Noise Management Proposal for Impossible bar & restaurant, 3 St Helen's Square, York, and the Impossible Motel, 5 St Helen's Square, York.

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Introduction

Impossible is a previously licensed restaurant/tea rooms/speakeasy at 3 St Helen's Square, York and a proposed hotel & restaurant at 5 St Helen's Square, York.

Number 3 St Helen's Square is the old Terry's Building, and 5 St Helen's Square is the old TSB bank that traded last as a failed retail store 'Marchbrea'.

The area is "located in a prominent location in the middle of one of York's central historic squares frequented by both locals and tourists and already has a number of other licensed premises on the square itself that close between midnight and 1am. The area is a mix of restaurants, bars, business premises and residential premises at the roof top level."[1], a statement which is a little misleading as the adjacent Hawkers holds 3am licensed nights and both Revolution and Pitcher hold nightly 3am licenses albeit that the latter are located off the 'Square' but the only customer entrance/exit is directly via the 'Square'

This report will assess the likely impact of both developments at 3 and 5 St Helen's Square.

Elements to be considered

1. Ground Floor: tea rooms and a restaurant with existing licensed external seated area
2. First Floor: cocktail club with live music
3. Rear Ground & First Floor: 'Speakeasy': cocktail bar, lower rooftop terrace
4. Second Floor existing licensed Private Dining Room & upper rooftop terrace

Ground Floor

Internally the music system is very low power and designed for background reproduction only.

First Floor 'Cocktail / Supper Club'

The First Floor has a small 'Line Array' system of speakers, 'Line Array' speakers are expensive specialist which are purposefully very directional and focussed. They are placed facing into the bar, and we had them operating for 4 weeks (Dec 2nd to 30st 2020) without complaint. When music is being played the windows are closed. It should be noted that the façade is facing away from the nearby residences, so minimising any likelihood of nuisance. Although glazing exists along the rear of one side this is away from residential and into a commercial alleyway to the adjacent late licensed bar

[1] From Premises Licence Grant by Michael Golightly

First Floor 'Speakeasy'

There are three main elements to the 'Speakeasy':

- Internal bars
- Lower Rooftop Terrace
- Upper Rooftop Terrace

The internal bars will have background music at low levels. This will be contained within the fabric of the building. The lower terrace faces a residence around 14m from the closest point. The upper terrace is around 40m from the residences opposite McDonalds. Each will have a maximum of 60 people due to their single means of fire escape.

Proposals for Both Ground Floor Bar/Restaurants

Proposals for First Floor

- Level management on the sound system to maintain the volume at or below an agreed level with the environmental health officer – we would consider a maximum of 100dBA as a sensible limit
- The use of a Sound Processor to physically limit the amplified noise output - this system will be locked to ensure DJs or Managers are unable to exceed this level
- When music is being played the windows to the outside will be closed
- Regular noise checks to take place around the external property to ensure no amplified noise can cause nuisance to the closest residential property.

Proposals for First / Second Floor Hotel

- The Basement, First and Second floors of 5 St Helens Square are hotel rooms, no significant volume will be permitted in these rooms
- The hotel rooms actively add an important layer of self-policing to the restaurants below and adjacent supper club and roof terraces – these rooms will effectively become the nearest noise sensitive premises, and management will be required to control noise to prevent discomfort to their own hotel guests.

Proposals for 'Speakeasy' & Roof Terraces

- Level management on the sound system for all areas to maintain the volume at or below an agreed level with the environmental health officer – we would consider a maximum of 80dBA to 85dBA as a sensible limit
- The use of a Sound Processor to physically limit the amplified noise output - this system will be locked to ensure DJs or Managers are unable to exceed this level
- Lower terrace – erect a solid noise barrier 2.2m high which will provide a reduction of 25dB; if the terrace has 60 people all talking, the level produced is 83dBLAeq
- The suggestion that this terrace ceases regular activity at 23:00hrs, a time which is generally accepted as the watershed between daytime and nighttime sound levels.

