



ACOUSTIC
CONSULTANTS LTD

Noise Assessment

**Proposed Tattoo Removal Studio
7 Parc Pen Y Bryn, Port Talbot**

Reference: 8900/BL

Client:	Acoustic Consultant:
Ink Out Wales 7 Parc Pen Y Bryn Goytre Port Talbot SA13 2XZ	 ACOUSTIC CONSULTANTS LTD

Document Control

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The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise aspects as included in this report. We provide advice only in relation to noise and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

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1. Introduction

Ink Out Wales appointed Acoustic Consultants Limited to carry out a noise impact assessment for the proposed tattoo removal studio at 7 Parc Pen Y Bryn Goytre, Port Talbot, Glamorgan SA13 2XZ.

The report identifies relevant planning and noise guidance whilst establishing the impact of operational noise on the nearby dwellings. The client has applied for planning permission from them to change the second living room from a C3 use to D1 use.

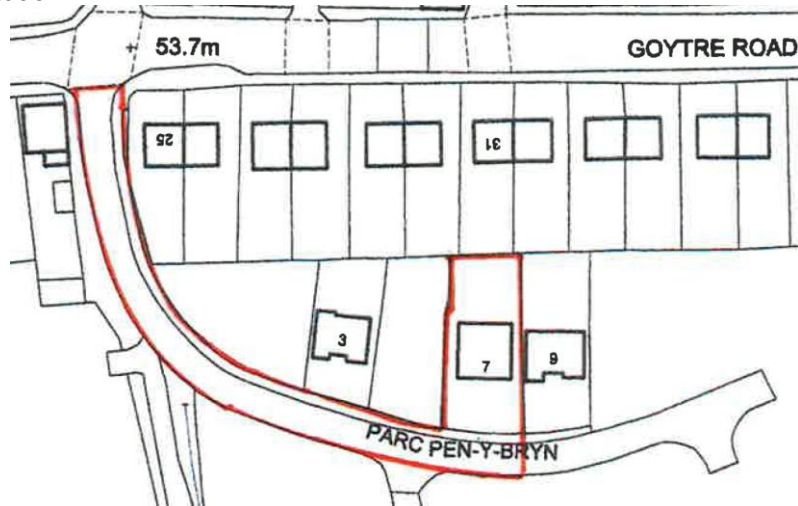
The author of this report is a Member of the Institute of Acoustics (MIOA) with a recognised acoustic qualification and over 13 years' experience within the field of noise.

2. The Site & Development

The site is located at 7 Parc Pen Y Bryn, Port Talbot, Glamorgan SA13 2XZ. The adjoining site is being redeveloped into a new dwelling (5 Parc Pen Y Bryn). This dwelling will be the closest dwelling to the tattoo removal studio.

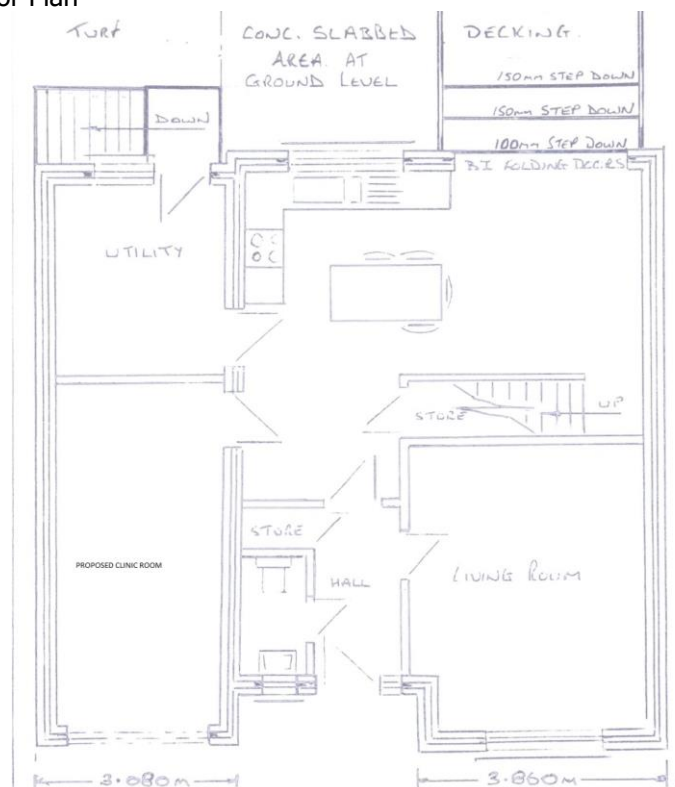
The site location is provided below.

Figure 1: Site location



The proposed ground floor plan is as follows and shows the clinic room within the former garage.

