOBBY OR FROM WASHINGTON AVENUE.
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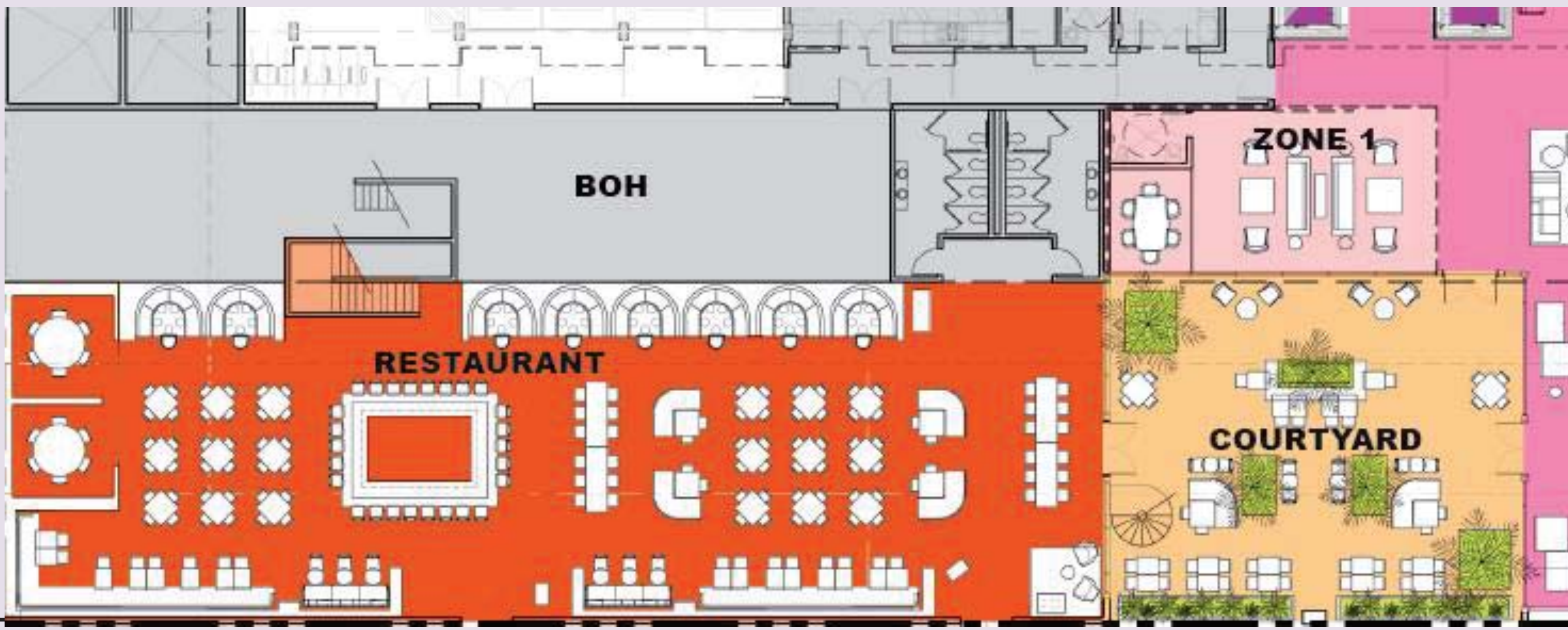


SECOND FLOOR

2ND LEVEL BAR

OPERATOR: TBD

EMPLOYEES: 15

CONCEPT: TBD
SEATS: BAR + TERRACE: 156

HOURS OF OPERATION : 11 AM - 2 AM
HOURS OF ENTERTAINMENT: 11 AM – 11 PM (DJ/LIVE); AMBIENT MUSIC THEREAFTER

DESCRIPTION: THE 2nd FLOOR BAR WILL BE OPEN TO HOTEL GUESTS AND THE PUBLIC, WITH ACCESS FROM THE GROUND FLOOR RESTAURANT AND COURTYARD. EGRESS AND SERVICE ACCESS WILL BE PROVIDED TO THE HOTEL POOL AREA.

