ARUP

Technical Memorandum

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Reference	Carriage House Parking, Transportation, and Acoustics Assessment
From	**Arup:** Ryan Cox, Avi Bortnick
Subject	Acoustics Onsite Sound Level Measurements and Observations at the Carriage House Club

Contents

1. Introduction

The Carriage House ("the club"), an exclusive private club offering invitation-only membership, is planning to expand their membership and outdoor dining opportunities. The club, located at 264-270 South County Road, Palm Beach, is situated along the major north-south thoroughfare South County Road (S. County Road) and east-west four-lane connector Royal Palm Way, which links Palm Beach with West Palm Beach.

As part of this initiative to understand noise impacts due to a potential increase in club members, Arup's technical team completed a series of sound level measurements as part of a site survey of Carriage House Palm Beach. This memorandum summarizes the results of the sound level measurements and contextualizes them in relation to applicable local noise limits.

2. Relevant Standards

Section 42-228 of the Town of Palm Beach Code of Ordinances contains the following thresholds for maximum permissible emissions of non-vehicular noise:

Table 1 - Town of Palm Beach Maximum Noise Levels

	Maximum Level, dBA	
Area (Geographic)	**Day**	**Night**
1	61	55
2	**64**	**58**
3	61	55
4	61	55

The club is within Area 2, extending from Wells Road southerly to Worth Avenue, with a noise limit (at the property line of the property originating the noise) of 64 dBA during the day, and 58 dBA at night. Night is defined as the hours between 7:00 PM and 9:00 AM.

3. Site Measurements

3.1 Logger Locations

In order to understand the noise impact of Carriage House activities in the adjacent neighborhood, Arup deployed two logging sound level meters[1] within Phipps Plaza Park on the northwest side of Carriage

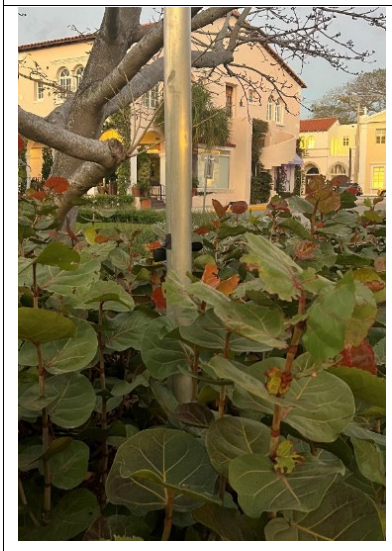
[1] Convergence Instruments NSRTW mk3 sound level meter data logger, capable of continuously measuring and storing sound levels over several days or a specified period of time.

House (NL-2 and NL-3). The locations of the logging sound level meters is shown below in Figure 1, with photos of the meters in Table 2.

The loggers measured sound levels continuously from 6:30 PM on Friday, February 2, 2024 until 6:30 AM the next morning, and again from 6:30 PM to midnight on the night of February 3rd. The intent was to measure sound levels within and surrounding Carriage House over a weekend evening, with typical club activities and outdoor dining, as well as measure ambient sound levels in the neighborhood.

Figure 1 – Sound Level Meter Logger Locations

Table 2 - Noise Logger Locations

NL-2	NL-3
	

3.2 Logger Results

The graphs in Figure 2 and Figure 3 below show the sound level[2] measured in 5 minute increments by the two sound level loggers in the neighborhood adjacent to Carriage House during the evening hours of operation on February 2nd and 3rd. The applicable sound level limits from the Town of Palm Beach Code of Ordinances are also shown in the graphs for reference to the measured levels. As can be seen, the measured levels indicate that nighttime sound levels in the neighborhood are below Ordinance limits.