Lower terrace reduction with distance	Resulting LAeq value (dB)
Normal speaking voice at 1m	65dB
Noise level of 60 people	83dB
Level at windows opposite assuming 14m distance	58dB
Transmission loss to residential windows	-24dB
a dimension of terrace	1.5
b dimension of terrace	4

- The resultant maximum level at the façade of the nearby residence would be 58dB less the barrier reduction and the smaller reduction from the overhead canopies and would certainly be less than the 50 -55dBLAeq recommended by the WHO for daytime levels in gardens/outdoor areas.

- Upper terrace – the nearest residence is opposite McDonalds, 40m away from the terrace. As can be seen from the calculation below, the maximum level at their windows is 49dB. This does not allow for any reducing effect of the partial barrier of the hotel roof. It should also be noted that McDonalds opposite is open 24 hours, and has people queuing up outside so generating considerable noise which will be reflected between the façades of the buildings.

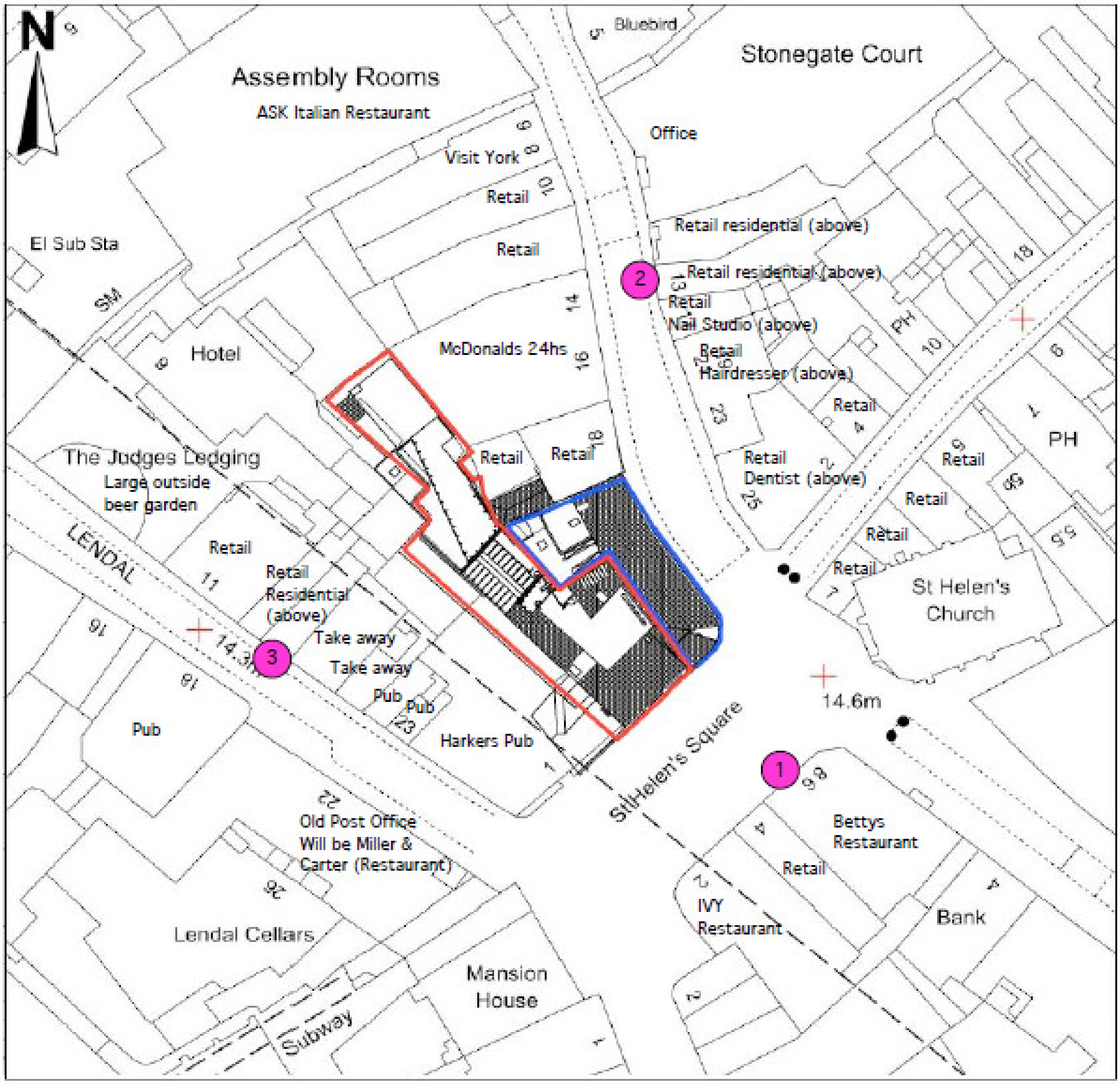
- The level at the residence will again be less than the 50 -55dBLAeq recommended by the WHO for daytime levels in gardens/outdoor areas.

