REPORT

FAÇADE NOISE EXPOSURE AND NOISE IMPACT ASSESSMENT

ADDRESS

THE TAVERN, 55-57 FRINTON ROAD, HOLLAND-ON-SEA, ESSEX CO15 5UH

REFERENCE

HA/AD33/V2

HEALTHY ABODE ACOUSTICS
BUILDING ACOUSTICIANS & ENVIRONMENTAL NOISE CONSULTANTS

Our Ref	HA/AD33/V2
Site Address	The Tavern, 55-57 Frinton Road, Holland-on-Sea, Essex CO15 5UH
For	Aaron Smith (The Tavern Public House)
Client Address	The Tavern, 55-57 Frinton Road, Holland-on-Sea, Essex CO15 5UH
Date of Report	19 March 2021
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EXECUTIVE SUMMARY

- Aaron Smith (The Tavern Public House) instructed Healthy Abode Ltd t/a as HA Acoustics to undertake a noise exposure and impact assessment for proposed residential premises to be located at The Tavern, 55-57 Frinton Road, Holland-on-Sea, Essex CO15 5UH.

- The proposal is to undergo a change of use of the first and second floors (currently used as function rooms) into 4 two-bed flats as part of this, there will be a partial demolition of the single storey rear extension function suite and then erection of the proposed residential.

- HA Acoustics has undertaken an environmental noise survey at the site in order to determine prevailing ambient, background and maximum noise levels that are representative of the residential premises.

- A baseline environmental noise survey and assessment has been undertaken in line with the guidance contained in British Standard (BS) 8233:2014, measurements being taken over continuous 5-minute periods.

- An unattended survey was conducted between Friday 05 February and Monday 08 February 2021 at two fixed secure monitoring positions deemed representative of the worst affected façades of the proposed site.

- Existing noise levels at the site have been compared to relevant standards and guidance. The results of the noise survey are considered reasonable given the location of the measurement position and the existing noise sources in the local vicinity. The representative time-averaged ambient and night-time maximum noise levels have been calculated at:
    - Position 1 68dB $L_{Aeq\ daytime}$, 58dB $L_{Aeq\ night\ time}$, and 78dB $L_{Amax,F}$.
    - Position 2 60dB $L_{Aeq\ daytime}$, 60dB $L_{Aeq\ night\ time}$, and 74dB $L_{Amax,F}$.

- The assessment has indicated that internal noise levels within the proposed development are predicted to meet the guideline noise criteria contained in BS 8233: 2014 provided the identified appropriate minimum specified glazing, ventilation and façade materials are installed to a good manner of workmanship.

- At the time of composing the report the exact specifications of the construction/build of the proposal have not been finalised Recommendations provided in respect to sound insulation of the building have been proposed based on achieving the desired internal noise levels in BS 8233:2014.

- It is possible that measured noise levels will differ from the 'typical' due to ongoing Covid-19 pandemic and associated lockdown. The glazing and ventilation specifications have therefore been based upon calculated noise levels utilising historic noise level data of a similar public house in operation. Therefore differences between noise levels measured on site and noise levels which would be considered pre/post Covid are removed.

- It was not possible to take on-site measurements of the Public House situated below due to ongoing lock-down conditions. Therefore, a ProPG: 2017 and BS 4142: 2014 assessment has been based upon historic measured levels of similar activities to predict the potential impact on the proposed residential dwellings. As the measured background noise levels are likely to be lower than normal, any comparison against the typical L_{A90} is likely to be robust.

    - Calculations predict a Low Observed Adverse Effect Level upon the flats with the calculated level at receiver 1 being 1dB above the background.

    - Calculations predict a Significant Observed Adverse Effect Level from PH operations at receiver 2 (the nearest proposed house) with levels predicted to be 9dB above background. Mitigation measures for the external façade and glazing have therefore been given to ensure noise is sufficiently attenuated internally at the NSR's.

- A sound insulation airborne test was undertaken to determine the existing performance of the separating floor between the PH and first floor function room (proposed to be residential flats).It is recommended that the separating floor sound reduction index is enhanced during conversion. Typically impact testing is not required from residential to commercial premises, although care should be taken to minimise impact noise during construction and with floor finishes.

- Additional mitigation in the form of an enhanced glazing and ventilation specification have been incorporated. It has been demonstrated that internal sound level guidelines are still achievable during these operational hours. Based on the noise survey and associated calculations, the site is considered suitable for residential development, provided good acoustic design and build.

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1. INTRODUCTION

1.1. It is proposed to introduce new residential premises at The Tavern, 55-57 Frinton Road, Holland-on-Sea, Essex CO15 5UH. The existing ambient noise climate could have the potential to affect the premises.

1.2. The purposes of this report are:

1.2.1. To determine and assess prevailing ambient, background and maximum noise levels affecting the proposal due to nearby noise sources (e.g. air and road traffic);

1.2.2. To present desired internal noise levels to be achieved within the residential premises in accordance with BS 8233:2014;

1.2.3. To detail appropriate sound insulation requirements for the purposes of mitigating noise caused by prevailing and potential noise sources such that internal noise levels are achieved, and

1.2.4. To assess nearby commercial noise generating premises (the public house) in line with ProPG: 2017 guidance under BS 4142: 2014 +A1: 2019 methodology, to establish their potential impact on the proposed dwellings

2. SITE DESCRIPTION AND OBSERVATIONS

2.1. The Tavern, 55-57 Frinton Road, Holland-on-Sea, Essex CO15 5UH is hereafter referred to as 'the site'. The site is currently comprised of a Public House to the ground floor with associated function and storage rooms to the first and second storey. The proposal is to convert the 1st and 2nd floor storeys and undergo change of use to form 4 residential flats and to partially demolish the single storey rear function suite extension and erect four two-bed houses to the rear garden. See appendix A for the site plan (SP1-SP2).

2.2. The Public House, the Tavern, was not operable at time of survey due to the current Covid-19 lockdown. However, it is understood that the PH opening hours are: 12:00 – 23:00 hours on Monday – Thursday & Sunday and 12:00 – 24:00 hours on Friday & Saturday =.

2.3. The site is located within Holland-on-Sea a seaside town and urban area. The site is surrounded by a mixture of residential and commercial premises. The site fronts onto Frinton Road – the B1032. Located to the east is a row of residential premises located over commercial premises. Situated to the rear of the site are residential premises. An East of England Co-operative is located to the west of the site. The Co-operative is only open during daytime hours.

2.4. The noise survey was unmanned; therefore, a subjective assessment of background and ambient noise sources could not be undertaken for the whole monitoring duration. However, during installation and collection of the monitoring equipment, the dominant noise source emanated from road traffic on Frinton Road. These noise sources are considered normal to the site location. No significant abnormal noise source(s) were identifiable.

2.5. Due to the ongoing Covid-19 pandemic and the associated reduction in free movement and operation of commercial premises it is likely that the measured ambient noise climate is lower than it typically is during normal operating circumstances. There is a reduced number of vehicles and aircraft operating. Therefore, the use of the typical background value is considered to be quieter than usual, and therefore more robust.

2.6. The nearby commercial premises were not open due to the ongoing Covid-19 pandemic and associated lockdowns/restrictions. Therefore, it was not possible to measure on-site noise levels from these establishments

3. METHODOLOGY

3.1. Environmental Noise Survey

3.2. An unmanned environmental noise survey was undertaken at two secure single measurement locations (see appendix A). The surveys were undertaken between 14:00 hours on Friday 5th February 2021 and 14:00 hours on the Monday 8th February 2021.

3.3. Ambient, background and maximum sound pressure level measurements (L_{Aeq}, L_{A90} and $L_{Amax,F}$ respectively) were measured throughout the noise survey with continuous recorded 5 minute periods. The measurement position is indicated in orange in Appendix A.

3.4. The sound level meters (SLM) were mounted at first floor level and positioned approximately 1 metre from reflective surfaces (walls) to the front and rear boundary of the proposed development. The position are considered not to be in 'free-field' conditions so a façade correction of -3dB has been applied to the data. The positions were chosen to gain representative noise levels from any noise sources as well as for monitoring equipment security reasons.

3.5. The equipment used for the noise survey is summarised in Table 3.1.

Equipment	Description	Quantity	Serial Number
Svantek 977	Class 1 automated logging sound level meter	1	69506
ACO Pacific 7052E	Class 1 ½" microphone	1	68191
Svantek 977	Class 1 automated logging sound level meter	1	69701
ACO Pacific 7052E	Class 1 ½" microphone	1	71699
Larson Davis CAL200	Class 1 Calibrator	1	14069

Table 3.1 Description of Equipment used for Noise Survey

3.6. The noise survey and measurements were conducted, in accordance with BS7445-1:2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*'. Measurements were made generally in accordance with ISO 1996-2:2007 '*Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels*'.