Figure 2: Ground Floor Plan



3. Planning and Noise

3.1. Planning Policy Wales

Planning Policy Wales (PPW) Edition 10 dated December 2018 sets out the land use planning policies of the Welsh Government. Section 1 states:

1.1 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs¹, MTANs² and policy clarification letters comprise national planning policy.

The most relevant statements for noise affecting a residential use are provided in Section 6.7 and summarised below:

"6.7.1 Clean air and an appropriate soundscape, contribute to a positive experience of place as well as being necessary for public health, amenity and well-being. They are indicators of local environmental quality and integral qualities of place which should be protected through preventative or proactive action through the planning system. Conversely, air, noise and light pollution can have negative effects on people, biodiversity and the resilience of ecosystems and should be reduced as far as possible."

6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

6.7.5 In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change.

In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.

6.7.6 In proposing new development, planning authorities and developers must, therefore:

- address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;*
- not create areas of poor air quality or inappropriate soundscape; and*
- seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.*

6.7.7 To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer."

6.7.8 Good design, for example setting back buildings from roads to avoid canyon effects and using best practice in terms of acoustic design to ensure the appropriate and intended acoustic environment of completed developments should be incorporated at an early consideration in the design and planning process. Other mitigation measures must be capable of being effectively implemented for their intended purpose, and could include those related to:

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- traffic management and road safety;*
- ensuring progress towards a shift to low or zero emissions means of road transport, such as electrical charging points;*
- supporting low or zero emissions public transport;*
- providing active travel infrastructure; and*
- incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its dispersal, reduce real or perceived noise levels by absorbing and scattering noise and introducing natural sounds to soften man-made noise, provide areas of relative tranquillity, and reduce exposure by putting a buffer between sources of pollution and receptors.*

6.7.14 Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur. In circumstances where impacts are unacceptable, for example where adequate mitigation is unlikely to be sufficient to safeguard local amenity in terms of air quality and the acoustic environment it will be appropriate to refuse permission. Location of Commercial, Industrial and other Potentially Polluting Development.

6.7.19 The health imperative of good air quality and appropriate soundscapes in contributing to the overall character and quality of places and the health and well-being of people and wildlife should be fully recognised. It will not be appropriate to locate sensitive uses, such as hospitals, schools, care homes and housing adjacent to busy roads or other transport routes, where there are no connectivity benefits to be gained and where health and amenity impacts associated with increased exposure of

people to pollution will be unacceptable. Whilst some uses may be appropriate with the aid of good design air quality and soundscape considerations can be overriding factors, especially for sensitive uses, if they cannot be adequately mitigated and impacts minimised.

6.7.20 Where sensitive developments need to be located close to existing transportation infrastructure for sustainable movement and access they should be designed, as far as practicable, to limit harmful substances and noise levels within and around those developments both now and in the future. This may include employing the principles of good acoustic design and the inclusion of active travel or travel management measures as part of development proposals. Such development, however, should preferably be located away from existing sources of significant noise, which may include aircraft noise or roads, particularly new roads or those with programmed route improvements.

6.7.21 Regard should be paid to current air quality and noise levels and the quality of the existing soundscape and account taken of any relevant local air quality action plan, noise action plan and/ or local or regional air quality strategy as part of development strategies and proposals in development plans and before determining planning applications. Soundscapes and Compatibility of Uses

6.7.24 The potential impacts of noise pollution arising from existing development, be this commercial, industrial, transport related or cultural venues (such as music venues, theatres or arts centres), must be fully considered to ensure the effects on new development can be adequately controlled to safeguard amenity and any necessary measures and controls should be incorporated as part of the proposed new development. This will help to prevent the risk of restrictions or possible closure of existing premises or adverse impacts on transport infrastructure due to noise and other complaints from occupiers of new developments. It will be important that the most appropriate level of information is provided and assessment undertaken.

PPW does not provide any quantifiable criteria.

3.2. Local Authority Comments

The client has advised us that:

The council has been contacted by environmental health who have requested that we need to demonstrate how the layout and the sound insulation performance of the building envelope of those dwellings achieves the relevant values detailed in Table 4 of British Standard BS8233:2014.

Therefore Table 4 of BS8233:2014 is the criteria we have worked to, to inform the noise assessment.

3.3. BS8233:2014

British Standard 8233:2014 entitled "Guidance on sound insulation and noise reduction for buildings", Section 7.7.2, Table 4 of the standard provides internal ambient noise levels for dwellings from noise sources 'without a specific character'. This is summarised below:

Table 1: British Standard 8233:2014 internal noise criteria

Activity	Location	Daytime (07:00 to 23:00)	Night-time (23:00 to 07:00)
Resting	Living Room	35 dB $L_{Aeq,16 \text{ hour}}$	-
Dining	Dining Room/area	40 dB $L_{Aeq,16 \text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16 \text{ hour}}$	30 dB $L_{Aeq,8 \text{ hour}}$

Section 7.7.2 Note 4 of the British Standard states "*Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values*".