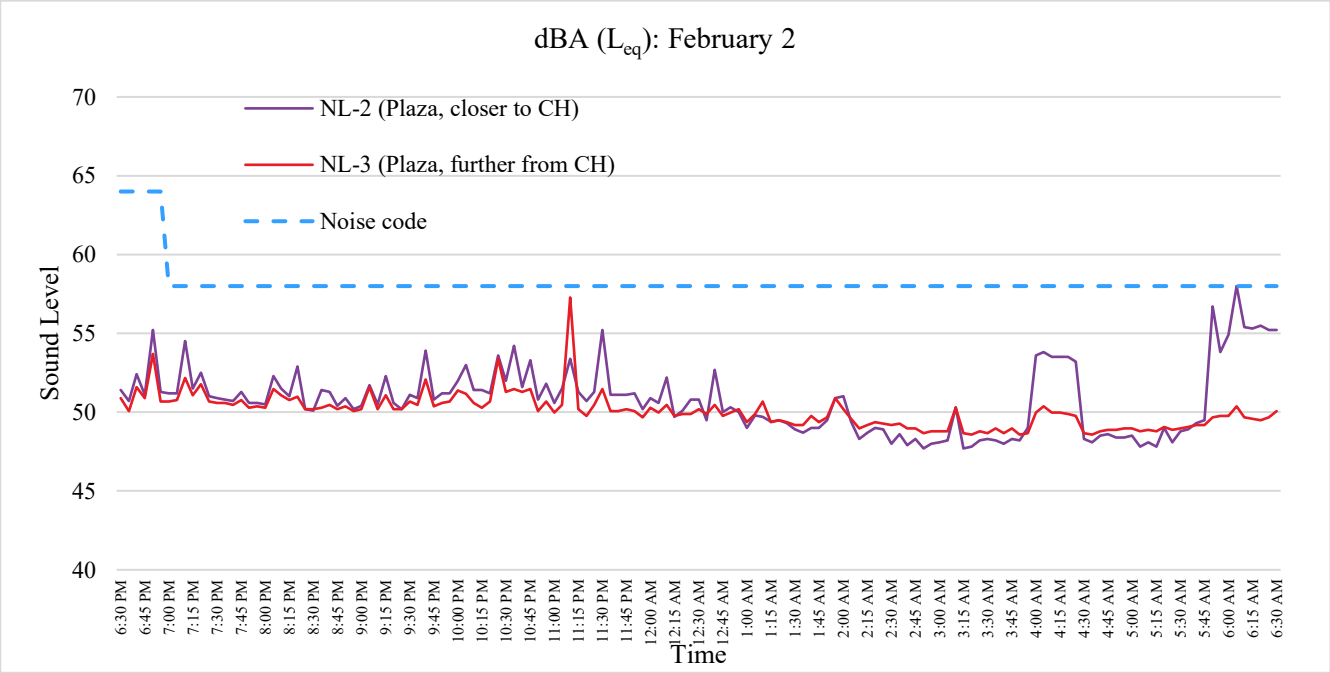


Figure 2 - Noise Logger Sound Levels Night 1, February 2, 2024

[2] The sound level shown in the graphs is the broadband A-weighted or dBA, using the L_{eq} metric, which represents the average sound level over the measurement interval.

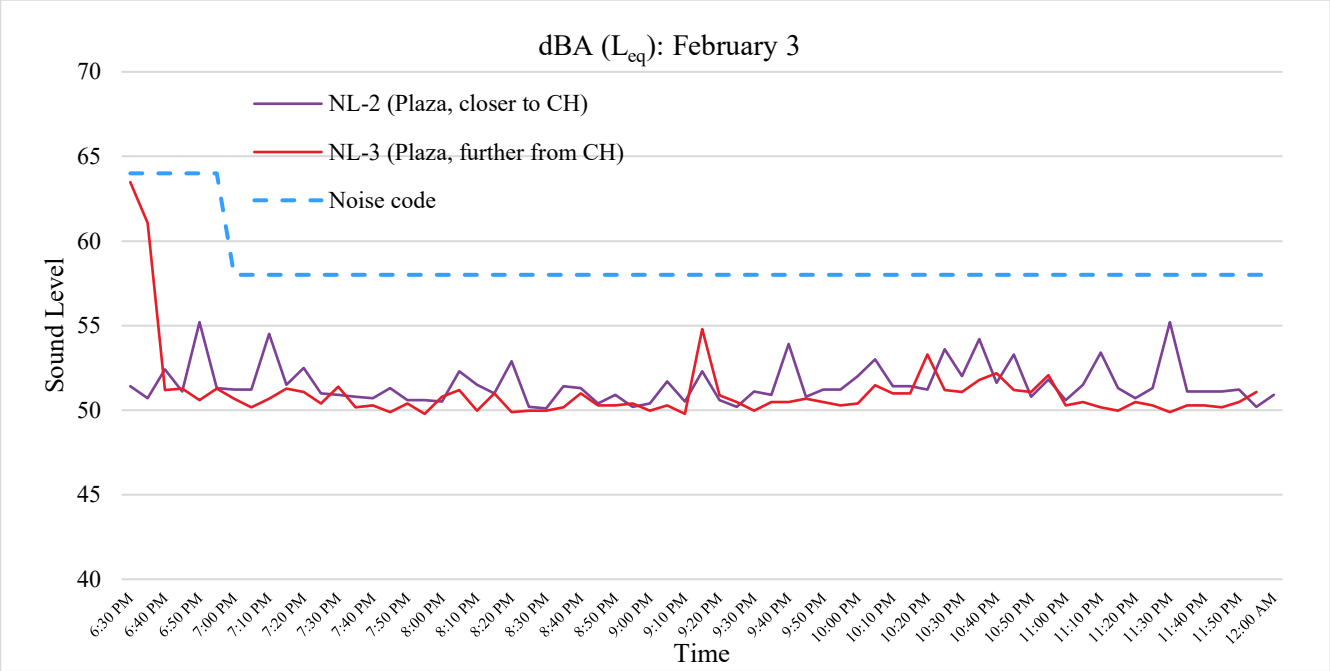


Figure 3 - Noise Logger Sound Levels Night 2, February 3, 2024

Table 3 below shows the average of the logged 5-minute A-weighted sound levels between the hours of 6:30 PM and midnight on the two nights Arup was present onsite.