3.7. The noise monitoring equipment used was calibrated before and after the noise survey period. No significant drift was recorded. Equipment calibration certificates can be provided upon request.

3.8. Weather conditions were noted to be:

3.8.1. during install - warm (approx. 10° Celsius), dry, with clear to cloudy skies (50-75% cloud cover) and a light wind (<5m/s).

3.8.2. during collection - cold (approx. -1° Celsius), with snow showers and a strong wind (>5m/s).

3.8.3. during measurement period - cold (approx. 0-10° Celsius), with clear to cloudy skies (50-75% cloud cover) and a light wind (<5m/s). Heavy rainfall and snowfall occurred over the weekend, particularly Saturday night and Sunday with higher winds accompanying. Therefore, this data has been discounted after 19:00 hours on Saturday from the calculations.

3.9. These weather conditions were checked against and confirmed by the use of the Met Office mobile application available on smart phone technology. These conditions were generally maintained throughout the whole survey period and are considered reasonable for undertaking environmental noise measurements.

3.10. **Sound Insulation Airborne Testing**

3.11. High volume "pink-EQ" noise was generated from an omnidirectional speaker and amp in the source room. The speaker was positioned in order to obtain a diffuse sound field within the room. Measurements were taken using a sweeping microphone technique over a minimum period of 30 seconds at each of two speaker positions. Sound levels were measured and recorded across the 1/3 octave frequency bands between 100 Hz – 3150 Hz. The same measurement procedure was followed in the source and receiver room.

3.12. The value tests were carried out in conformance with BS EN ISO 140-4: 1998 "Field measurements of airborne sound insulation between rooms" and the post processing of the results with BS EN ISO 717-1: 1997 "Rating of sound insulation in buildings and of building elements. Part 1 - Airborne sound insulation".

3.13. The differences between the levels in the source and receiver rooms have been calculated. Correction factors are then applied based on the effect of background noise and reverberation time in the receiving room. This produces a spectrum of values known as the "Standardised Level Difference". This spectrum is then converted to a single figure result: the "Weighted Standardised

Level Difference" with comparison to two reference spectra to produce the parameter required in Approved Document E.

3.14. The reverberation time in the receiver room is obtained using the interrupted noise source method. High volume "pink-EQ noise" was generated within the receiver room. The internal program of the sound level meter was used to measure the decay time of sound in the room. The sound level meter has an internal program, which measures the decay time of sound within a room. Three measurements were taken at each microphone position. A minimum of 3 microphone positions were used. The results were then averaged.

3.15. Background noise levels were undertaken in conformance with BS EN ISO 140 part 4, within the receiver rooms. Measurements were taken for a minimum of 6 seconds. During testing, it was observed that the dominant noise source emanated from road traffic noise from the surrounding road network.

3.16. The equipment used for the sound tests is summarised in Table 3.2.

Equipment	Description	Quantity	Serial Number
NTi XL2	Class 1 automated logging sound level meter	1	A2A-14765-E0
MA220 microphone	Class 1 ½" microphone	1	7564
NTi	Dodecahedron Sound Source DS3	1	D-1081-A3
NTi	Power Amplifier PA3	1	1168
Larson Davis CAL200	Class 1 Calibrator	1	14069
Bosch GLM 40	Laser Measure	1	703222573

Table 3.2 Description of Equipment used for sound testing

3.17. The sound level meter was calibrated before and after testing. No significant drift was recorded. Equipment calibration certificates can be provided upon request.

4. NOISE EMISSION CRITERIA

4.1. National Planning Policy Framework

4.2. In March 2012, the National Planning Policy Framework (NPPF) came into force and was revised in February 2019. This document replaces a great many planning guidance documents, which previously informed the planning system in England.

4.3. The NPPF (2019) sets out the Government's economic, environmental and social planning policies for England and these policies articulate the Government's vision of sustainable development.

4.4. The Noise Policy Statement for England (NPSE) published 2010 applies to *'all forms of noise, including environmental noise, neighbour noise and neighbourhood noise'*.

4.5. **Paragraph 180 of the NPPF (2019) considers noise, stating:**

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

4.6. National Planning Policy is guided by the NPPF. With regard to noise, the terms 'significant adverse impact' and 'other adverse impacts' are defined in the explanatory notes of the 'Noise Policy Statement for England' (NPSE). These state that there are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

- 'NOEL – No Observed Effect Level, this is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise, and

- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.

4.7. Extending these concepts for the purpose of this NPSE leads to the concept of SOAEL - significant observed adverse effect level. This is the level above which significant adverse effects on health and quality of life occur'. However, no specific noise limits for LOAEL and SOAEL have been defined. Therefore, guidance from other acoustic standards must be employed to determine suitable levels within the overall principal of the National Planning Policy Framework; such as BS 8233:2014.

4.8. **Local Authority Criteria**

4.9. The proposed site lies within the jurisdiction of the Local Authority, Tendering District Council. An acoustic report is required to support detailed planning consent. The noise assessment is to include the impact of ventilation, extraction and public house use on residential amenities. The following wording in relation to the requirement of the noise assessment has also been provided by the local authority:

> Also of particular relevance in this instance would be the compatibility of uses, i.e. residential and public house. Therefore, an application would need to be submitted by the relevant noise reports to assess and demonstrate the impact of ventilation, extraction and the Public House use itself on neighbouring residential properties.

4.10. **BS8233:2014**

4.11. Local Authorities usually stipulate internal noise criteria for new build residential uses based on British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'.

4.12. BS 8233:2014 provides references and guideline values for desirable indoor ambient noise levels for dwellings as shown in Table 4.1 below.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Table 4.1 **BS 8233:2014 Desirable Internal Ambient Noise Levels for Dwellings**

4.13. The table is noted to apply to external noise as it affects the internal acoustic environment from sources without a specific character. The above internal ambient noise levels are therefore considered appropriate within this assessment.

4.14. BS 8233:2014 states that 'for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed an upper guideline value of 55dB L_{Aeq}, which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances...in higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited'.

4.15. **ProPG: 2017**

4.16. The ProPG: Planning and Noise, Professional Practice Guidance on Planning and Noise for New Residential Development was released in 2017. ProPG: 2017 aims to consider noise in relation to the planning process and encourages good acoustic design at an early stage. The guidance aims to protect people from the harmful effects of noise.

4.17. A summary of the overall ProPG approach is shown below in figure 4.2.

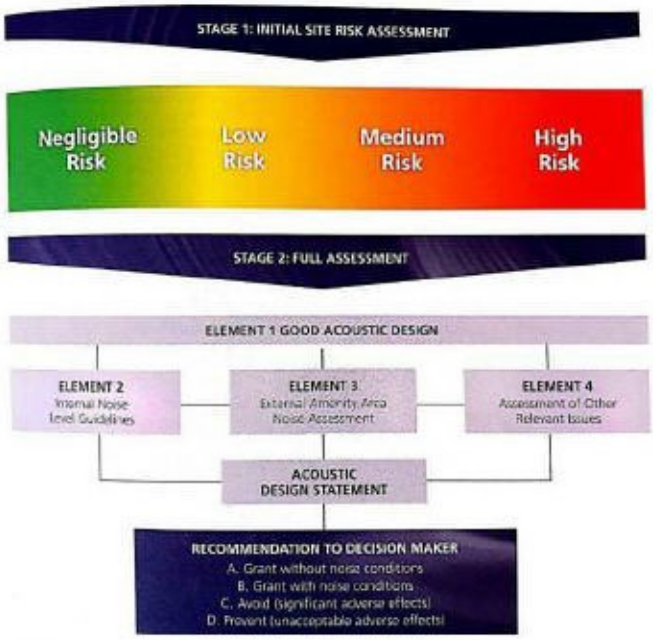


Figure 4.2 – Summary of the ProPG: 2017 approach

4.18. ProPG: 2017 provides recommendations and is to be taken into account with other acoustic guidance.

4.19. ProPG: 2017 notes that it *'does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy on which users should take their own advice as appropriate'*.

4.20. **BS 4142: 2014**

4.21. BS 4142: 2014 "Methods for Rating and Assessing Industrial and Commercial Sound" presents a method for assessing the significance and possible adverse impact due to an industrial or commercial noise source upon the proposed residential. A comparison has been made of the source noise levels and the background noise levels, both of which are measured or predicted at the proposed noise sensitive receiver.