Upper Terrace reduction with distance	Resulting LAeq value (dB)
Normal speaking voice at 1m	65dB
Noise level of 60 people	83dB
Level at windows opposite McDonalds assuming 40m distance	49dB
Transmission loss to residential windows	-34dB
a dimension of terrace	1.5
b dimension of terrace	4

Proposals for general management of sound levels

- Managers will have an app on their phones to measure sound pressure levels. Though not laboratory accurate each manager's phone will be tested using a class 1 measuring device (see Appendix 1) and results noted. In general, these devices are accurate enough for indicative readings to alert for deviations from specified levels. Several positions for managers to check levels will be prepared eg on first floor at bar, outside in front of 3 St Helen's Square. Where there are noise levels above the expected, the managers will take steps to correct them. Below is a map indicating what we consider to be the three most sensitive points in the area that will be monitored by management.

Map indicating sensitive points (1, 2 and 3) to be monitored



- Managers, Security and door staff will be briefed on their specific duties regarding noise control
- Any complaints will be dealt with following a procedure that will include an immediate reduction of any noise causing a nuisance, a detailed description of the problem, and proposals to ensure it is not repeated
- Any noise complaints will be logged; any repeated complaints will be escalated to senior management for investigation and resolution.

Calculation for sound level reduction over distance

The calculation for the reduction in sound level is based on the size of the 'source', which we have reckoned to be 1.5m high and 4m wide. Where a = height, and b = width, and r = the distance from the source to the nearest residence, the calculation is:

No reduction between 1m to a/π
Line source between a/π and b/π
Point source between b/π and r
Sound Level at nearest residence = 83dBA - 10 x $\log_{10}((b/\pi)/(a/\pi))$[2] – 20 x $\log_{10}(r/(b/\pi))$[3]

Noise Levels in the context of PPG24, WHO recommendations and BS8233

The standards above (PPG24, the World Health Organisation and BS8233) recommend similar sound pressure levels in gardens during the day (7am – 11pm), of between 50dBLAeq and 55dBLAeq.

The noise from the terraces will be below the minimum recommended level in both cases so will not constitute a nuisance.

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[2] Line source calculation
[3] Point source calculation

Appendix 1

Equipment used

Hardware Configuration

Device Info:	XL2, SNo. A2A-04060-D1, FW2.10
Mic Type:	NTi Audio M2210, S/N: 1578, Factory adjusted
Mic Sensitivity:	19.9 mV/Pa

XL2 + M2210:
• Class 1 frequency response according IEC 61672, IEC 60651
• Type 1 frequency response according ANSI S1.4

Conforms with Standards:
• IEC 61672, IEC 60651, IEC 60804, IEC 61260 class 0, ISO 2969
• China: GB/T 3785:2010, GB/T 3241, GB 3096-2008, GB 50526, GB-T_4959-1995
• Germany: DIN 15905-5, DIN 45645-2, optional: DIN 45645-1
• Japan: JIS C1509-1:2005, JIS C 1513 class 1, JIS C 1514 class 0
• Switzerland: SLV 2007
• US: ANSI S1.4, ANSI S1.43, ANSI S1.11-2004 class 1
• International IEC standards are adopted as European standards and the letters IEC are replaced by EN. XL2 conforms to these EN standards.

