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Dear Sirs

NOISE IMPACT ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT LAND AT WATT STREET AND WHALLEY ROAD, SABDEN, LANCASHIRE

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Limited (ENS) has been commissioned by Skipton Properties to carry out a noise impact assessment for a proposed residential development at land at Watt Street and Whalley Road, Sabden, Lancashire (hereafter referred to as the application site).

1.02 The objectives of the noise impact assessment were to:

- Determine the ambient noise level at the application site.
- Assess the potential impact of the ambient noise climate on the proposed residential development with reference to relevant guidelines.
- Provide recommendations for a scheme of sound attenuation works, as necessary, to ensure that the future occupants of the proposed residential development do not experience any unacceptable loss of amenity due to noise.

1.03 This report details the methodology and results of the assessment and provides recommendations for the building envelope (fenestration and ventilation) and boundary treatments. It has been prepared to accompany a planning application to be submitted to the local planning authority.

1.04 This report has been prepared for Skipton Properties for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult Skipton Properties and ENS as to the extent to which the findings may be appropriate for their use.

1.05 A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

2.00 APPLICATION SITE SETTING AND PROPOSED RESIDENTIAL DEVELOPMENT

2.01 The application site is located in a semi-rural environment in Sabden village, Ribble Valley, Lancashire. Currently comprising of existing mill buildings (which are to be demolished) and associated yards, the application site is bound by (see Appendix 2 for a site layout):

- Whalley Road and Sabden Brook (a river) to the north.
- Watt Street to the east.
- Castle Sheet Metal (fabricators) and existing residential dwellings to the south.
- Open land to the west, with existing residential dwellings beyond.

2.02 The hours of operation at the adjacent fabricators are understood to be 0800 to 1700 hours Monday to Friday and 0800 to 1200 hours on Saturdays, with no working on Sundays. Additionally, there are circa 3 no. deliveries to the site per week, during daytime hours.

2.03 The noise environment at the application site is characterised by road traffic on Whalley Road and Watt Street and river noise associated with Sabden Brook. Noise associated with the adjacent fabricators was occasionally audible at the southern boundary of the application site, but not significant (discussed in more detail in Section 3.00). No other significant noise sources were noted.

2.04 The proposed residential development consists of the construction of 34 no. residential dwellings with associated landscaping and estate roads (a site layout is contained in Appendix 3 for reference).

2.05 A sketch masterplan (drawing ref: 1515TLA/PNLSmp01) indicates that the residential development footprint is set back circa **10 metres** from the nearside kerb of Whalley Road and circa **5 metres** from the nearside kerb of the Watt Street.

3.00 BASELINE NOISE SURVEY

3.01 In order to establish the ambient and background noise levels at the application site, a baseline noise survey was undertaken on Monday 11th December 2017.

3.02 For the purpose of the assessment, the following noise monitoring positions were adopted (the approximate location of the noise monitoring positions is contained in Appendix 2 for reference):

- MP1 was located at the western end of the northern boundary of the application site at circa 10 metres to the nearside kerb of Whalley Road.
- MP2 was located at the eastern boundary of the application site at circa 5 metres to the nearside kerb of Watt Street.
- MP3 was located at the centre of the application site (within an existing courtyard).

3.03 No significant noise break out from the adjacent fabricators was noted at the southern boundary of the application site. Following discussion with fabricator staff, it was confirmed that operations were typical on the day of the survey.

3.04 For the purpose of the noise assessment, it was agreed to simulate the noisiest scenario, specifically, the operation of the hole puncher with the side door (on the northern façade) and the roller shutter door (on the eastern façade) left open. To reiterate, this represents an extreme worst case scenario, occurring very infrequently and for short durations, and is not representative of **typical** operations at the fabricators.

3.05 On the basis of the above, the following additional noise monitoring positions were adopted (see Appendix 2):

- MP4 was located at the southern boundary of the application site at circa 5 metres from the centre of the northern elevation of the Castle Sheet Metal workshop.
- MP4A was located at the southern boundary of the application site at circa 5 metres from the north western corner of the Castle Sheet Metal workshop.
- MP4B was located at the southern boundary of the application site at circa 5 metres from the north eastern corner of the Castle Sheet Metal workshop.