4.22. The specific noise level due to the source is determined, with a series of corrections for tonality, impulsivity, intermittency or any other unusual characteristic. This can result in a maximum total correction of +21dB being added if the new noise source demonstrates all the above characteristics. The rating level is then compared to the background noise level and the significance of the new noise source likelihood of any adverse impact is determined in accordance with the following advice:

> *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

5. NOISE SURVEY RESULTS

5.1. Environmental Survey

5.2. The average-ambient and noise levels at the measurement position during the survey has been based on an analysis of the monitoring data and are summarised in Table 5.1. A time history of the noise monitoring data recorded during the measurement survey is provided in Appendix B (TH1-TH2).

Monitoring Position	Period	Measured External Sound Pressure Level, dB	Typical Background Level, dB
Position 1 (Front Façade)	Daytime (07:00 - 23:00)	70 $L_{Aeq,T}$	55 dB $L_{A90,T}$
	Night-time (23:00 - 07:00)	58 $L_{Aeq,T}$	31 dB $L_{A90,T}$
	Night-time (23:00 - 07:00)	*78 $L_{Amax,F}$	-
	Operating PH Hours (12:00-00:00)	69 $L_{Aeq,T}$	61 dB $L_{A90,T}$
Position 2 (Rear Façade)	Daytime (07:00 - 23:00)	49 $L_{Aeq,T}$	45 dB $L_{A90,T}$
	Night-time (23:00 - 07:00)	40 $L_{Aeq,T}$	27 dB $L_{A90,T}$
	Night-time (23:00 - 07:00)	**57 $L_{Amax,F}$	-
	Operating Hours (12:00-00:00)	48 $L_{Aeq,T}$	45 dB $L_{A90,T}$

*14th highest measured noise level **13th highest measured noise level

Table 5.1 Environmental Noise Survey Results

5.3. BS 8233:2014 does not provide specific guidance on night time $L_{Amax,F}$ criteria therefore maximum levels are based on World Health Organisation 'Guideline for Community Noise' (2009) (WHO) guidance, BS8233:1999 guidance and ProPG:2017 guidance. It is stated that for suitable sleeping conditions, 45dB $L_{Amax,F}$ should not be exceeded by more than 10-15 times a night within a bedroom. For robustness, the $L_{Amax,F}$ noise levels presented above is the not normally exceeded (NNE) 13th and 14th highest measured between 23:00 and 07:00 hours. This $L_{Amax,F}$ noise level then needs to be reduced to 45dB internally to comply with the night time internal noise level.

5.4. Sound Insulation Airborne Results

5.5. The results of the airborne testing are summarised in table 5.2 The testing certificate can be found in Appendix E.

Test Element	Source	Receiver	Test Result
Floor	Main Bar	Function Room	$D_{nT,w} + C_{tr}$ 46dB

Table 5.2 **Sound Insulation Test Results**

6. NOISE IMPACT ASSESSMENT

6.1. The proposed development is to be located above and to the rear of an existing source of commercial noise, the PH, therefore a noise impact assessment has been undertaken to predict the potential impact noise from this venue would have on the proposed residential dwellings.

6.2. The operation of the Co-operative Store, located to the west, has been considered as a potential nearby noise source. The operation of this premise has been measured during the unattended noise survey and has therefore been accounted for within the glazing specification. Whilst onsite, the co-op was not noted to produce any particular tonal or unusual noise characteristics.

6.3. It has not been possible to take on-site measurements of these businesses operating due to the current Covid-19 lockdown restrictions. This assessment has therefore utilised historic noise measurement data of similar businesses and activities in operation. The sound level data used within this assessment is presented in Table 6.1:

Noise Source	Octave band sound pressure level at 1m, dB							dB(A)
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Pub – External noise level in pub garden with music event inside	72	63	66	65	58	54	44	69

Table 6.1 Historic noise levels used in the assessment

6.1. Two noise sensitive receiver (NSR) points have been identified on the proposed development due to their close proximity to the PH. These are identified on SP3.

6.1.1. NSR1 has been identified as a window on the front façade of the proposed flat development, located directly above the PH. The window is approximately 2m above and there is no line of sight.

6.1.2. NSR2 has been identified as a window in the front façade of the proposed houses, located approximately 4m from the rear façade of the PH, with partial line of sight.

6.2. It can be confidently assumed that if the noise impact assessment indicates that the specific sound source has a low impact on these premises then it can be safely assumed it will be met at other properties of equal distance and/or those further away.

6.3. The noise criteria has been set in line with the typical background operational levels, which is 61 dB $L_{Aeq,operational\ hours}$ at NSR1 and 45 dB $L_{Aeq,operational\ hours}$ at NSR2.

6.4. Calculations to predict the noise level of these nearby commercial premises on the proposed development are provided in Appendix D. The following factors have been taken into account during the assessment and within the calculations:

6.5. A 'penalty' addition of +3dB has been added for intermittency as the noise sources have the potential to be *'readily distinctive against the residual acoustic environment'*. Penalty additions have not been added for impulsivity, tonality or other noise characteristics as PH's are usually not identified as generating such features.

6.6. The operating hours for the premises are understood to be the PH opening hours are: Monday – Thursday & Sunday = 12:00 – 23:00 hours and on Friday & Saturday = 12:00 – 24:00 hours.

6.7. The rating noise level from the PH in operation with amplified music has been calculates at 62 dB $L_{Ar,Tr}$, at NSR1 and at 54 dB $L_{Ar,Tr}$, at NSR2. This is **1 dB(A) above** the assessed background noise level (61 dB $L_{A90,T}$) for NSR1 and **9 dB(A) above** the assessed background noise level (45 dB $L_{A90,T}$) at NSR2. This is an indication of the specific noise source (live music from the PH) having LOAEL at NSR1 and a SOAEL at the NSR2.

6.8. It should be noted that these predictions are based on measurements at other sites and afford a degree of cautiousness when determining the impact. All levels are predicted at 1m from the external façade of the NSR's. The internal noise criteria has been designed to be met, accounting for these potential nearby businesses noise emissions.

6.9. As operations from the PH have the possibility to cause an adverse impact at NSR1 and NSR2 it is recommended that some degree of mitigation is taken to reduce this. It has been recommended that acoustic trickle ventilation and mechanical ventilation is also utilised within the development. This allows residents the option of keeping their windows closed during the hours of operation but still have fresh ventilation, control the internal temperature and thus reduce the potential noise impact from this premises. Should further mitigation be required a noise limiter could be installed into the PH to limit the source noise. The noise limiter would need to be set appropriately once the premises were constructed.

6.10. Further façade impact calculations and glazing specification calculations have been undertaken to establish whether it is possible to achieve internal noise levels within the proposed development during operating hours of the public house (12:00 – 00:00)

6.11. The operating or 'on-time' has been recalculated with the following formula:

$$L_2 = L_1 + 10\log(T_0/T_r)$$

Where T_0 is the on-time of the noise and T_r is the reference/total time period

6.12. The day-time (07:00 – 23:00) noise level from the PH operating has therefore been calculated at 60 dB $L_{Aeq,day\text{-}time}$ at NSR1 and at 52 dB $L_{Aeq,day\text{-}time}$ at NSR2.

6.13. The night-time (23:00 – 07:00) noise level from the PH in operation has been calculated at 53 dB $L_{Aeq,night\text{-}time}$ at NSR1 and 45 dB $L_{Aeq,night\text{-}time}$ at NSR2. These noise levels have been utilised within the glazing specification calculations in Appendix C.

6.14. As the measured noise levels were higher for position 1, these will be used for the glazing calculations to determine the internal noise levels for day and night-time. The re-calculated levels to include operations, will however be used for position 2 as the recalculated levels are higher.

6.15. **Noise Impact Assessment for Internal Sound Transfer**

6.16. A sound test was undertaken to determine the existing airborne sound performance of the separating floor between the bar and first floor function room. The function room will be converted into the first floor residential flats.

6.16.1. It is unusual for impact testing to be required form a residential floor down to commercial, although care should be taken when construction to ensure footfall / impact noises are minimised.

6.17. The current performance is 46 dB $D_{nTw+Ctr,}$ which exceeds the building regulation criteria for new builds between residential properties. The criteria can be seen in figure 6.2 and the results of the sound test in appendix E.

Table 0.1a **Dwelling-houses and flats – performance standards for separating walls, separating floors, and stairs that have a separating function**		
	Airborne sound insulation sound insulation $D_{nT,w} + C_{tr}$ dB (Minimum values)	Impact sound insulation $L'_{nT,w}$ dB (Maximum values)
Purpose built dwelling-houses and flats		
Walls	45	-
Floors and stairs	45	62
Dwelling-houses and flats formed by material change of use		
Walls	43	-
Floors and stairs	43	64

Table 6.2 Performance standards for separating walls and floors - Source Building Regulations ADE: 2015

6.18. There is no set criteria for sound insulation performance between residential and commercial premises, however we recommend the sound performance of the floor is enhanced to at least 10dB above the building regulations to reduce any airborne noise transference between the PH and proposed residential, especially if the PH is to operate amplified or live music. This will reduce the potential for negative impact upon the residents. Internal levels as under BS 8233: 2014 guidance would need to be met with the pub in operation through the floor. Following planning consent, architectural building regulation drawings will need to be generated. The floor will need design input from structural, fire and acoustic engineers. At such time consideration to the floor construction specification and architectural acoustic design will enable the internal criteria to be met to reduce the risk of noise nuisance, including for the times when the public house has live and amplified music.