Appendix 2

Acoustic Terms

dB(A)
The human ear does not hear all frequencies with the same intensity. It is most sensitive to sounds in the 500Hz-8kHz range. Above and below this range the ear becomes progressively less sensitive. To compensate for this, sound level meters incorporate electronic filtering to correspond with the varying sensitivity of the ear. This filtering is called **A-weighting** and Sound Pressure Levels obtained with this weighting are referred to as **A-weighted** and signified as **dB(A)**.

$dBL_{Aeq(t)}$
This figure is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specific time period.

dBL_{A10} and dBL_{A90}
These indicate the level exceeded for 10% and 90% of the time respectively. These statistical parameters can tell us a lot about the nature of the sound. The LA10 figure is mainly used to measure road traffic noise, reflecting as it does infrequent noise sources. The LA90 figure is usually used to measure environmental background noise. Where the LA90 figure is low it indicates irregular and variable background noise, and where close to the LAeq figure, it indicates a fairly constant background.

TL

Transmission Loss (TL) is a figure which rates the ability of a material to block sound. It is usually measured in 1/3 octave band intervals. Mathematically it is defined as the ratio of the sound energy transmitted through a material to the sound energy incident on the material.

The Transmission Loss (TL) of a material is measured by mounting a sample of the material in an opening of a wall separating two reverberant test rooms. Broadband noise is played in one room (source). The difference between the sound levels in the source room the the other (receiving) room is defined as the **Noise Reduction (NR)**. As the frequency and/or density increases the Transmission Loss also increases. The density of the material is directly related to Transmission Loss.

SRI

The ASTM (American) 1/3rd octave Sound Transmission Losses measured above are referred to by the European ISO standards as **Sound Reduction Indices (R)**. ISO 717/1 defines a standard contour and a procedure for fitting the contour to the measured sound reduction indices to determine a single-number rating of a sound transmission loss spectrum. This rating is called the **Weighted Sound Reduction Index (Rw)**. Unlike the STC contour, the Rw contour is defined over a slightly lower frequency range of 100 Hz to 3.15 kHz.

The contour fitting procedure requires that:

- The sound reduction values be determined to one decimal place
- The contour be raised in 1 dB increments to a point where the average deficiency over the contour frequency range is as close to, but not exceeding, 2.0 dB.
- If an 8dB or larger deficiency exists in the sound reduction index data, then the deficiency amount in dB and the frequencies at which they occur must be reported.
- The average deficiency is the sum of all deficiencies in all frequency bands divided by 16, the number of 1/3rd octave frequency bands spanned by the contour.
- The actual Rw value is equal to the fitted contour value at 500 Hz.

  It should be noted that the SRI value has been developed to approximate the performance of a material in reducing the transmission of speech. The SRI value obtained from the TL data is useful for a quick comparison of materials but does not give a true idea with respect to non-speech sounds such as music, traffic, trains, aircraft etc.

STC

STC is the American ASTM, standard E413, equivalent of SRI and is based on the averaged sound insulation achieved between 125Hz and 4kHz. As before, the standard defines a procedure for determining the STC rating for a TLoss spectrum by fitting a contour to the 1/3rd octave data. This procedure involves raising or lowering the contour following these rules:
The contour may not be raised above the point at which the Tloss in any 1/3rd octave band falls more than 8dB below the contour.
The contour may not be raised above the point at which the total number of deficiencies is greater than 32dB.

A deficiency occurs when the TL data in any 1/3rd octave band falls below the contour by 1dB.

The STC rating resulting from the contour fitting procedure is the TL value of the contour at 500Hz.

It should be noted that the STC value has been developed to approximate the performance of a material in reducing the transmission of speech. The STC value obtained from the TL data is useful for a quick comparison of materials but does not give a true idea with respect to non-speech sounds such as music, traffic, trains, aircraft etc.

NRC

The Noise Reduction Coefficient defines how much sound specific materials absorb. It is the average sound absorption between 250Hz - 2kHz rounded to the nearest 0.05.
This is analogous to a room's finishes. Just as various colors of paint, or textures, visually alter a room, various materials with different NRC ratings, such as carpet or tile, audibly alter a room. A material with a low NRC rating (tile) absorbs little sound and a material with a higher NRC rating (carpet) absorbs more sound.