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August 25, 2011

Mr. Timothy A. Fecker  
Lillibridge Healthcare Services  
5308 West Plano Parkway  
Plano, TX 75093

**Ref: Lawrence Hospital  
Existing Ambient Sound Level Evaluation  
C&A Project #19695**

Dear Mr. Fecker:

We have completed our review of the existing ambient sound level condition at Lawrence Hospital. The purpose of our analysis was to measure and assess existing ambient sound levels. The following letter summarizes our findings and comments.

### 1.0 EXISTING HOSPITAL EQUIPMENT

We first visited the hospital to inspect any rooftop mechanical equipment or other systems that could potentially transmit noise to the adjacent residences. Mechanical equipment are located on the upper and lower roofs of the hospital. Specific equipment that we identified as potential noise contributors are as follows:

#### Upper Roof:

- AC-5 and 5A (within MER)
- Three (3) mushroom exhaust fans (EF-12, 13, 14)
- Two (2) exhaust fans (EF-1 and 4) and one (1) toilet exhaust fan (TEF) behind mechanical louvers behind UPS/telecom equipment

#### Lower (3<sup>rd</sup> floor) Roof:

- Two (2) Liebert drycoolers

Based on the above equipment, testing at the residential building would ideally include temporarily turning off these equipment to assess any variance in sound levels.

### 2.0 MEASUREMENT LOCATIONS

Sound level measurements were to be conducted in the following locations, as outlined in our Measurement Protocol dated August 9, 2011:

- A. Westbourne Building – upper and lower residential units facing the hospital
- B. Eastbourne Building – ground floor, exterior measurements only
- C. Arcade Building – ground floor, exterior measurements only

For testing at the Westbourne Building, located directly across Pondfield Road, measurements were conducted within Unit 4A. Measurements within Unit 4A were conducted at a point just outside an open window as well as a point approximately 3 ft inside the same open window.

Access to a lower level residence was not granted, therefore measurements were taken on the ground floor outside of Unit 1A. In addition, measurements were taken in the stairwell of the fourth and first floors to assess the variation in elevation. The stairwell faces to the west of Westbourne but the hospital is still visible to the south. Measurements in the stairwell were taken just outside an open stairwell window, while all other measurements including at the Eastbourne and Arcade buildings were taken in front of the building façade at a point nearest to the hospital.

We note that a representative from Mack Associates was present during the entire duration of the testing. Mack Associates was acting as a professional witness on behalf of the Village of Bronxville.

### 3.0 WESTBOURNE MEASUREMENTS

Measurements within Unit 4A were conducted in both the east bedroom as well as in the dining room alcove. From the dining room alcove, noise transmission from the three (3) mushroom exhaust fans and AC-5/5A could be evaluated. From the east bedroom, noise levels from the exhaust fans behind the UPS/telecom equipment could be evaluated. Table 1 below summarizes the measurements conducted in the east bedroom of Unit 4A:

Table 1. Unit 4A – East Bedroom Measurements			
Location	All Equipment On	AC-5/5A and EF-12/13/14 Off	Change
Outside window	53 dBA	53 dBA	n/c
3 ft inside open window	44 dBA	45 dBA	+1 dB

Table 2 below summarizes the measurements taken in the dining room alcove of Unit 4A:

Table 2. Unit 4A – Dining Room Alcove Measurements			
Location	All Equipment On	TEF and EF-1/4 Off	Change
Outside window	53 dBA	54 dBA	+1 dB
3 ft inside open window	45 dBA	47 dBA	+2 dB

As shown in the above tables, turning off the subject mechanical equipment did not result in any reduction of existing sound levels. Because sound levels with the equipment turned off increased, this suggests that the existing ambient sound level is not controlled by the hospital equipment but rather is due to the surrounding environment. Therefore the ambient sound levels are subject to fluctuations based on the surrounding area, rather than because of the hospital mechanical equipment.

Measurements taken outside of the stairwell windows and outside of Unit 1A are presented below:

Location	Level
Outside 4 <sup>th</sup> floor stairwell	54 dBA
Outside 1 <sup>st</sup> floor stairwell	50 dBA
Outside Unit 1A east bedroom	49 dBA

The measurement taken outside the 4<sup>th</sup> floor stairwell is consistent with the measurements taken outside of Unit 4A’s east bedroom and dining room alcove windows. This would suggest that sound levels are consistent around the property and are not due to a specific noise source. On the first floor, measurements taken outside the stairwell window and outside of Unit 1A measured 50± dBA. While this is lower than the levels measured on the upper (4<sup>th</sup>) floor, this cannot be directly attributed to the hospital as at the lower elevation noise levels from the nearby Bronx River Parkway are reduced from the barrier effect of the hospital parking garage.

#### 4.0 EASTBOURNE AND ARCADE MEASUREMENTS

In addition to measurements taken at the Westbourne building, measurements were also conducted outside of the Eastbourne and Arcade buildings. Eastbourne is a residential building on the same complex as Westbourne with similar exterior construction while the Arcade building is mixed use with retail on the ground floor. The table below summarizes the measurements taken outside of the Eastbourne and Arcade buildings:

Location	All Equipment On	TEF and EF-1/4 Off	Change
Eastbourne	53 dBA	-	-
Arcade	54 dBA	54 dBA	n/c

As shown above, turning off the exhaust fans behind the UPS/telecom equipment at the hospital did not result in any change in ambient sound level at the Arcade building. Note, however, that we were unable to turn off the two (2) Liebert drycoolers on the lower roof. Nor were we able to conduct measurements in front of the Eastbourne building with the exhaust fans turned off.

#### 5.0 DISCUSSION AND CONCLUSION

As shown in the previous sections, existing ambient sound levels at the residential properties did not appear to change when hospital mechanical equipment was turned on/off. Indeed, no reduction was measured which would have suggested that the ambient condition is at least partly controlled by hospital equipment. Since ambient sound levels did not dramatically change, and in some cases increased, the ambient condition is likely controlled by several factors, including traffic noise from local roadways including the nearby Bronx River Parkway and possibly other nearby mechanical equipment.



In addition, as noted in Section 2.0 the existing ambient sound level outside the residential buildings measured approximately from 50 to 55 dBA. From our previous correspondence and reports, we had identified a level of 55 dBA as a typical daytime noise level limit as established in various noise ordinances for surrounding areas. Similarly, a level of 45 dBA is common for nighttime noise level limits. As measured during our testing, the existing nighttime ambient sound levels are closer to the daytime limit. Existing ambient sound levels taken within the 4A residential unit approximated the typical nighttime limit, however most noise ordinances are measured at the property line and not from within residences.

Based on our analysis of the existing nighttime ambient conditions, the hospital mechanical equipment tested does not appear to be a significant contributor to the ambient sound condition. Rather, the existing ambient levels are controlled more by the surrounding environment. In addition, existing ambient sound levels are closer to the commonly used daytime noise level limit as established in various town ordinances. This concludes our comments at this time. Should you have any questions, comments or concerns please do not hesitate to contact us.

Very truly yours,

A handwritten signature in black ink, appearing to read "Justin Y. Lau". The signature is written in a cursive style with a long, sweeping underline that extends to the left and then loops back under the name.

Justin Y. Lau  
Senior Associate

JYL:bh

cc: Timothy Hughes / Lawrence Hospital  
Brook Crossan / Mack Associates  
Stephen G. Lindsey/ Cerami & Associates