3.06 Noise measurements were made in a free field environment, at circa 4 metres above ground level, using a Bruel & Kjaer 2250 Type 1 integrating sound level meter. A windshield was fitted for all measurements. The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end, using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration level was noted. Weather conditions throughout the survey were appropriate for monitoring.

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3.07 Measurements consisted of A–weighted broadband parameters, together with linear 1/3rd octave band L_{eq} levels. The following tables contain summaries of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 3.1 – Summary of Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{A1} (dB)	Comment
MP1	11/12/17	1052–1108	54	40	54	67	Intermittent road traffic on Whalley Road (maximum noise levels of passing vehicles up to 72 dB L_{AFMax}).
MP1	11/12/17	1308–1322	54	39	54	67	
Daytime noise level circa 54 dB $L_{Aeq, T}$ Maximum noise levels of passing vehicles up to 72 dB L_{AFMax}							
MP2	11/12/17	1009–1032	53	49	55	64	Intermittent road traffic on Watt Street (maximum noise levels of passing vehicles up to 72 dB L_{AFMax}), constant river noise from Sabden Brook.
MP2	11/12/17	1140–1156	53	49	54	64	
Daytime ambient noise level circa 53 dB $L_{Aeq, T}$ Maximum noise levels of passing vehicles up to 72 dB L_{AFMax}							
MP3	11/12/17	1129–1139	44	41	47	52	Distant road traffic and river noise.
Daytime ambient noise level circa 44 dB $L_{Aeq, T}$							

Table 3.2 – Summary of Fabricators Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{A1} (dB)	Comment
MP4	11/12/17	1216–1219	45	38	44	58	Typical operations (no significant break out).
MP4	11/12/17	1219–1222	65	47	67	78	**Punch in operation at fabricators.**
MP4	11/12/17	1230–1235	45	42	47	52	Typical operations (no significant break out).
Typical ambient noise level circa 45 dB $L_{Aeq, T}$; Worst case ambient noise level up to circa 65 dB $L_{Aeq, T}$							
MP4A	11/12/17	1200–1215	44	38	48	53	Typical operations (no significant break out).
MP4A	11/12/17	1223–1225	49	40	50	58	**Punch in operation at fabricators.**
MP4A	11/12/17	1326–1339	43	39	45	51	Typical operations (no significant break out).
Typical ambient noise level circa 44 dB $L_{Aeq, T}$; Worst case ambient noise level up to circa 49 dB $L_{Aeq, T}$							
MP4B	11/12/17	1225–1227	59	42	54	71	**Punch in operation at fabricators.**
MP4B	11/12/17	1240–1250	46	40	49	56	Typical operations (no significant break out).
MP4B	11/12/17	1418–1424	46	44	48	54	Typical operations (no significant break out).
Typical ambient noise level circa 46 dB $L_{Aeq, T}$; Worst case ambient noise level up to circa 59 dB $L_{Aeq, T}$							

3.08 Ambient noise levels at MP1 and MP2 were due to road traffic on Whalley Road and Watt Street respectively, with an underlying contribution from river noise associated with Sabden Brook, and were measured at 53–54 dB $L_{Aeq, T}$, which is relatively quiet.

3.09 In the absence of hole punch noise, ambient noise levels at the southern boundary of the application site (MP4, MP4A, MP4B) were circa 44–46 dB $L_{Aeq, T}$, which is very quiet.

3.10 Worst case ambient noise levels, associated with the break-out of hole punch noise, were measured at up to **65 dB $L_{Aeq, T}$** (at MP4), with noise levels dropping off with increased distance to the open side door. This level is robustly adopted for habitable rooms which overlook the fabricators.

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4.00 NOISE IMPACT CRITERIA

4.01 ProPG Planning and Noise: New Residential Development (ProPG) was published in May 2017 by the Association of Noise Consultants, Institute of Acoustics and the Chartered Institute of Environmental Health.

4.02 Stage 1 of ProPG comprises an initial site noise risk assessment which correlates external noise levels at the site with the risk of an adverse impact. For reference, Figure 1 of ProPG indicates that daytime noise levels of ≤ 55 dB $L_{Aeq\ (0700\text{-}2300)}$ are assessed as between a **low risk** and a **negligible risk** in terms of adverse impacts.