7. SITE SUITABILITY FOR RESIDENTIAL DEVELOPMENT

7.1. With appropriate sound insulation measures and building construction as exampled within this report the proposed site is more than capable of achieving the recommended internal noise levels in the premises. The façade construction is proposed to be of brick and block. All major building elements should be tested in accordance with BS EN ISO 140-3:1995.

7.2. Sound reduction performance calculations have been undertaken to determine the internal noise levels and performance of the glazed and non-glazed elements as outlined in Table 7.1. The specification has been adopted to achieve the night-time level (23:00 – 07:00 hours) for bedrooms, 30dB $L_{Aeq\ 8hour}$ and for the daytime (07:00 – 23:00) for living rooms, 35dB $L_{Aeq\ 16hour}$. Values of the night-time period have been also applied to the calculated sound reduction index of the glazed element to confirm the limit of 45 $L_{Amax,F,}$ is also achieved for single events during the night.

façade	Period	Measured External Sound Pressure Level, dB	Calculated External Sound Pressure Level, dB	Internal Sound Pressure Level Requirement, dB
Position 1 Front Façade	Daytime (07:00 – 23:00)	70 dB $L_{Aeq,T}$	60 dB $L_{Ar,Tr}$	35 dB $L_{Aeq,T}$
	Night time (23:00 – 07:00)	58 dB $L_{Aeq,T}$	53 dB $L_{Ar,Tr}$	30 dB $L_{Aeq,T}$
	Night time (23:00 – 07:00)	78 dB $L_{Amax,F}$*	N/A dB	45 dB $L_{Amax,F}$
Position 2 Rear Facade	Daytime (07:00 – 23:00)	49 dB $L_{Aeq,T}$	52 dB $L_{Ar,Tr}$	35 dB $L_{Aeq,T}$
	Night time (23:00 – 07:00)	40 dB $L_{Aeq,T}$	45 dB $L_{Ar,Tr}$	30 dB $L_{Aeq,T}$
	Night time (23:00 – 07:00)	57 dB $L_{Amax,F}$*	N/A dB	45 dB $L_{Amax,F}$

*14th highest measured noise level **13th highest measured noise level

Table 7.1 Required Sound Insulation Performance

7.3. Suggested glazing units and building element specifications other than those provided below may be suitable but should be checked before purchase or installation. The analysis is provided to demonstrate that a design solution is feasible at the site for the purposes of meeting the requirements of the Local Authority.

8. BUILDING FACADES SUITABILITY

8.1. Non-Glazed Elements

8.2. It is understood that the non-glazed elements of the building will utilise the existing construction for the flats which is understood to be constructed from brick and block work and internally drylined. It is understood that the proposed houses will also be constructed from brick and block work and internally drylined.

8.3. This construction would be anticipated to provide a sound reduction performance of at least the figures shown in Table 8.1 when tested in accordance with BS EN ISO, 140-3:1995.

Element	Octave band centre frequency SRI, dB					
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
Non-glazed element brick/block cavity wall SRI	41	43	48	50	55	55

Table 8.1 Non-glazed elements assumed sound reduction performance

8.4. The below example of construction provides guidance to a typical wall build which should attenuate external noise such that the internal noise levels are achieved.

- BS 8233 Table E.1A (50-54dB R_W sound insulation) (d) details construction of "Brick laid frogs up, wall nominal 200 mm thickness, weight (including plaster) not less than 380 kg/m^2. Plaster or dry-lined finish both sides. Brickwork joints well filled".

8.5. Given the typical extensive build and construction of external walls in accordance with the Building Regulations it is predicted that this element would provide significant attenuation to achieve the internal noise levels.

8.6. Roofs

8.7. Roofs generally have a lower SRI than masonry façade walls but they are required to reduce noise from external sources. Typical construction and sound insulation values of roofs can be gained from BS 8233:2014, for example a traditional pitched roof with tiles on felt with 100mm mineral wool on plasterboard ceiling has an SRI of approximately 43dB *R*w. It is predicted that the build of the roofs is likely to achieve and exceed this value of 43dB *R*w and that these elements would provide significant attenuation to achieve the internal noise levels.

8.8. Given the typical extensive build and construction of roofs it is predicted that these elements would provide significant attenuation to achieve the internal noise levels.

8.9. **Glazed Elements**

8.10. Calculations (Appendix C) show that based on monitoring data, façade materials, room sizes and volumes, a minimum of 45 dB R_w noise reduction is required for all glazed elements within the flats and a minimum of 31 dB R_w noise reduction is required for all glazed elements within the houses to be installed. The performance is specified for the whole window unit, including the frame and other design features such as the inclusion of trickle vents. Sole glass performance data would not demonstrate compliance with this specification. Glazing performance calculations have been based on the measured L_{Aeq} noise levels as recommended by BS 8233:2014.

8.11. As this report has been produced for a planning pre-application, no finalised architectural plans have been produced at this time, therefore the following assumptions have been made:

8.11.1. **Bedroom:**

8.11.1.1. Dimensions = 3.5m x 3m x 2.4m;

8.11.1.2. Volume = 25.2m^3;

8.11.1.3. External façade = 15.6m^2;

8.11.1.4. Glazing = 6m^2.

8.11.2. **Living Room dimensions:**

8.11.2.1. Dimensions = 4m x 3.5m x 2.4m;

8.11.2.2. Volume = 33.6m^3;

8.11.2.3. External façade = 18m^2;

8.11.2.4. Glazing = 8m^2.

8.12. Typical' thermal double-glazing required by the Building Regulations provide approximately 31dB R_w sound insulation therefore this enhanced glazing specification should ensure that the internal noise levels and thermal levels are achieved. These specifications and their acoustic data on octave band frequencies are provided in Appendix C.

8.13. The glazing requirements are listed below in table 6.3. These specifications and their acoustic data on octave band frequencies are provided in Appendix C.

Glazing Type	Required Overall Sound Reduction Performance, R_w	Glazing and Ventilation Type – Indicative Only
Flat Façades*	45 dB	R_w 45 dB Acoustic Laminate Glazing System (13mm Glass – 12mm air gap – 13mm laminate glazing)
		Mechanical Ventilator ($100\ D_{n,e,w}$)
House Façades*	29 dB	R_w 31 Double Glazing System (4mm Glass – 12mm air gap – 4mm glass)
		Acoustic Trickle Ventilator ($42\ D_{n,e,w}$)

**based on approximate average room sizes*

Table 6.3 Required Glazing specifications.

8.14. **Ventilation**

8.15. In addition to the glazing requirements, internal noise levels should be considered in the context of room ventilation requirements. At the time of writing, full details regarding a ventilation strategy are not available. Table 8.2 details a suitable mechanical ventilation, which provides a sound insulation performance of 100dB $D_{n,e,w,}$ which would work in combination with the specified glazing spectral for the house's.

8.16. Table 8.2 details a suitable acoustic trickle ventilator, which provides a sound insulation performance of 42dB $D_{n,e,w,}$ which would work in combination with the specified glazing spectral for the house's.

8.17. **Detailed Design Stage Notes:**

8.18. The analysis is provided to demonstrate that a design solution is feasible at the site for the purposes of meeting the requirements of the Local Authority local policy and British Standard internal design criteria and therefore to produce a noise impact assessment to be supplied in support of the planning application.

8.19. Following planning consent, then it is usual that the architect will produce full building regulation drawings. At which time, structural chartered engineers, thermal engineers, M+E and acoustic engineers will be engaged to input on the detailed design. As part of this detailed design

stage, it is strongly recommended that further acoustic analysis of the individual specified components and if necessary further recommendations, specifications be undertaken.

8.20. Acoustic calculations to determine the glazing and ventilation strategy should also be re-run should the room sizes and percentage of glazing differ from the design provided in appendix C.

8.21. Should the public house be opened and lockdown restriction eased due to Covid-19, it is advisable that levels of the public house in operation are gained and if they differ, that the calculations are re-run. This could be done following planning consent at time of detailed building regulation drawing stage.

9. EXTERNAL AMENITY SUITABILITY

9.1. BS 8233:2014 states that '*for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$ with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances…in higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited*'.