POOL DECK

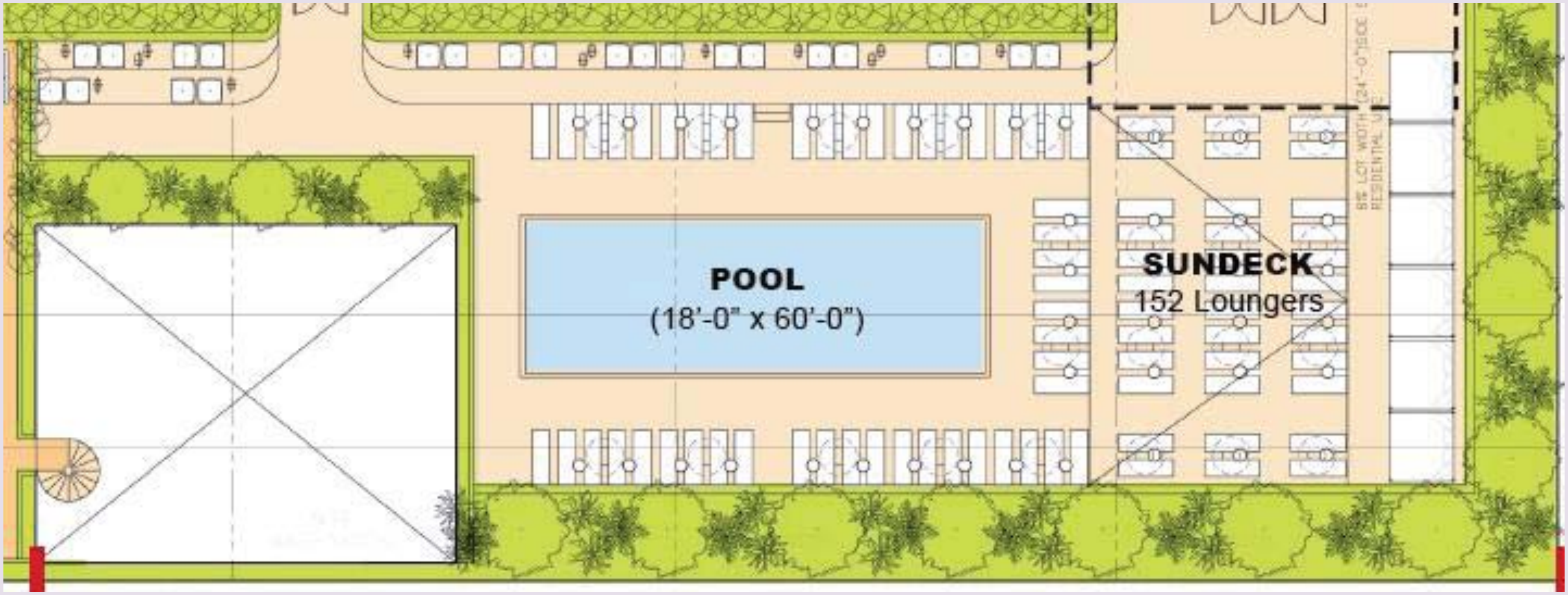
OPERATOR: TBD

EMPLOYEES: 20

CONCEPT: TBD
SEATS: HOTEL POOL DECK: 139

HOURS OF OPERATION: 7 AM – 2 AM
HOURS OF ENTERTAINMENT: 11 AM – 11 PM (DJ/LIVE); AMBIENT MUSIC THEREAFTER

DESCRIPTION: ACTIVE POOL ENVIRONMENT, WITH LIVE ENTERTAINMENT. OPEN TO HOTEL GUESTS ONLY



ROOFTOP

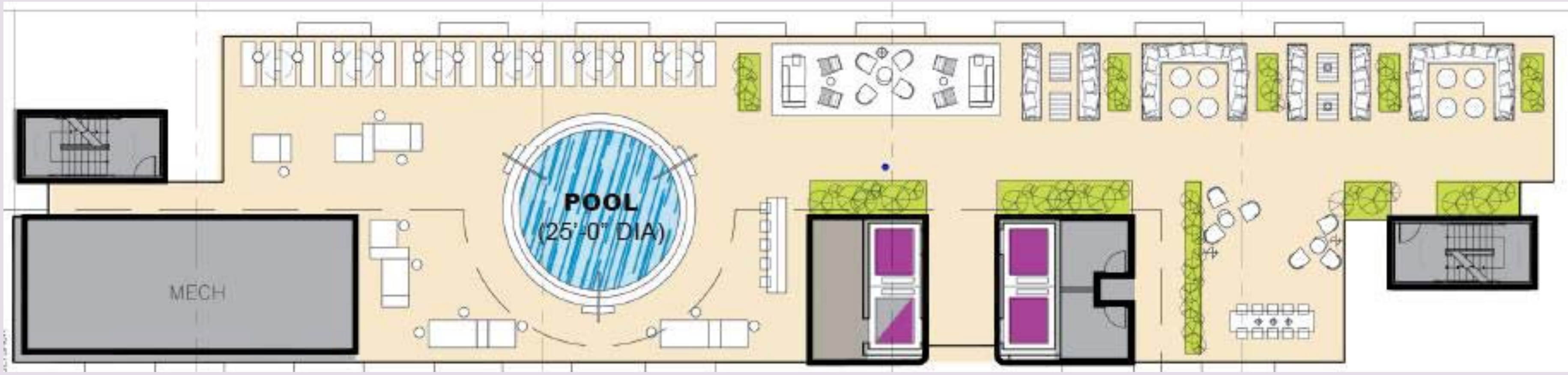
OPERATOR: TBD

EMPLOYEES: 10

CONCEPT: TBD
SEATS: UPPER POOL DECK: 80

HOURS OF OPERATION: 7 AM – 2 AM
AMBIENT MUSIC ONLY

DESCRIPTION: FOR PUBLIC AND HOTEL GUESTS, ACCESSIBLE THROUGH THE HOTEL TOWER ELEVATORS



VENUE	FLOOR	INDOOR/ OUTDOOR	SEAT COUNT	MAX OCCUPANCY	PUBLIC/ HOTEL-ONLY	HOURS OF OPERATION	HOURS OF ENTERTAINMENT	ENTERTAINMENT	DANCE HALL FOOD SERVICE LICENSE
Indoor Restaurant	Ground	Indoor	234		Public	7 AM - 5 AM	7 AM - 5 AM	DJ/Live	Yes
Outdoor Café	Ground	Outdoor	46		Public	7 AM - 2 AM	7 AM - 11 PM	DJ/Live	Yes
2nd Level Bar	2nd	Indoor/ Outdoor	156		Public	11 AM - 2 AM	11 AM - 11 PM	DJ/Live	Yes
Pool Deck	2nd	Outdoor	139		Hotel-Only	11 AM - 11 PM	11 AM - 11 PM	DJ/Live	No
Rooftop	7th	Outdoor	119		Public	7 AM - 2 AM	-	Ambient	No

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Outdoor Sound Systems Specifications

915 - 955 Washington Avenue, Miami Beach, Florida

Systems for the outdoor venues shall be designed to fully comply with local noise ordinances, employing several special techniques to accomplish this goal. These techniques include:

A. Deployment of multiple small, closely spaced speakers driven at low individual volumes. The system design is intended to physically distribute sound uniformly within the listening area in such a manner as not to interfere with normal conversational level of the clientele. Maximum long-term system levels will be limited to LeqA 78 dB/LeqC 82 dB (measured at 10 ft.) with user access restricted to the selection of program material and manual reduction only of system levels. No increase above maximum design sound levels shall be possible.

