

November 2, 2020

Mr. Steve Fontana
City of New Haven Economic Development Office
165 Church Street Floor 4R
New Haven, Connecticut

Re: Paw Haven Acoustical Report

Dear Steve,

We have conducted an analysis of community noise impact due to the recent outfitting and opening of the Paw Haven pet care facility in New Haven based on our recent site visit conducted on October 20th at 10AM. The following summarizes our comments and findings.

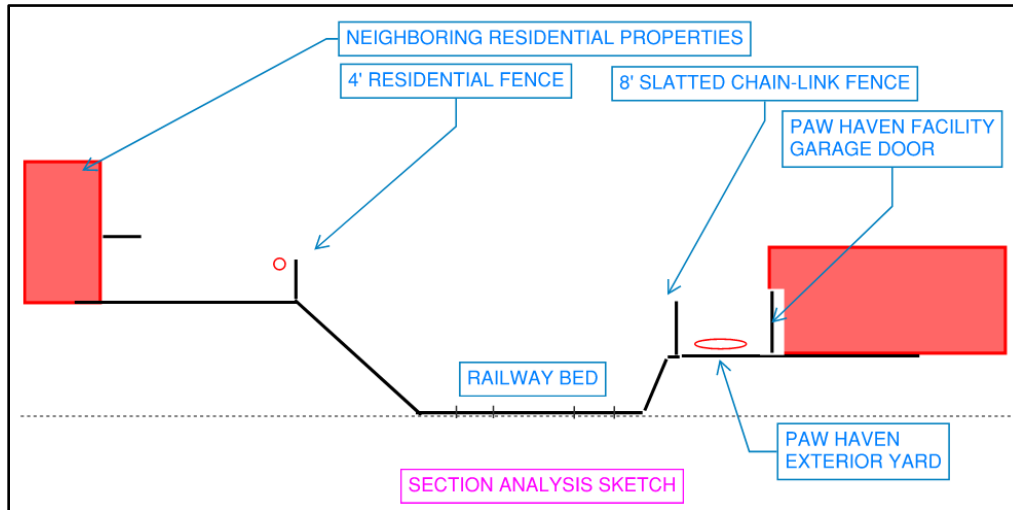
EXECUTIVE SUMMARY

1. The measured outdoor noise levels from Paw Haven exceeds local noise ordinance limits at the residential property line to the south.
2. Modifying the existing 8 foot Paw Haven fence to include sound barrier material will significantly reduce noise levels at the residential property line to the south of Paw Haven.
3. Calculated noise levels with implemented recommendations are expected to be below the average daytime ambient noise levels and below the noise ordinance maximum allowable daytime dBA limits.
4. Acoustic treatment located on the ceiling is recommended to reduce interior noise buildup in the indoor pen areas and reduce noise at the residential property line.
5. Recommend closing exterior garage doors half way to limit direct line of sight to residences to the south and reduce noise levels.

SITE OBSERVATIONS

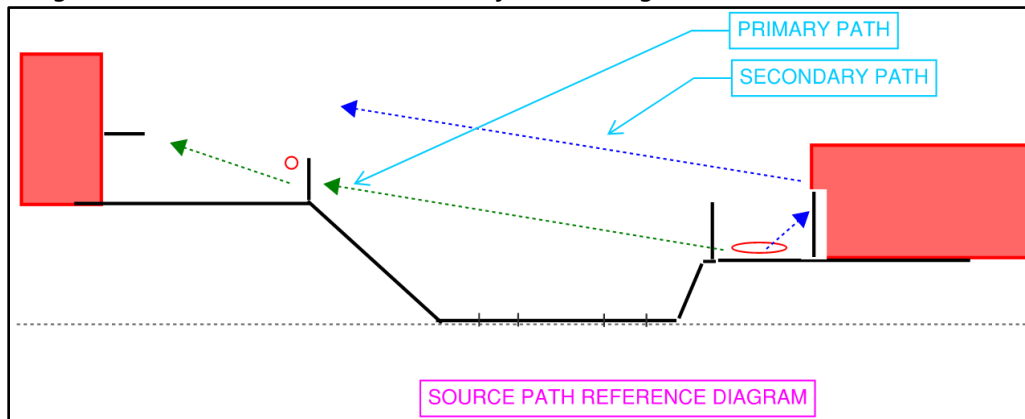
There are two immediately noticeable paths of noise emanating from the south side of the building; the first path is from the noise present in the yard which escapes through the slatted chain link fence, which then travels across the adjacent railway tracks and onto the neighboring residential properties. The secondary path is from the noise that is present in the yard which reflects upwards and off of the exterior wall of the Paw Haven facility, which then travels across the railway tracks to the neighboring residential properties. For reference, see Image 1 and Image 2.