9.2. The recently released ProPG Planning and Noise Guidance, published 2017, states that: *"If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended"*. It is understood that external amenity is proposed to the rear of the site and that once developed there will be no external pub garden or patron use of the rear area of the pub site.

9.3. It is understood that external amenity is also proposed for the flats to the rear of the site. Noise monitoring data of site conditions during time of survey confirms that the external amenity areas achieve BS8233:2014 and WHO (1999) guidance levels, therefore no mitigation levels are required.

9.4. Noise monitoring data confirms that the external amenity areas achieve BS8233:2014 and WHO (1999) guidance levels for the residential houses, therefore no mitigation levels are required. Should a further reduction be desired, then a basic standard fence will achieve a sound reduction of around 5dB(A), a good standard fence design will achieve around 10dB(A) noise reduction.

9.5. The noise with the PH in operation has been considered upon the external amenity, as seen in the Acoustic Calculations in appendix D. The kitchens, storerooms and toilets are proposed to the rear of the pub, which would afford further attenuation.

10. UNCERTAINTY

10.1. The levels of uncertainty in the data and calculations are considered to be low given the robust exercise undertaken in noise monitoring and the confidence in the statistical analysis.

10.2. All measurements taken on-site by instrumentation are subject to a margin of uncertainty. This is relatively small, with a sound level meter manufacturer's margin of uncertainty at +/- 1.1dB. It is due to the tolerances associated with the Class 1 sound level meter and calibrator equipment used to measure background.

10.2.1. The meter and calibrator used have a traceable laboratory calibration and were field calibrated before and after the measurements.

10.3. Uncertainty in the calculated impact has been reduced by the use of a well-established calculation method.

10.4. There is a degree of uncertainty within the noise impact assessment due to the use of historic noise levels as opposed to on-site measured levels. The data has been selected from similar activities and locations to provide a robust assessment and keep this uncertainty as low as possible.

10.5. There is some uncertainty in the on-site measured levels due to the ongoing Covid-19 pandemic and associated reduction of free movement/lock-down as activity levels may differ from 'normal'.

11. CONCLUSION

11.1. A new residential development is proposed at The Tavern, 55-57 Frinton Road, Holland-on-Sea, Essex CO15 5UH

11.2. A noise survey and assessment has been undertaken for the proposed development. Existing noise levels at the site have been measured and compared to relevant standards and guidance.

11.3. A minimum of 45dB R_w noise reduction is required for all glazed elements to be installed into the proposed flats and a minimum of 31dB R_w noise reduction is required for all glazed elements to be installed into the proposed houses. Glazing calculations have been carried out and the requirements identified.

11.4. With appropriate sound insulation glazing measures and building construction as exampled within this report the proposed residential premises is more than capable of achieving the guideline internal noise criteria contained in BS 8233:2014.

11.5. It is recommended that the existing separating floor between the pub and proposed residential is upgraded, to reduce noise transferring and negatively impacting the flats.

11.6. The associated PH has been identified as a potential cause of adverse noise impact with a rating noise level of 62 dB LAr,Tr at the NSR1 and 54 dB LAr,Tr at NSR2. This is 1 dB(A) above the measured background level of 61 dB LA90,T during normal operation at NSR1 and 9 dB(A) above the measured background level of 45 dB LA90,T during normal operation at NSR2. Therefore additional mitigation in the form of an enhanced glazing and ventilation specification have been incorporated. It has been demonstrated that internal sound level guidelines are still achievable during these operational hours.

11.7. Due to Covid-19 it is recommended that a further baseline noise survey is undertaken at time of Building Regulation drawings and Acoustic Detailed Design stage.

11.8. Based on the noise survey, the predictions of noise emissions from when nearby businesses are operable, the site is considered suitable for residential development, provided good acoustic design and build are implemented.

Appendix A – Site Plan (SP1)

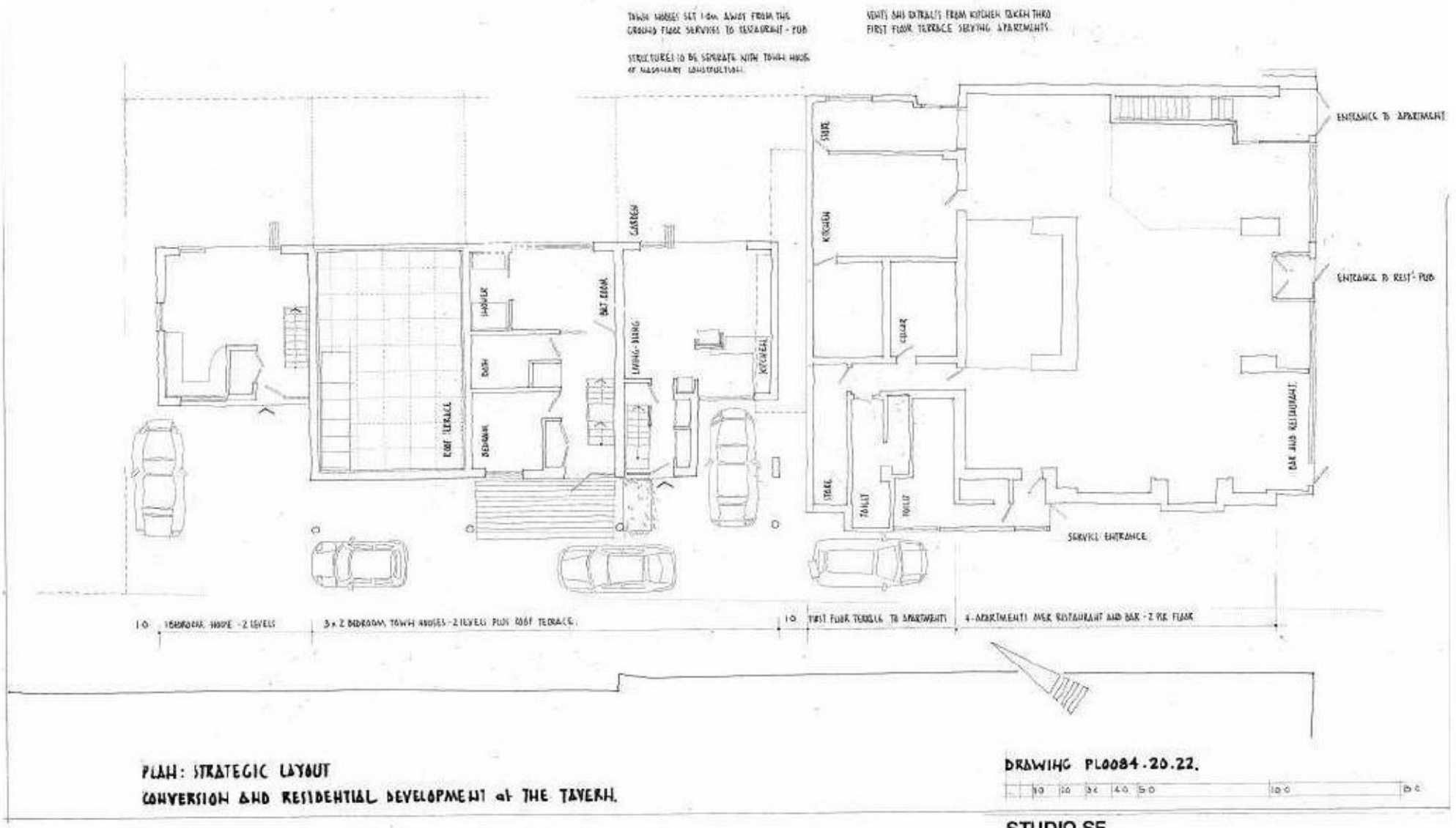
Key:

Noise Monitoring Position

Site Boundary

Appendix A – Site Plan (SP2)