B. Size of outdoor speakers shall be limited to small woofers (not to exceed 8" nominal) incapable of producing appreciable levels of low frequency energy, as lower frequencies (longer wavelengths) can travel greater distances than higher frequencies (shorter wavelengths). The lowest frequencies, which are essential to the reproduction of musical styles such as hip-hop and rap, are to be significantly attenuated by electronic means.

C. A BSS “Soundweb™ London” Digital Signal Processing System (or approved equal), a centralized computer control and digital signal processor, shall form the heart of each system. With this device, the system is equipped with the following functions:

   1. All controls under lock and key, with limited access via password security.
   2. The system will provide for preset maximum level and equalization.
   3. Local control will consist only of source selection and the ability to turn the system down.
   4. A leveling program which will minimize the inevitable disparities between source and selection volumes, further ensuring consistent playback levels.

D. All outdoor speakers shall be oriented in such a way as to minimize sound propagation towards adjacent properties. A combination of ground-mounted and wall-mounted speaker systems shall be permitted as dictated by site conditions. Only the system installers and programmers shall have access to the full complement of controls and adjustments, ensuring compliance with the stated standard. Volume levels will be automated so as not to exceed the specified maximum, predetermined level. Once final adjustments have been made to the system, all controls are to be locked to prevent intentional or inadvertent adjustments.