4. Operational Noise Predictions

4.1. Proposed Operations

The client has advised us that:

The laser used will be the NDYAG Picosecond laser machine. This machine makes 60 decibels of noise when in use.

The hours of use of the equipment are proposed to be between 9am and 8pm (Monday to Friday) and 10am - 5pm (Saturday and Sunday).

Within these hours the service of laser tattoo removal will not take place consistently, with a maximum of 8 customers per day attending sessions that last approximately 30 minutes (15 minutes to fill out paperwork and 15 minutes for the laser tattoo removal procedure). Thus, the duration per hour of use would be 15 minutes per session.

4.2. Predicted External Noise Level

The noise emission has been calculated using the standard formulas for noise predictions to the dwellings 3m to the west.

4.2.1. Internal Noise Level

To determine a reasonable worst-case noise emission from the use of the laser machine, we have assumed the above noise level is 60dB(A) at 1m.

The room will be reverberant which would add around +6dB(A) to the level noted for a typical room of the size noted above.

4.2.2. Operational Time

We would consider it appropriate to consider the impact in the day over a 1 hr period. As such, the level needs to be corrected for the operational time per hour. The client has advised that this will be 15 minutes per hour, giving a -6dB reduction when calculating the $L_{Aeq(1hr)}$.

4.2.3. Noise Breakout

It is assumed the machine will be used with the windows open. This would reduce the noise emission to 1m from the façade by at least 10dB(A).

The breakout noise via the building structure (walls/roof) will be considerably lower than that via the open windows. Therefore, the open window path of sound transmission has been considered as a worst case.

4.2.4. **Distance Correction**

The nearest dwellings are 3m from the nearest open window.

Allowing for the distance attenuation of sound over hard ground ($20 \cdot \log(R1/R2)$) the predicted distance attenuation is -10dB(A).

4.2.5. **Angle of View**

The dwellings will have a reduced angle of view to the windows, as such the predicted level to the nearest dwelling reduced by -3dB(A)

4.2.6. **Predicted Level at Façade**

Taking into account the above, the predicted free-field level at the nearest dwelling is 37 dB $L_{Aeq}(T)$.

5. Comparison with Local Authority Criteria

Section 7.7.2 Table 4 of British Standard 8233 provides internal ambient noise levels for dwellings from noise sources 'without a specific character' and are based on existing guidelines issued by the World Health Organisation in 1999.

This table does not provide criteria for external areas. Therefore, the internal noise levels need to be considered:

The internal level is approximately at least 10 dB quieter than the external free-field level (as stated by the BS8233:2014 and WHO 1999) allowing for the attenuation of a partially open window. Therefore, based on the predicted rating levels noted above, the internal levels are as follows.

Table 2: Comparison with British Standard 8233:2014 at Worst Case Receiver

Location	Predicted External Level $L_{Ar(T)}$ dB	Open Window Correction dB(A)	Predicted Internal Level $L_{Ar(T)}$ dB	Within Criteria
5 Parc Pen Y Bryn	37	-15	22	YES

As can be seen from the table above, the internal sound levels are comfortably below the British Standard 8233:2014 criteria for daytime rooms.

This therefore meets the supplied Local Authority criteria, and no mitigation is necessary.

6. Summary and Conclusions

Ink Out Wales appointed Acoustic Consultants Limited to carry out a noise impact assessment for the proposed tattoo removal studio at 7 Parc Pen Y Bryn Goytre, Port Talbot, Glamorgan SA13 2XZ.

The report identifies relevant planning and noise guidance whilst establishing the impact of operational noise on the nearby dwellings. The client has applied for planning permission from the to change the second living room from a C3 use to D1 use.

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7. Glossary of Acoustic Terminology

A-weighted sound pressure p_A – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network

A-weighted sound pressure level, L_{pA} – quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$$L_{pA} = 10 \log_{10} (p_A/p_0)^2$$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
 p_0 is the reference sound pressure (20 μ Pa)

Background sound level, $L_{A90,T}$ – A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{Aeq,T} = 10 \log_{10} \left\{ (1/T) \int_{t_1}^{t_2} [p_A(t)^2/p_0^2] dt \right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 μ Pa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,Tr}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r .

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements

Rating level, $L_{Ar,Tr}$ – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level, once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, eVDV – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Peak Particle Velocity (PPV) – the maximum instantaneous velocity of a particle at a point during a given time interval. Typically used to assess the impact of vibration from construction activities. Expressed as a distance with time, i.e. ms^{-1} or m/s .

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).



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