Proposed Site layout



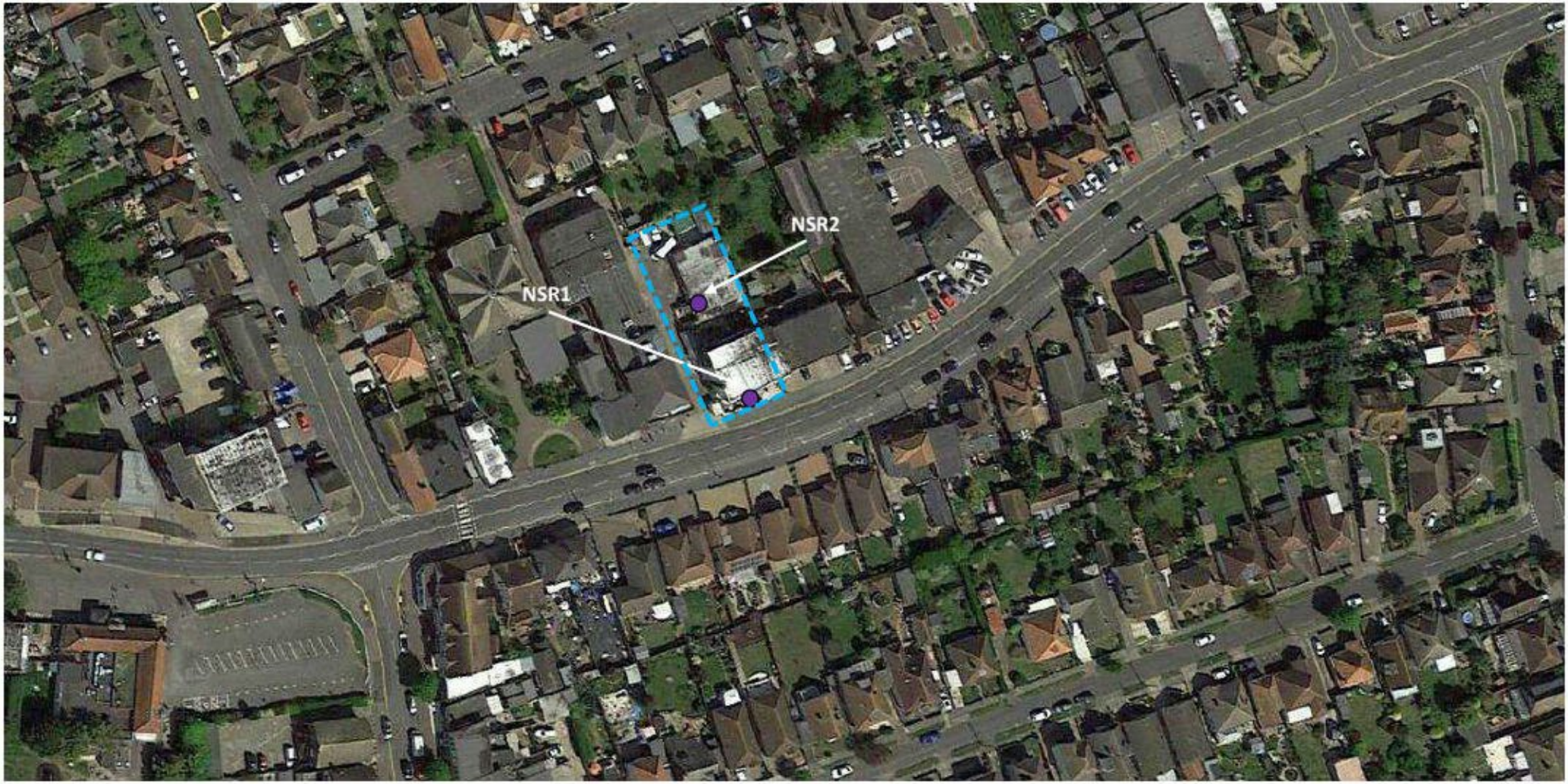
PLAN: STRATEGIC LAYOUT
CONVERSION AND RESIDENTIAL DEVELOPMENT at THE TAVERN.

DRAWING PL0084.20.22.

STUDIO SE
Architects

[redacted]

Appendix A – Site Plan (SP3)



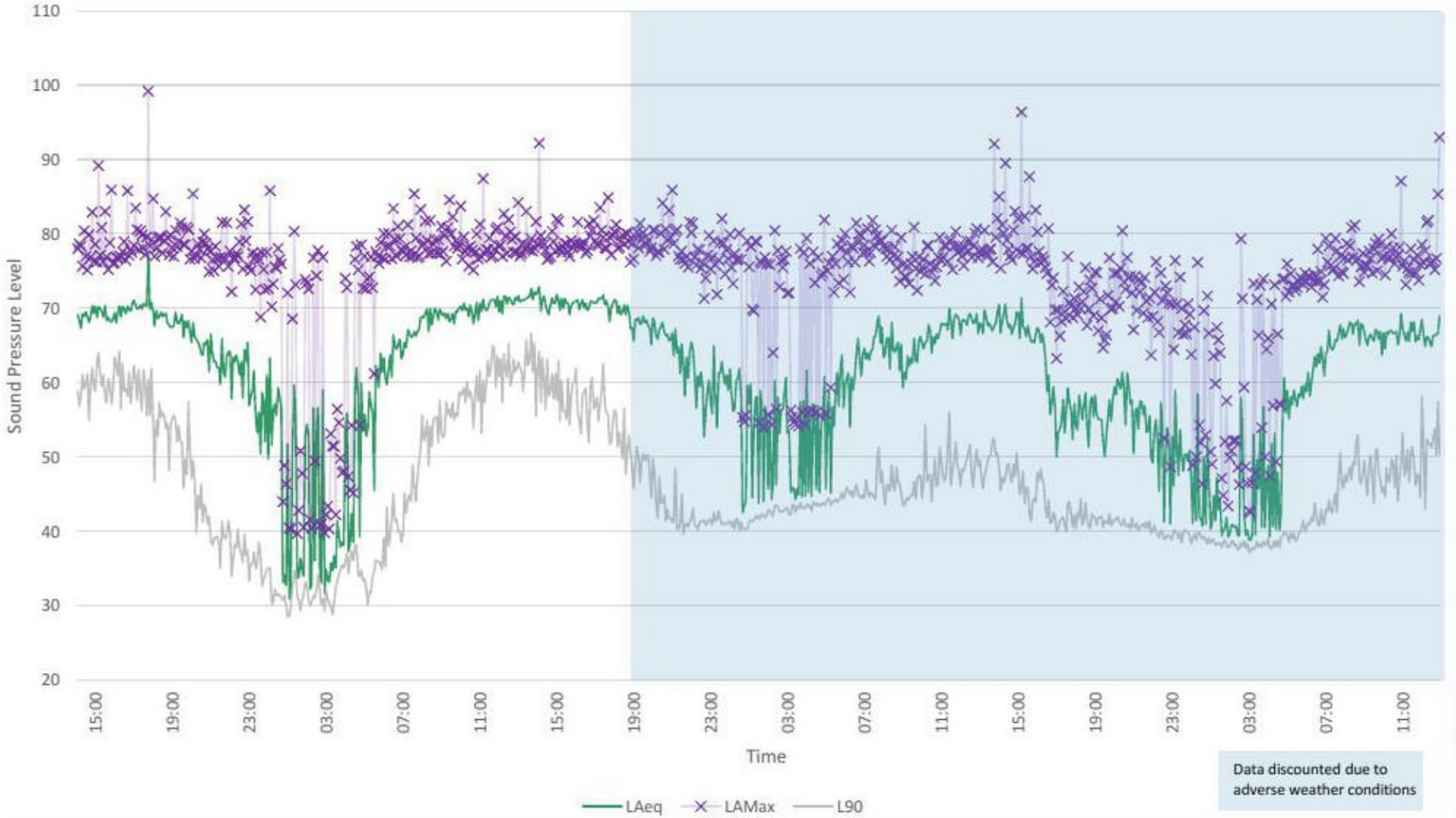
Key:

Noise Sensitive Receiver

Site Boundary

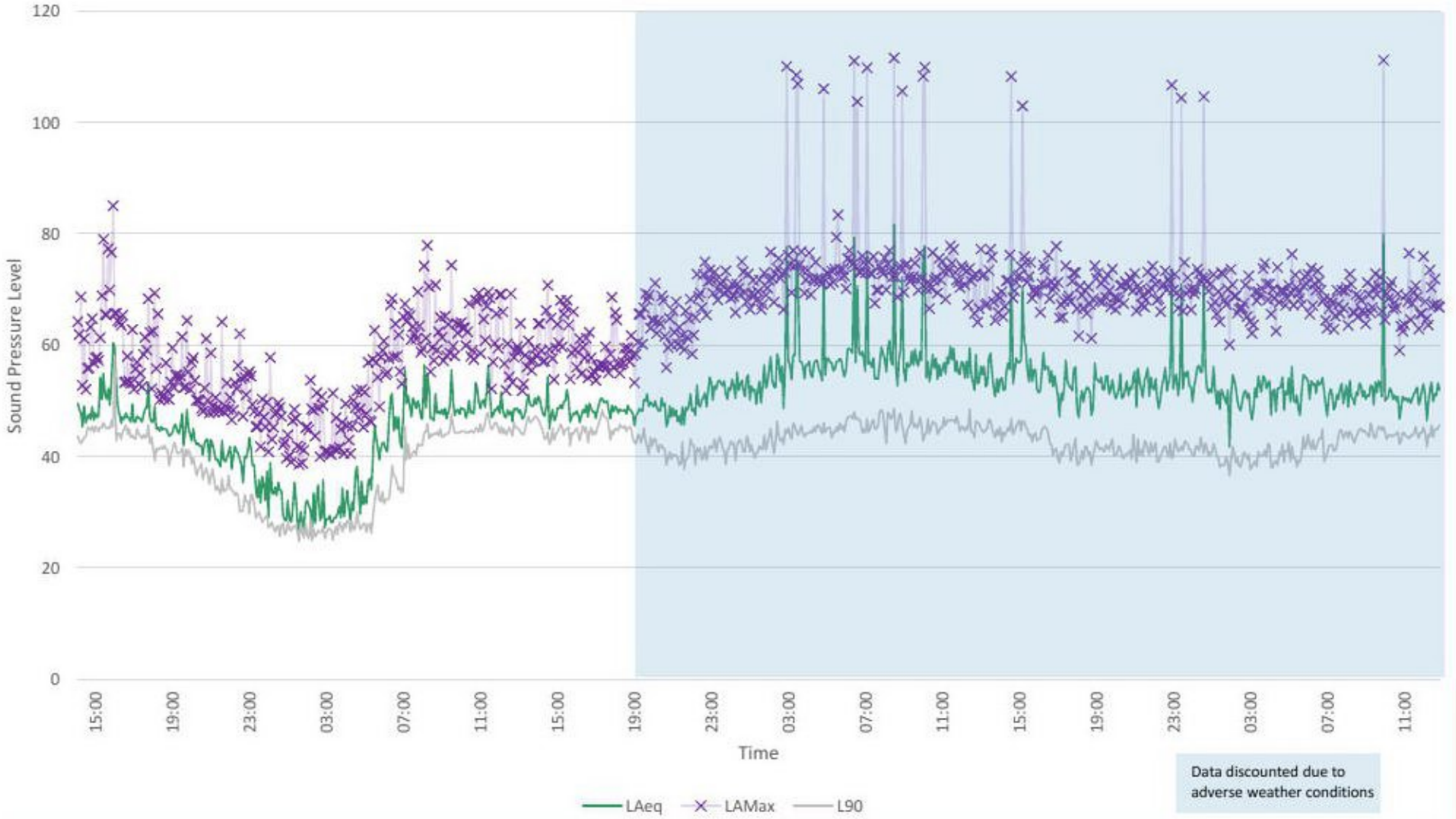
Appendix B - Time History 1 (TH1)

The Tavern, 55-57 Frinton Road, Holland-on-Sea, Essex
Friday 5 February 2021 - Monday 8 February 2021
Position 1



Appendix B - Time History 2 (TH2)

The Tavern, 55-57 Frinton Road, Holland-on-Sea, Essex
Friday 5 February 2021 - Monday 8 February 2021
Position 2



Appendix C

The Tavern, 55-57 Frinton Road
Flats

BS EN 12354-3 Calculation to determine glazing specification

Habitable room data variables

Type of habitable room	Bedroom	**Based on approximate room sizes*
Volume	25	cubic metres
Total area - external façade(s	16	square metres
Total area - window(s)	6	square metres
L(k)	3	
Lmax (K)	3	
Trickle Ventilator(s)	5	
Solid Façade (exc. windows)	10	square metres
Reverberation Time	0.5	seconds

External noise level

	1:1 Octave Bands Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Logged Log average daytime Leq	67	63	63	63	67	62	54	**70**
Logged Log average night-time Leq	54	52	52	51	56	51	42	**58**
Logged Lmax for duration of survey	77	74	72	72	75	70	63	**78**

Sound reduction of building fabric

	1:1 Octave Band Centre Frequency (Hz)							Rw /
	63	125	250	500	1000	2000	4000	Dn,e,W
45 Rw - Pilk 13/12/13mm acoustic laminate	26	28	34	44	52	47	55	**45**
**Standard Masonry from Template Re	39	41	43	48	50	55	55	
100 Dn,e,w - Mechanical Ventilation	98	100	100	100	100	100	100	**0**

	1:1 Octave Band Centre Frequency (Hz)						
	63	*125*	*250*	*500*	*1000*	*2000*	*4000*
Reduction from façade	-23.9	-25.9	-31.4	-40.1	-44.7	-44.3	-49.0
Addition for Ctr	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Resultant internal noise level

	1:1 Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Daytime internal Leq	48	42	36	28	28	23	10	**34**
Night-time internal Leq	35	31	25	16	16	11	-2	**22**
Night-time internal Lmax	53	48	40	31	31	26	14	**38**

Based on BS8233:2014 - Design Criterion:	LAeq	30
Based on BS8233: 1999 Lmax levels	LAmax	45

Appendix C

The Tavern, 55-57 Frinton Road
Flats

BS EN 12354-3 Calculation to determine glazing specification

Habitable room data variables

Type of habitable room	Living Room	**Based on approximate room sizes*
Volume	34	cubic metres
Total area - external façade(s	18	square metres
Total area - window(s)	8	square metres
L(k)	3	
Lmax (K)	3	
Trickle Ventilator(s)	10	
Solid Façade (exc. windows)	10	square metres
Reverberation Time	0.5	seconds

External noise level

	1:1 Octave Bands Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Logged Log average daytime Leq	67	63	63	63	67	62	54	**70**
Logged Log average night-time Leq	54	52	52	51	56	51	42	**58**
Logged Lmax for duration of survey	77	74	72	72	75	70	63	**78**

Sound reduction of building fabric

	1:1 Octave Band Centre Frequency (Hz)							Rw /
	63	125	250	500	1000	2000	4000	Dn,e,W
45 Rw - Pilk 13/12/13mm acoustic laminate	26	28	34	44	52	47	55	**45**
**Standard Masonry from Template Re	39	41	43	48	50	55	55	
100 Dn,e,w - Mechanical Ventilation	98	100	100	100	100	100	100	**0**

	1:1 Octave Band Centre Frequency (Hz)						
	63	*125*	*250*	*500*	*1000*	*2000*	*4000*
Reduction from façade	-24.1	-26.1	-31.7	-40.6	-45.6	-44.6	-49.8
Addition for Ctr	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Resultant internal noise level

	1:1 Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Daytime internal Leq	48	42	36	27	27	23	10	**33**
Night-time internal Leq	35	31	25	16	15	11	-3	**22**
Night-time internal Lmax	53	48	40	31	30	26	13	**37**

Based on BS8233:2014 - Design Criterion: LAeq 35
Based on BS8233: 1999 Lmax levels LAmax n/a

Appendix C

The Tavern, 55-57 Frinton Road
Houses

BS EN 12354-3 Calculation to determine glazing specification

Habitable room data variables

Type of habitable room	Bedroom	**Based on approximate room sizes*
Volume	26	cubic metres
Total area - external façade(s	16	square metres
Total area - window(s)	6	square metres
L(k)	3	
Lmax (K)	3	
Trickle Ventilator(s)	5	
Solid Façade (exc. windows)	10	square metres
Reverberation Time	0.5	seconds

External noise level

	1:1 Octave Bands Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Logged Log average daytime Leq	53	46	40	39	42	46	48	**52**
Logged Log average night-time Leq	47	39	33	32	35	40	41	**45**
Logged Lmax for duration of survey	61	56	54	56	50	48	42	**57**

Sound reduction of building fabric

	1:1 Octave Band Centre Frequency (Hz)							Rw /
	63	125	250	500	1000	2000	4000	Dn,e,W
31 Rw - Pilk 4/12/4mm	22	24	20	25	35	38	35	**31**
**Standard Masonry from Template Re	39	41	43	48	50	55	55	
42 Dn,e,w - Renson AK38 - Acoustic trickle vent	29	31	33	42	43	39	44	**42**

	1:1 Octave Band Centre Frequency (Hz)						
	63	*125*	*250*	*500*	*1000*	*2000*	*4000*
Reduction from façade	-19.6	-21.6	-18.2	-23.3	-32.7	-34.0	-33.0
Addition for Ctr	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Resultant internal noise level

	1:1 Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Daytime internal Leq	38	29	27	21	14	17	20	**26**
Night-time internal Leq	33	22	20	14	7	10	13	**19**
Night-time internal Lmax	41	34	36	33	17	14	9	**32**

Based on BS8233:2014 - Design Criterion:	LAeq	30
Based on BS8233: 1999 Lmax levels	LAmax	45

Appendix C

The Tavern 55-57 Frinton Road
House

BS EN 12354-3 Calculation to determine glazing specification

Habitable room data variables

Type of habitable room	Living Room	**Based on approximate room sizes*
Volume	34	cubic metres
Total area - external façade(s	18	square metres
Total area - window(s)	8	square metres
L(k)	3	
Lmax (K)	3	
Trickle Ventilator(s)	10	
Solid Façade (exc. windows)	10	square metres
Reverberation Time	0.5	seconds