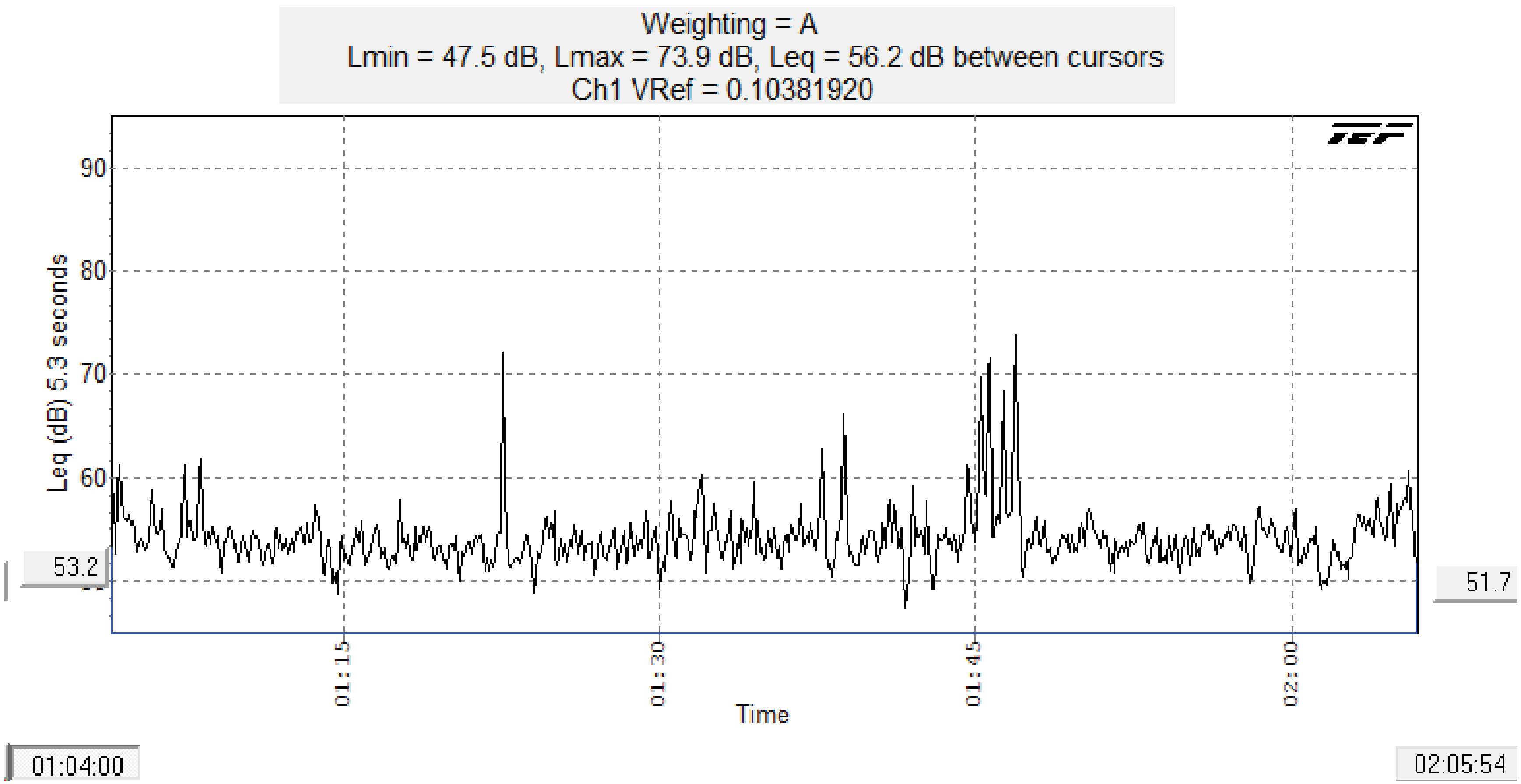
E. Live entertainers and DJs will be prohibited from bringing portable loudspeakers and amplifiers to the venue. They will only be permitted to provide their own music sources (computers, iPads, iPods, CD players, turntable) and mixing console. Connections will be provided a locations to be selected during the sound system design process.

The system, once completely installed, shall be tested and adjusted under the supervision of Don Washburn of the Audio Bug, Inc. to ensure that all aspects of the system’s performance comply with the design intent, City Ordinance and good technical practices.

Moxy Hotel, Miami Beach, Florida

62 minute LAeq on West side of Washington Avenue

Instantaneous:	min = 32.4 dB	max = 83.5 dB	Lmean = 53.6 dB
Percentiles:	L10 = 57.2 dB	L50 = 53.3 dB	L90 = 50.1 dB



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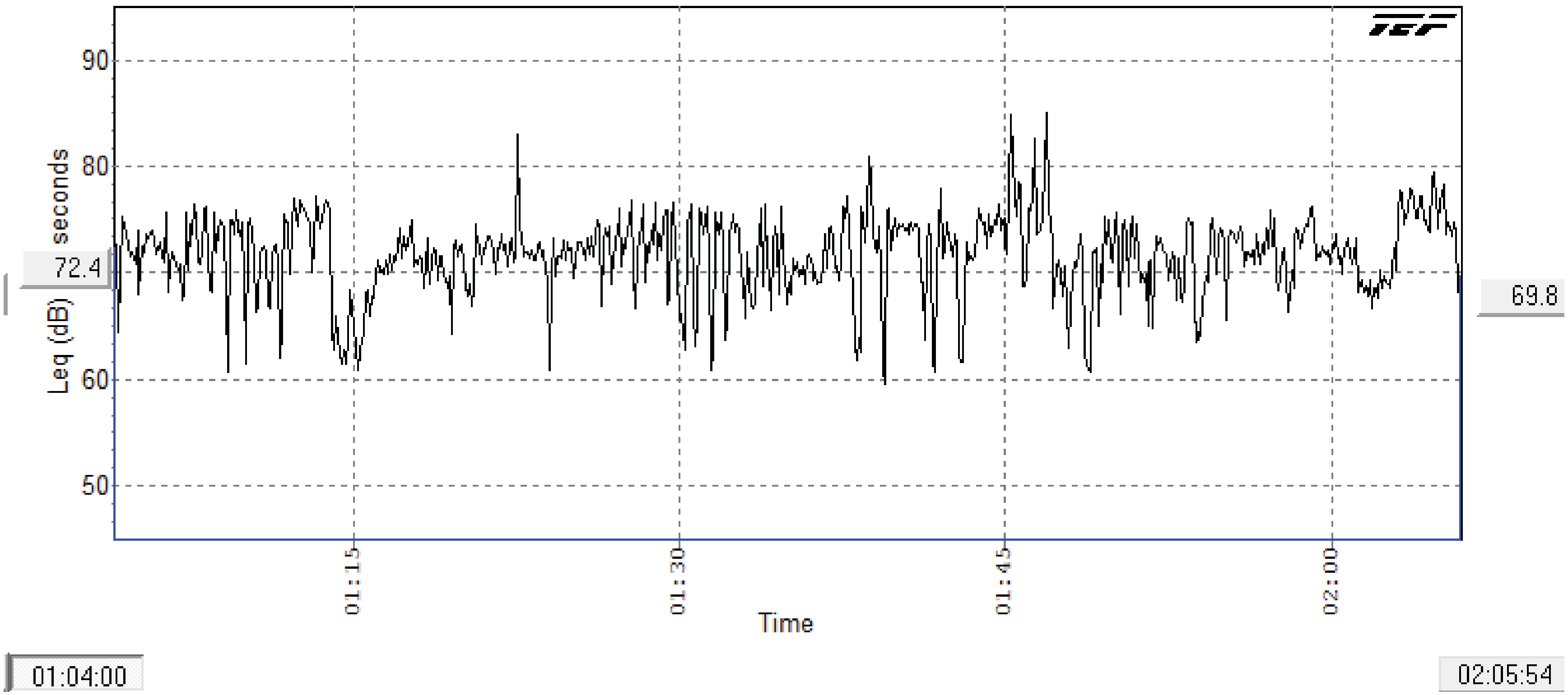
Moxy Hotel, Miami Beach, Florida