4.03 Stage 2: Element 2 of ProPG sets indoor ambient noise levels for residential dwellings based on the guidance contained in British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233) (see table below).

Table 4.1 – Indoor Ambient Noise Levels in Dwellings

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB $L_{Aeq\ (0700–2300)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\ (0700–2300)}$	30 dB $L_{Aeq\ (2300–0700)}$ 45 dB $L_{AFMax\ (2300–0700)}$

4.04 Note 5 to the above table states: *'Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.'*

4.05 On the basis of the above, the following criteria (with windows closed and trickle vents open) are considered appropriate for the proposed residential development:

- ≤ 35 dB $L_{Aeq\ (0700\text{-}2300)}$ in living rooms and bedrooms during the day
- ≤ 30 dB $L_{Aeq\ (2300\text{-}0700)}$ and 45 dB L_{AFMax} not normally exceeded in bedrooms during the night

4.06 These internal ambient noise levels represent good resting and sleeping conditions.

4.07 With respect to external amenity, ProPG reflects the advice contained in BS 8233, as follows:

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 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. 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.'

5.00 SOUND ATTENUATION SCHEME PROPOSALS

5.01 Based on external and internal noise measurements undertaken by ENS at other sites, it is considered that a standard double glazed window with standard trickle vents in a building façade will provide of the order of 30 dB(A) sound insulation (from external to internal) to road traffic noise. This statement is also corroborated by Annex 6 of the now superseded Planning Policy Guidance 24 'Planning and Noise' (PPG 24).

5.02 It is therefore considered that standard double glazed windows and standard trickle vents are appropriate throughout the majority of the application site, with the exception of habitable rooms of Plots 1–3, 5 and 10 overlooking the adjacent fabricators.

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5.03 Worst case ambient noise levels adjacent to the fabricators were measured at up to **65 dB $L_{Aeq, T}$** (at MP4) during use of the hole punch, with the side door open.

5.04 Although this is considered a worst case scenario, as a precautionary measure (and to ensure that future operations at the fabricators are not unreasonably restricted) is it recommended that habitable rooms within these plots which overlook the fabricators should have enhanced glazing rated at least 35 dB R_w, such as **10 mm glass** / **6–16 mm cavity** / **6 mm glass** (see Appendix 3 for locations of enhanced glazing).

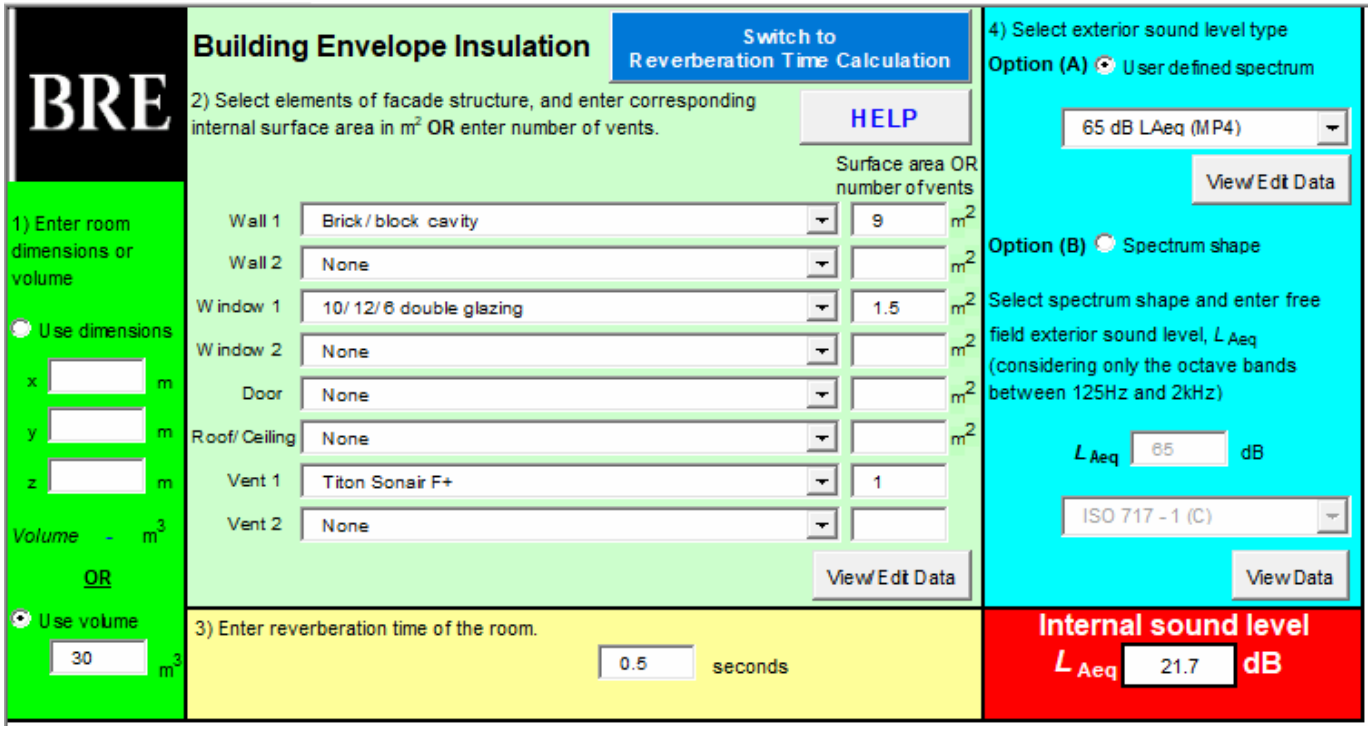
5.05 Trickle ventilation is not appropriate in habitable rooms where enhanced glazing is specified. In order to provide rapid ventilation without the need to open windows, it is recommended that the habitable rooms with enhanced glazing are provided with a mechanical ventilation strategy. Appropriate ventilation solutions include:

- A fully ducted mechanical ventilation system with heat recovery (MVHR).
- An individual room ventilator, such as the Titon Sonair unit (or equivalent).

5.06 In order to calculate the sound insulation requirements of the building envelope for these habitable rooms, the Building Research Establishment (BRE) building envelope insulation calculation spreadsheet was used. This spreadsheet is based on the calculation methodology advocated in BS 8233. The spreadsheet allows input of external noise levels, typical room dimensions and reverberation time together with parameters for the various elements of the building envelope and calculates the internal noise level in terms of the external noise level metric (L_{Aeq} in this case).

5.07 As demonstrated in the following spreadsheet, internal noise levels within these habitable rooms will be significantly (circa 13 dB) below the internal noise criteria outlined in ProPG/BS8233, even during worst case operations at the adjacent fabricators.

BRE Calculation Spreadsheet for Habitable Rooms overlooking Fabricators



5.08 Should there be any room-in-roof constructions in Plots 1–3, 5 and 10 which overlook the adjacent fabricators, these should have double boarded ceilings / walls (and also double board 'cheek' walls to dormer windows) and an equivalent glazing specification to that in Paragraph 5.04.

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5.09 Ambient noise levels throughout the application site were measured at ≤ **54 dB $L_{Aeq, T}$** in the absence of hole punch noise (which occurs infrequently). On this basis no specific mitigation measures are required to protect garden amenity.

5.10 Notwithstanding this, as a precautionary measure, it is recommended that a 1.8 metre solid timber fence is installed along the western portion of the southern boundary (see Appendix 3 for location of fence) in order to screen the gardens of plots in close proximity to the fabricators.

6.00 CONCLUSIONS

6.01 A noise impact assessment has been undertaken for a proposed residential development at land at Watt Street and Whalley Road, Sabden, Lancashire.

6.02 The noise environment at the application site is characterised by road traffic on Whalley Road and Watt Street and river noise associated with Sabden Brook.

6.03 Noise associated with the adjacent fabricators was occasionally audible at the southern boundary of the application site, but not significant. Notwithstanding this, a scheme of enhanced glazing/ventilation and boundary screening has been recommended as a precautionary measure in plots adjacent to the fabricators.

6.04 In summary, with the proposed mitigation measures in place, the ambient noise climate does not represent a constraint to the proposed development.

I trust the foregoing is sufficient for your needs. Should you have any queries regarding the above, please do not hesitate to contact me.