External noise level

	1:1 Octave Bands Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Logged Log average daytime Leq	53	46	40	39	42	46	48	**52**
Logged Log average night-time Leq	47	39	33	32	35	40	41	**45**
Logged Lmax for duration of survey	61	56	54	56	50	48	42	**57**

Sound reduction of building fabric

	1:1 Octave Band Centre Frequency (Hz)							Rw /
	63	125	250	500	1000	2000	4000	Dn,e,W
31 Rw - Pilk 4/12/4mm	22	24	20	25	35	38	35	**31**
**Standard Masonry from Template Re	39	41	43	48	50	55	55	
42 Dn,e,w - Renson AK38 - Acoustic trickle vent	29	31	33	42	43	39	44	**42**

	1:1 Octave Band Centre Frequency (Hz)						
	63	*125*	*250*	*500*	*1000*	*2000*	*4000*
Reduction from façade	-19.3	-21.3	-18.1	-23.2	-32.5	-33.2	-32.7
Addition for Ctr	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Resultant internal noise level

	1:1 Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	dB(A)
Daytime internal Leq	39	29	27	21	15	18	21	**26**
Night-time internal Leq	33	23	20	14	7	11	13	**19**
Night-time internal Lmax	42	35	36	33	18	15	9	**32**

Based on BS8233:2014 - Design Criterion: LAeq 35
Based on BS8233: 1999 Lmax levels LAmax n/a

Appendix D - HA Calculations

Noise Sensitive Receiver 1 - Façade

	Frequency Spectral Data (Hz)								
	63*	125	250	500	1000	2000	4000	8000	dB(A)
SPL pub external noise level with internal music event	78	72	63	66	65	58	54	44	69
BS4142 Penalty for Intermittancy	3	3	3	3	3	3	3	3	
No line of sight	-10	-10	-10	-10	-10	-10	-10	-10	
Calculated level at Receiver 1 - Façade (front)	**71**	**65**	**56**	**59**	**58**	**51**	**47**	**37**	**62**

**63 Hz extrapolated level*

Noise Criteria	**61**
Low Observed Adverse Effect Level	

Noise Sensitive Receiver 1 - External Amenity

	Frequency Spectral Data (Hz)								
	63*	125	250	500	1000	2000	4000	8000	dB(A)
SPL pub external noise level with internal music event	78	72	63	66	65	58	54	44	69
BS4142 Penalty for Intermittancy	3	3	3	3	3	3	3	3	
No line of sight and attenuation by building façade	-15	-15	-15	-15	-15	-15	-15	-15	
Calculated level at Receiver 1 - External menity	**66**	**60**	**51**	**54**	**53**	**46**	**42**	**32**	**57**

**63 Hz extrapolated level*

Noise Criteria	**45**
Low Observed Adverse Effect Level	

Noise Sensitive Receiver 2 - Façade

	Frequency Spectral Data (Hz)								
	63*	125	250	500	1000	2000	4000	8000	dB(A)
SPL pub external noise level with internal music event	78	72	63	66	65	58	54	44	69

BS4142 Penalty for Intermittancy	3	3	3	3	3	3	3	3	
Distance mitigation (4m)	-12	-12	-12	-12	-12	-12	-12	-12	
Partial line of sight	-5	-5	-5	-5	-5	-5	-5	-5	
Calculated level at Receiver 2 - Façade	**64**	**58**	**49**	**52**	**51**	**44**	**40**	**30**	**54**

**63 Hz extrapolated level*

Noise Criteria	**45**
Significant Observed Adverse Effect Level	

Noise Sensitive Receiver 2 - External Amenity

	Frequency Spectral Data (Hz)								
	63*	125	250	500	1000	2000	4000	8000	dB(A)
SPL pub external noise level with internal music event	78	72	63	66	65	58	54	44	69
BS4142 Penalty for Intermittancy	3	3	3	3	3	3	3	3	
Distance mitigation (12)	-22	-12	-12	-12	-12	-12	-12	-12	
No line of sight	-15	-15	-15	-15	-15	-15	-15	-15	
Calculated level at Receiver 2 - External Amenity	**44**	**48**	**39**	**42**	**41**	**34**	**30**	**20**	**44**

**63 Hz extrapolated level*

Noise Criteria	**45**
Significant Observed Adverse Effect Level	

Standardized level difference in accordance with Approved Document E (2003)
Field measurements of airborne sound insulation between rooms

Client: Aaron Smith (The Tavern) Date of test: 08/02/2021

Location: AD33: The Tavern, 55-57 Frinton Road, Holland-on-Sea

Main Bar - Function Room

XL2 Sound Level Meter: A2A-14765-E0 (M2230: 7564)

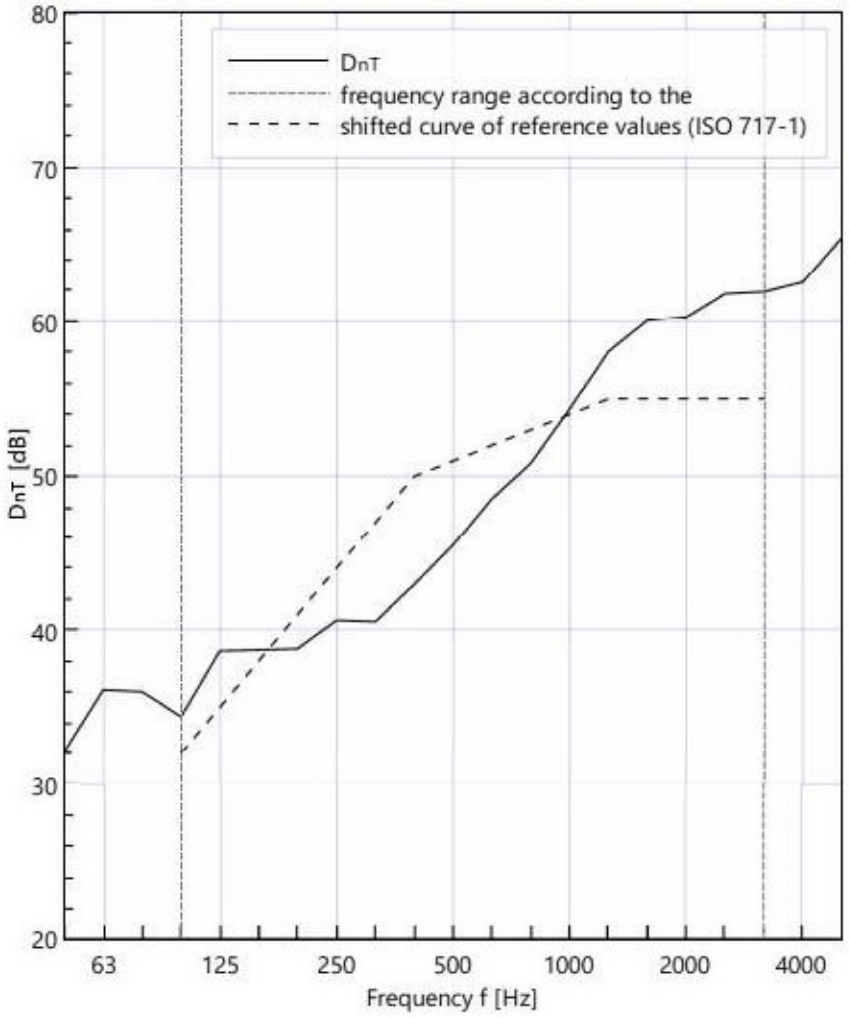
Area of common partition: 161.00 m^2

Source room volume: 518.00 m^3

Receiving room volume: 370.00 m^3

Frequency f Hz	D_{nT} 1/3 octave dB	
50	32.1	*
63	36.1	*
80	36.0	
100	34.4	
125	38.6	
160	38.7	
200	38.8	
250	40.6	
315	40.5	
400	42.9	
500	45.5	
630	48.6	
800	50.9	
1000	54.4	
1250	58.1	
1600	60.1	
2000	60.3	
2500	61.8	*
3150	61.9	*
4000	62.5	*
5000	65.5	*

* 1.3 dB correction applied,
value at the limit of measurement



Rating in accordance with ISO 717-1:

$D_{nT,w}(C;C_{tr})$ = 51 (-1; -5) dB $C_{50\text{-}3150}$ = -1 dB; $C_{50\text{-}5000}$ = -1 dB; $C_{100\text{-}5000}$ = 0 dB

Evaluation based on field measurement using results obtained by an engineering method. $C_{tr,50\text{-}3150}$ = -6 dB; $C_{tr,50\text{-}5000}$ = -6 dB; $C_{tr,100\text{-}5000}$ = -5 dB

No. of test report: AB1 Name of test institute: Healthy Abode t/a HA-Environmental

Date: 08/02/2021 Signature: [redacted]