62 minute LCeq on West side of Washington Avenue

Instantaneous:	min = 55.6 dB	max = 90.7 dB	Lmean = 69.7 dB
Percentiles:	L10 = 77.0 dB	L50 = 70.0 dB	L90 = 62.0 dB

Weighting = C
Lmin = 59.6 dB, Lmax = 85.0 dB, Leq = 73.2 dB between cursors
Ch1 VRef = 0.10381920



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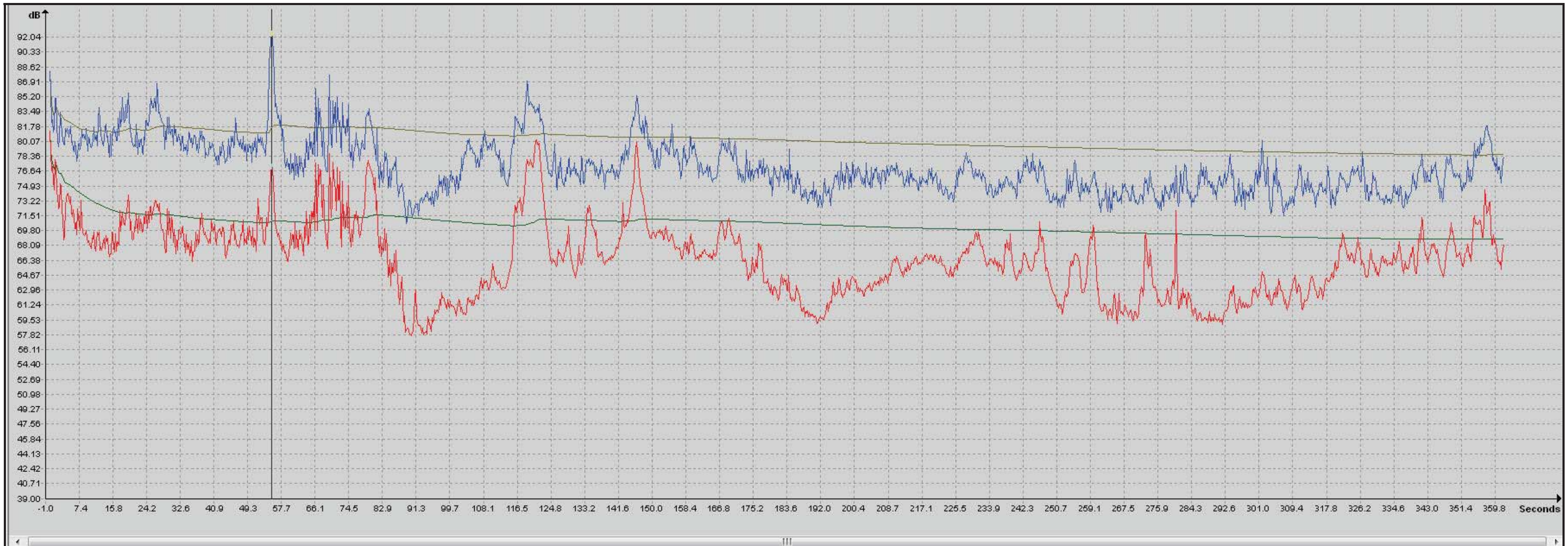
Moxy Hotel, Miami Beach, Florida

6 minute Leq walking along West side of Washington Avenue
June 4, 2016 - 5:00 p.m.