Yours sincerely

T. Crabb

Thomas Crabb
MIOA, Diploma in Acoustics & Noise Control
For Environmental Noise Solutions Limited

cc File

Appendix 1
Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 µPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 µPa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF\ max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

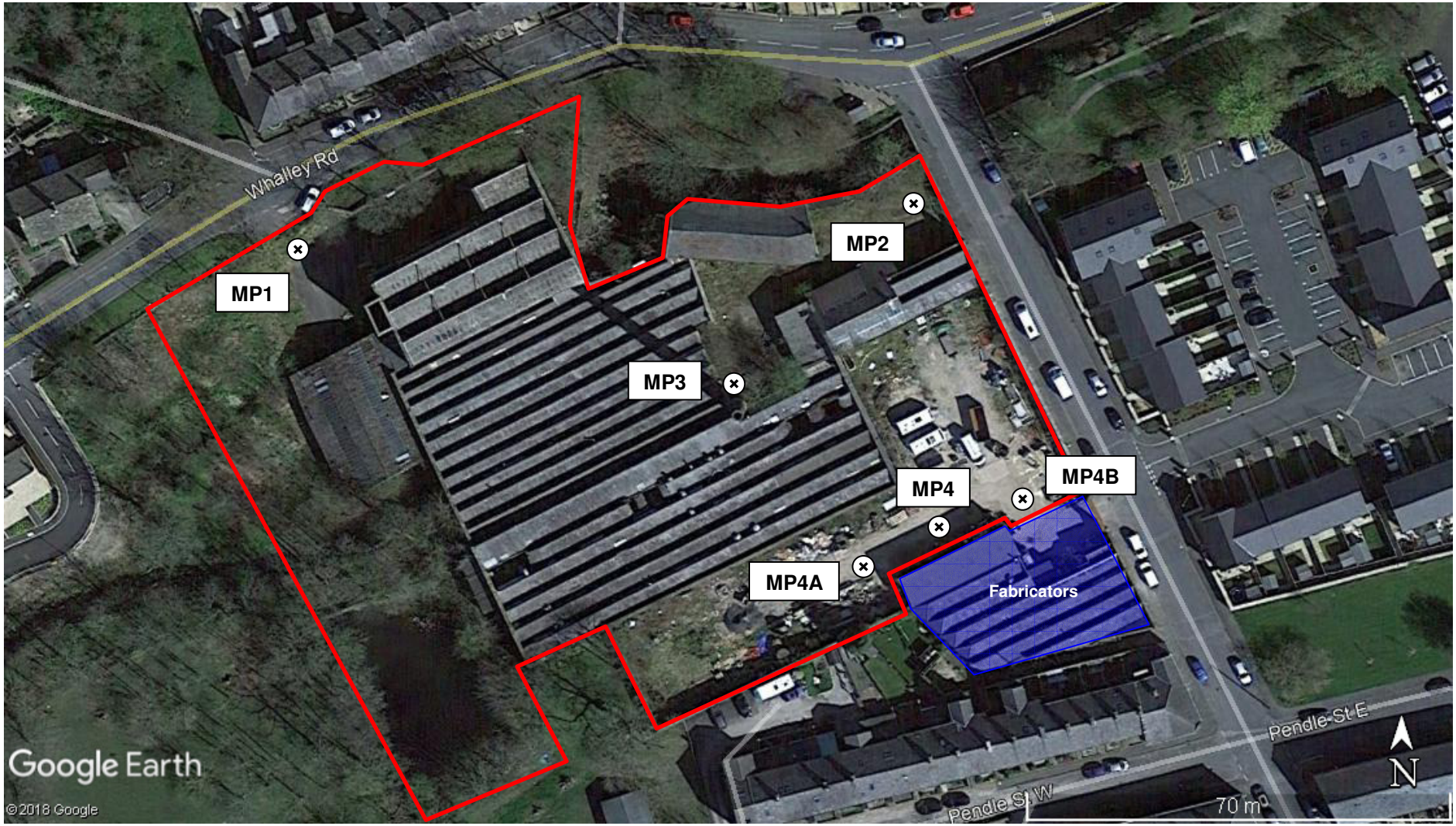
Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_W)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix 2
Drawings (Site Boundary / Noise Monitoring Positions)



Appendix 3
Drawings (Proposed Site Layout and Scheme of Sound Attenuation)

Enhanced glazing > 35 dB Rw 10/(6-20)/6 and mechanical ventilation
1.8 m solid timber fence