Image 1: Section Analysis Reference Image



A tertiary path of noise from the interior of the Paw Haven facility is escaping through the large garage door and out to the yard. This path of noise transmission is significantly less apparent than the primary and secondary paths. Jaffe Holden recommendations for excess reverberation control within the main interior space of the facility will help to reduce this contributing factor.

Image 2: Noise Source Emission Path Reference Diagram



It is apparent when standing near the yard and when standing at neighboring property boundaries, that noise is escaping via the two paths described above and in Image 2. The noise source has a clear line-of-sight to the residential property line, enabling easy transmission of acoustic energy to the surrounding areas. The reflective nature of the building's exterior brick façade and the relative 'acoustic transparency' of the chain link fence are contributing factors to the unimpeded acoustic transmission. An effective noise mitigation strategy will effectively address these factors.

MEASUREMENTS

Sound level measurements were taken from numerous locations near the facility in compliance with the noise level measurement procedures outlined in the 2006 New Haven noise ordinance. Two locations at the residential property line were taken covering approximately the east and west extent of the outdoor area. The noise levels were measured using a Bruel and Kjaer 2270 sound level meter at 9 different locations throughout the affected area with a windscreen at approximately 5 feet above the ground. The sound level meter was calibrated immediately prior to the measurements the morning of October 20th. At each location, measurements were conducted for approximately 60 seconds. Following the site visit, the data was analyzed and plotted across the audible frequency spectrum. Sound pressure levels by octave band are shown in Table 1.

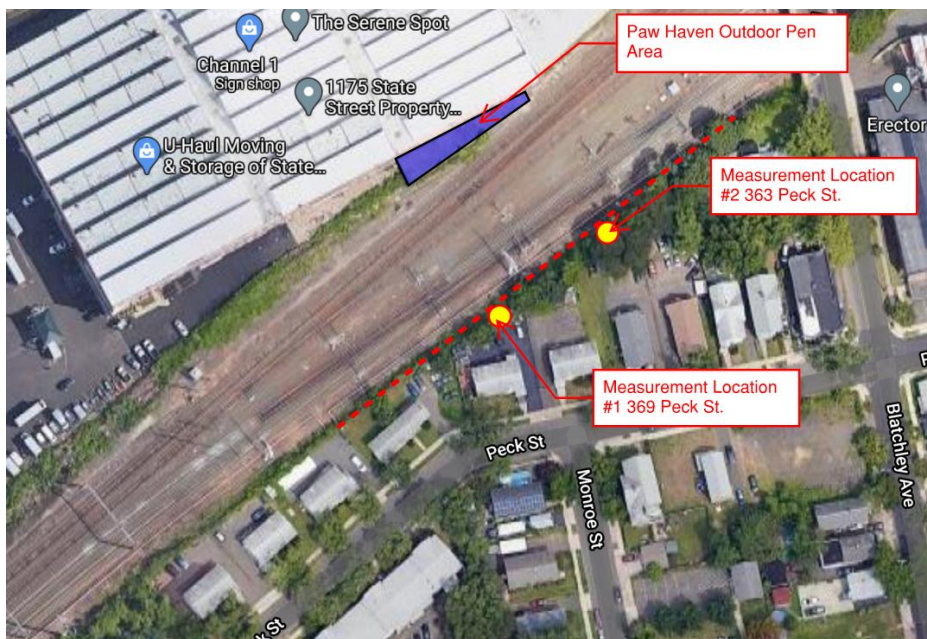


Image 3: Site Overview and Measurement Locations



Image 4: Measurement Photos

Table 1: Sound Pressure Level measurements calculated for #% loudness

	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dBA
1. 15-18 Dogs Barking loudly measured 2.5m from source	79	77	85	93	93	86	66	59	95.6
2. Background Noise at Neighboring Property Line (Average of location 1 and location 2.)	58	53	50	49	48	46	42	38	53.1
3. Background + Source Noise at Neighboring Property Line (Average of location 1 and location 2)	61	56	59	68	68	60	43	34	70.4
5. Neighboring Property Line, background noise with Train passby	82	83	83	89	81	79	75	66	88.7

Analysis shows nominal levels of more than 95 dBA at close proximity to the source. The nominal background noise without canine barking, as shown in Item #2 of Table 1 is measured to be 53dBA. The measured level of canine barking at the same location, Item #3, is roughly 17dB greater than the nominal background noise without barking present. The canine barking noise is significantly louder than the ambient background noise level at similar locations.