Color	Data Type	Cursor Value	Avg Selection Value	Cumulative Value
Select	A fast	77.76		
Select	A leq	70.85		68.83
Select	C fast	92.90		
Select	C leq	81.54		78.51

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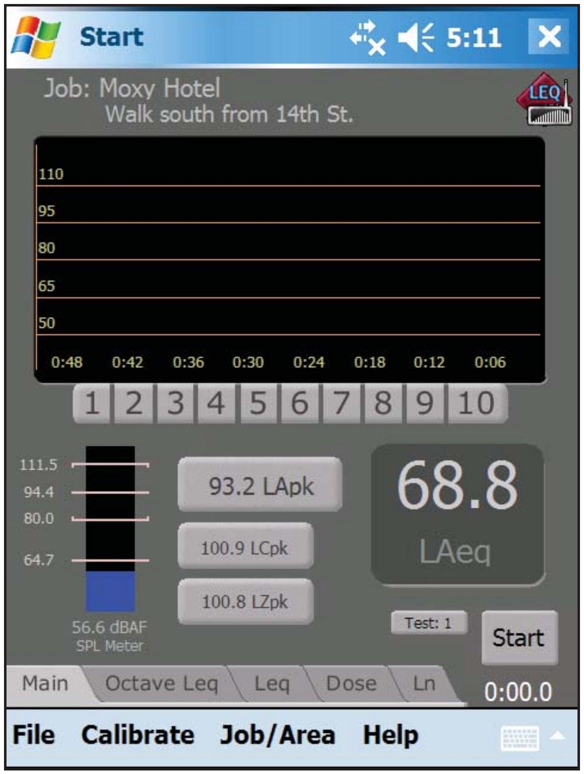
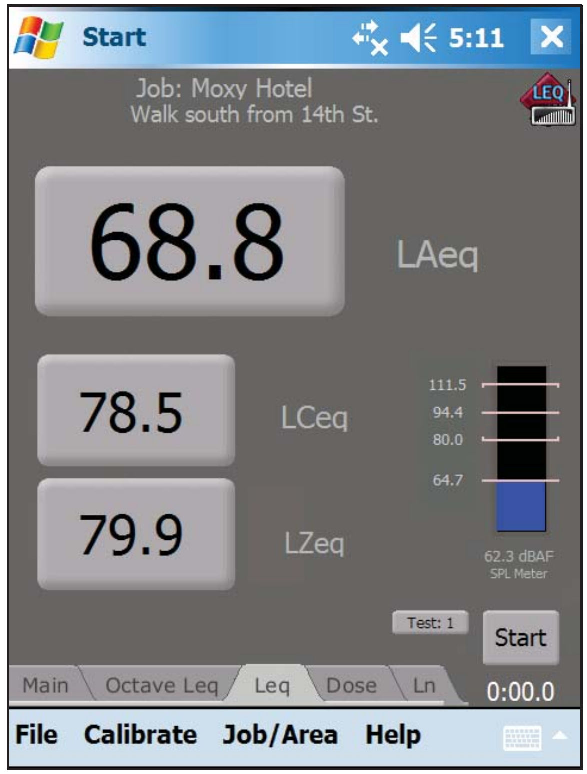
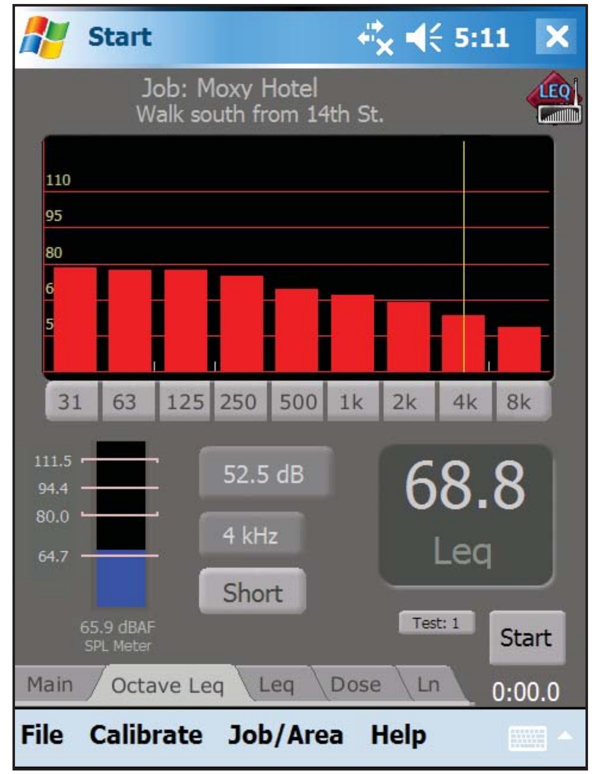
Moxy Hotel, Miami Beach, Florida

6 minute Leq walking along West side of Washington Avenue

June 4, 2016 - 5:00 p.m.