Table 3 - Average sound level between 6:30 PM and Midnight

	NL-2	NL-3	Town of Palm Beach Noise Ordinance
Night of 2/2	52 dBA	51 dBA	58 dBA
Night of 2/3	53 dBA	54 dBA	58 dBA

The logged sound levels indicate that activity sound as measured at the Carriage House courtyard does not cause an increase in the ambient level at locations NL-2 and NL-3, which stay consistent with the 50-55 dBA range regardless of the increase in Carriage House activity. The neighborhood sound levels are controlled principally by residential air conditioners and vehicular traffic flow, with no discernable effect from Carriage House activity.

3.3 Spot Measurement Results

Arup took several short duration "spot" measurements with a handheld sound level meter at different locations and times throughout Carriage House on both February 2 and February 3. These measurements ranged between 1 to 3 minutes.

Carriage House staff participated in a mock dinner in the courtyard to simulate outdoor dining sound levels in on both the evening of February 2 and February 3, before the club opened to members. Arup measured sound levels during these events to document dining activity sound levels.

In addition, Arup took several sound level measurements inside Carriage House, starting at both 9:00 and 11:00 PM, while members were in the club. Measurements were taken in both the Courtyard and on the dance floor while a DJ played music, which started at approximately 10:30 PM. While the DJ played, sound levels were measured around the perimeter of the property, as well as in Phipps Plaza Park to compare to the Palm Beach nighttime noise limit of 58 dBA.

The measured levels at the times and various locations within Carriage House and at the property line are indicated in Table 4 below.

Table 4 – Short duration measurements in and around Carriage House

	Friday Night Mock Dinner at 5:00	Saturday Might Mock Dinner at 5:00	Courtyard at 11:00 PM on Saturday	Dance floor on Saturday at 11:15 PM	Property Line near plaza on Saturday at 11:30 PM	West end of Phipps Plaza Park on Saturday at 11:30 PM
Sound Level L_{eq}	67 dBA	65 dBA	72 dBA	104 dBA	56 dBA	48 dBA

4. Measured Sound Level Summary of Findings

4.1 Noise Logger Results

Both Figure 2 and Figure 3 show that ambient sound levels at locations NL-2 and NL-3 are within the 50-55 dBA range (below the Town of Palm Beach Code of Ordinances nighttime noise limit of 58 dBA). The two loggers within Phipps Plaza do not show an increase in sound level, despite increased Carriage House activity. In other words, Carriage House activity appears to have no effect on ambient sound levels. This baseline ambient level captured by the loggers is controlled principally by nearby mechanical equipment (air conditioners, condensing units, compressors, and fans) and vehicular traffic flow on the nearby South County Road.

4.2 Spot Measurement Results

The short-duration spot measurements taken at the perimeter of the property were found to be 2-7 dBA below the maximum 58 dBA sound level limit contained in the Town of Palm Beach Code of Ordinances. Sound levels measured from within the courtyard (which are not relevant to Code of Ordinance limits) were found to be typical of outdoor courtyard and cocktail lounge uses. Dance floor sound levels were loud at 104 dBA, but not atypical of DJ and club sound levels. The indoor DJ sound was not found to contribute to the neighborhood ambient level in the plaza, and was inaudible in the Phipps Plaza Park and barely audible when standing directly adjacent to the space along South County Road.

5. Appendix 1: Sound Level Reference Point

dBA denotes a single-number sound pressure sound level that includes a frequency weighting ("A-weighting") to better reflect the subjective loudness of the sound level.

The frequency of a sound affects its perceived loudness. Human hearing is less sensitive at low and very high frequencies, and so the A-weighting is used to account for this effect. An A-weighted decibel level is written as dBA.

Some typical dBA levels are shown in Table 5 below:

Table 5 - Typical Sound Level Reference Points

Sound Pressure Level dBA	Example
140	Propeller aircraft
120	Riveter
100	Heavy truck
80	Loud traffic
60	Conversational speech
50	Private office, residential ambient
40	Quiet residence
30	Recording studio
20	Leaves rustling