During the measurements there were several train passbys. Train noise was measured as a reference with an average sound pressure level of 88 dBA.

The City of New Haven Civil Code mandates daytime noise levels at or less than 55dB located at ‘residential receptor zones’. We have calculated that the implementation of sound mitigation recommendations will reduce noise levels below the maximum allowable sound level for daytime hours.

CONCLUSIONS

When dealing with nuisance noise, there can be many sources of noise and many paths by which the noise travels to areas of interest. In this instance, it is apparent that noise from canine barking is emitting from the Paw Haven facility and is making its way onto adjacent residential properties. The quantitative analysis shows sound pressure levels are exceeding the New Haven Noise Ordinance sound pressure levels for sound transmission to neighboring properties.

We believe that the recommendations furnished below will provide a noise level of approximately 45dBA at the neighboring property lines, considerably lower than the nominal background noise level and below the noise ordinance maximum allowable sound levels.

However, at the second level of the neighboring property – the sound level may be as much as 6dB louder than at the measured location. This is due to the direct line of sight over the shrubbery and partially over the Paw Haven fencing. This makes the second recommendation below an important issue. While we expect noise levels to be below the average ambient noise level and below maximum

noise ordinance limits at the property line and second floor, impulsive barking noise will likely still be audible but at a reduced sound level.

RECOMMENDATIONS

Based on our analysis, we recommend a two phase approach to mitigate noise. We recommend that acoustical testing be conducted after phase 1 has been implemented to determine if phase 2 is necessary.

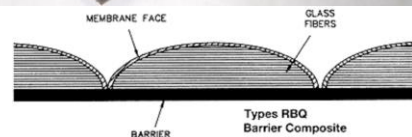
Phase 1

1. Install a sound-blocking and absorptive acoustic isolation barrier along the extent of the current slatted chain link fence at the Paw Haven facility (including east and west end fences).

- Basis of Design sound blocking fence shall be the Kinetics Noise Control Sound Absorber/Noise Barrier Composite Blanket, type KBC-100RBQ, or similar with a Sound Transmission Class rating of minimum STC 27. The sound absorptive side of the blanket should face the Paw Haven building façade.
- The barrier blanket should have overlap joints per manufacturer's installation instructions. Blankets should cover the entire fence from the ground to 8'.

2. Install a 2"-thick absorptive fiberglass treatment to the interior underside of the exposed roofing deck within the main space of the Paw Haven facility. The treatment should approximate 60-75% of the floor area of the space. Basis of Design Owens Corning QuietR Duct Liner Board, or similar duct liner type product.

3. If garage doors are required to be open, we recommend closing the doors 50% to reduce exposure to the second floor residential property.



Phase 2

1. Add an absorptive treatment along the exterior brick facade of the Paw Haven building. This treatment will help further reduce noise levels and secondary path to the second floor residential property to the south.

- The product basis of design shall be Kinetics Noise Control KFA Quilted Fiberglass Sound Absorber 1" thick. This shall be located along exposed brick areas of the facilities' exterior façade starting at approximately 9' extending to 13' above the ground (see example coverage area photo markup below).
- The product can be ordered with grommets for mounting to the exterior brick walls.



Model	Nominal Thickness	Octave Band Frequency (Hz)						
		125	250	500	1000	2000	4000	NRC
KFA-10Q-NA	1 in (25 mm)	0.12	0.47	0.85	0.84	0.64	0.62	0.70
KFA-10Q-NS	1 in (25 mm)	0.04	0.46	0.86	0.81	0.59	0.31	0.70
KFA-20Q-NA	2 in (51 mm)	0.08	0.33	0.79	1.02	1.04	1.02	0.80
KFA-40Q-AA	4 in (102 mm)	0.30	0.83	1.16	1.18	1.10	1.07	1.10