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NOISE LEVEL ANALYSIS TERMS

Sound Pressure Level (SPL) = The RMS sound pressure expressed in dB re 20 microPa, the lowest threshold of hearing for 1 kHz for a healthy auditory system. [As points of reference, 0 dB-SPL equals the threshold of hearing, while 140 dB-SPL equals irreparable hearing damage.] See: **inverse square law** below. 1 Pascal = 94 dB SPL. Average face-to-face conversation equals approximately 65 dB SPL.

Decibel (dB) = means of expressing power ratios, i.e. the difference between two sound levels, or an absolute sound level expressed in Sound Pressure Level (SPL) referenced to a standard pressure, i.e. 94 dB SPL = 1 Pascal.

dBA = "A" weighted sound pressure level. Please refer to the attached discussion of weighting filters and their applications.

SLM = Sound Level Meter. Device used to measure sound pressure levels.

L_{min} = Lowest, or softest, Sound Pressure Level measured during the test period.

L_{max} = Highest, or loudest, Sound Pressure Level measured during the test period.

L_{eq} = 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. A single L_{eq} number is often used to define an entire measurement period.

L_{10} = Sound level exceeded 10% of the measurement period. Highest of the Ln figures.

L_{50} = Sound level exceeded 50% of the measurement period. Median of the Ln figures.

L_{90} = Sound level exceeded 90% of the measurement period. Lowest of the Ln figures. This figure is most commonly used in estimating true ambient noise level.

L_{mean} = Mathematically averaged Sound Pressure Level.

NC = Noise Criteria, a standardized method of characterizing noise loudness. Extensively used in the analysis of noise and vibration.

Sone = a subjective unit of loudness for an average listener equal to the loudness of a 1 kHz. sound that has an intensity 40 decibels above the listener's own threshold of hearing.

Phon = the unit of loudness on a scale beginning at zero for the faintest audible sound (0.00002 Pascals) and corresponding to the decibel scale of sound intensity with the number of phons of a given sound being equal to the decibels of a pure 1 kHz tone judged by the average listener to be equal in loudness to the given sound.

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Inverse Square Law = inverse square law Sound Pressure Level. Sound propagates in all directions to form a spherical field, thus sound energy is inversely proportional to the square of the distance, i.e., doubling the distance quarters the sound energy (the inverse square law), so SPL is attenuated 6 dB for each doubling of distance from the source.

Noise Reduction Coefficient (NRC) = The average of the individual sound absorption coefficients at 250, 500, 1000 and 2000 Hz, to the nearest .05.

Impact Insulation Class (IIC) = Single-number rating that indicates the amount of impact noise isolation provided by a floor/ceiling assembly. The higher the number, the better the floor/ceiling assembly.

Sound Transmission Class (STC) = A single-number rating that indicates the sound transmission loss of a partition or ceiling system between adjacent closed rooms. STC Ratings are:

25	Normal speech can be understood quite clearly
30	Loud speech can be understood fairly well
35	Loud speech is audible but not intelligible
42	Loud speech is audible as a murmur
45	Must strain to hear loud speech
48	Some loud speech is barely audible
50	Loud speech is not audible

Definitions

1) **sonic**: utilizing, produced by, or relating to sound waves; broadly: of or involving sound: having a frequency within the audibility range of the human ear: of, relating to, or being the speed of sound in air or about 761 miles per hour (1224 kilometers per hour) at sea level at 59°F (15°C)
2) **subsonic**: of, relating to, or being a speed less than that of sound in air
3) **supersonic**: of, being, or relating to speeds from one to five times the speed of sound in air
4) **hypersonic**: of or relating to speed five or more times that of sound in air
5) **audio**: of or relating to acoustic, mechanical, or electrical frequencies corresponding to normally audible sound waves which are of frequencies approximately from 20 to 20,000 hertz
6) **infrasonic**: having or relating to a frequency below the audibility range of the human ear (< 20 Hz)
7) **ultrasonic**: having a frequency above the human ear's audibility limit of about 20,000 hertz
8) **audible**: heard or capable of being heard
9) **intelligible**: capable of being understood or comprehended
10) **aural**: heard or perceived with the ear

11) **auditory**: of, relating to, or experienced through the sense of hearing

12) **acoustic**: of or relating to the sense or organs of hearing, to sound, or to the science of sounds

13) **vibration**: a periodic motion of the particles of an elastic body or medium in alternately opposite directions from the position of equilibrium when that equilibrium has been disturbed (as when a stretched cord produces musical tones or particles of air transmit sounds to the ear)

14) **noise**:
1 loud, confused, or senseless shouting or outcry
2 **a:** SOUND; *esp.* **:** one that lacks agreeable musical quality or is noticeably unpleasant
b: any sound that is undesired or interferes with one's hearing of something
c: an unwanted signal or a disturbance (as static or a variation of voltage) in an electronic device or instrument (as radio or television); *broadly* **:** a disturbance interfering with the operation of a usu. mechanical device or system
d: electromagnetic radiation (as light or radio waves) that is composed of several frequencies and that involves random changes in frequency or amplitude
e: irrelevant or meaningless data or output occurring along with desired information

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Sound Level Meter Weighting Networks

The following brief description of how the various weighting networks are used is intended to provide the reader an understanding of the purposes for and applications of standard weighting networks found in professional sound level meters. The information is an extract from "The New Audio Cyclopedia, Handbook for Sound Engineers", edited by Glen Ballou. It can be found on page 21 of that reference publication.

1.16 Weighting Networks

Sound level meters come with one or more weighting networks built in. The question confronting the user is, "Which one should I use?" The frequency responses of the three standard networks (A, B and C) are shown in figure 1-16. In the simplest terms, these different curves are designed to give readings of sound pressure level that will correspond, at least roughly, with human response to the sound. As we shall see in Chapter 2 "Psycho Acoustics," the Fletcher-Munson curves show that the human ear is less sensitive at lower frequencies than at a frequency of 1 kHz. This effect is greater for lower-level sounds than for louder sounds. Therefore, it makes sense to reduce the sensitivity of the sound level meter (chiefly in the lower frequencies) so that its readings follow the characteristics of the ear more closely.

The A-weighted curve of Fig. 1-16 is based on the 40 phon Fletcher-Munson equal-loudness contour and is to be preferred for measuring lower-level sounds such as background noise. The B-weighted curve is based on the 70-phon equal-loudness contour and is suitable for measuring sounds of intermediate level. Measurements taken with the A and B weighting are called *weighted sound levels*. The C weighting is essentially flat and is used for very loud sounds. It is also used when *sound pressure levels* are to be measured and generally when the sound level meter feeds a signal to other instruments for analysis.

Table 1-4. Use of Weighting Networks

Sound Level Range, in dB	Recommended Weighting Network
20 - 55	A
55 - 85	B
85 - 140	C

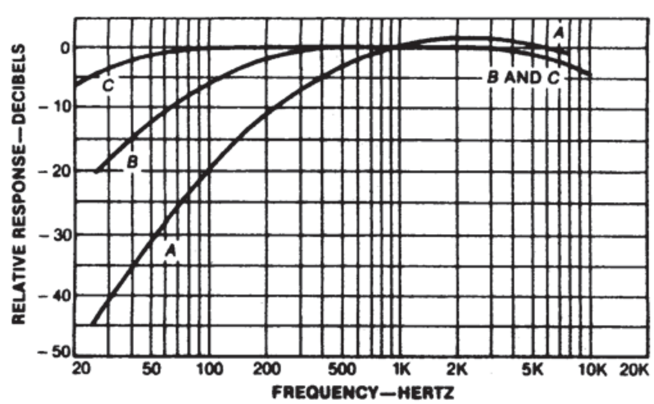
Table 1-4 gives general suggestions as to which weighting to use for different sound level ranges.

When comparing different sound levels, such as in Table 1-5, it may be expedient to use the A-weighting for the entire range rather than to shift weighting in the midst of a series of measurements to be directly compared.

Table 1-5. Typical A-Weighted Sound Levels

Sound Source	Sound Pressure Level, Decibels, (A-Weighted)
Jet airplane taking off (200 ft.)	120
Subway train (20 ft.)	90
Freight Train (100 ft.)	70
Speech (1 ft.)	70
Shopping Mall	60
Average residence with TV	50
Quiet residential area at night	40
Soft whisper	30
Recording studio background noise	30
Threshold of hearing	20

Figure 1.16 - Weighting Networks



Frequency Response Characteristics in the American National Standard Specification for Sound Level Meters, ANSI-31.4-1971.

Typical Sound Levels

Common Sounds	Sound Level (dB)		Loudness Compared to 70 dB
	130	Uncomfortable	
Air raid siren at 50 ft (threshold of pain)	120	Uncomfortable	32 x as loud
Maximum levels in audience at rock concerts	110	Very Loud	16 x as loud
On platform by passing train	100	Very Loud	
Typical airliner (B737) 3 miles from take-off (directly under flight path)	90	Moderate	4 x as loud
On sidewalk by passing bus	80	Moderate	
On sidewalk by passing typical automobile	70	Moderate	
Busy office	60	Quiet	
Typical suburban area background	50	Quiet	1/4 x as loud
	40	Quiet	
Library Bedroom at night Isolated broadcast study	30	Quiet	1/16 x as loud
Leaves rustling	20		
Just Audible	10		
Threshold of Hearing	0		

Source: Handbook of Environmental Acoustics, James P. Cowan, 1994