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Dear Mr Kirk

NOISE IMPACT ASSESSMENT FOR A PROPOSED RESIDENTIAL DEVELOPMENT LAND OFF FIELDSIDE ROAD AND BARNSLEY ROAD, GOLDTHORPE

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Ltd (ENS) has been commissioned by JK Planning and Design Service Ltd, on behalf of its client Mr P Bussey, to undertake a noise impact assessment for the proposed residential development of a parcel of land off Fieldside Road and Barnsley Road, Goldthorpe (hereafter referred to as the application site).

1.02 The development proposals consist of nine new build dwellings with associated landscaping and car parking provision.

1.03 The objectives of the noise impact assessment were to:

- Determine the ambient noise climate at the application site during representative periods of the daytime and night time.
- Assess the potential impact of the ambient noise climate on the proposed residential development with reference to the National Planning Policy Framework and other pertinent guidance.
- Provide recommendations for a scheme of sound attenuation works, as necessary, such that the future occupants of the proposed residential development do not experience any unacceptable loss of amenity due to noise.

1.04 This report details the methodology and results of the assessment and provides recommendations for the building envelope (fenestration and ventilation) and boundary screening.

1.05 This report has been prepared for JK Planning and Design Service Ltd and its client Mr P Bussey 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 the parties above and ENS as to the extent to which the findings may be appropriate for their use.

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

2.00 SITE SETTING AND PROPOSED DEVELOPMENT

2.01 The application site is located in a mixed residential and commercial environment in the centre of Goldthorpe. An annotated aerial image of the site, including a proposed development overlay, is contained in Appendix 2.1. The application site is bound by:

- A grassed area to the north.
- Residential development and a funereal directors/chapel of rest to the east.
- A small area of land to the south, with Barnsley Road beyond.
- Fieldside Road to the west, with a car sales forecourt beyond.

2.02 Within the wider site environment, the A635 is located circa 280 metres to the north of the site and a True manufacturing facility (manufacturer of commercial refrigeration products) circa 80 metres to the north west of the northern site boundary.

2.03 During the course of the noise survey, road traffic was the main noise source, with no other significant noise sources audible. A manual traffic count indicated of the order of 700 to 750 vehicles per hour during the daytime (circa 15:00 hours) on Barnsley Road and of the order of 450 vehicles per hour (circa 14:30 hours) on Fieldside Road, reducing significantly during the night time.

2.04 The proposed development consists of 9 units with associated landscaping and car parking provision. A proposed layout is contained in Appendix 2.2. With reference to the layout, Plots 1 to 8 are circa 3 metres to the nearside kerb of Fieldside Road and front onto the road (note: no glazing to bedrooms on the road frontage elevations), with gardens predominantly to the rear (east) of the dwellings. Plot 9 is set back circa 5 metres to the nearside kerb of Fieldside Road and 10 metres to the nearside kerb of Barnsley Road.

3.00 BASELINE NOISE SURVEY

3.01 In order to establish the ambient noise levels at the application site, a baseline noise survey was undertaken on Thursday 16th November into Friday 17th November 2017. Following a consultation response from the Environmental Health Department (EHD) additional daytime measurements were made on Tuesday 6th March 2018.

3.02 For the purpose of the assessment the following monitoring positions (MPs) were adopted (the approximate location of the MPs is shown in Appendix 2.1):

- MP1 was located on the western boundary, in a free field environment at 1.5 metres above ground level (mAGL) and approximately 3 metres to the nearside kerb of Fieldside Road (and 20 metres to Barnsley Road).
- MP2 was located towards the northern end of the western boundary, in a free field environment, at 1.5 mAGL and approximately 3 metres to the nearside kerb of Fieldside Road.

3.03 Noise measurements were undertaken using Bruel & Kjaer 2260 and 2250 Type 1 integrating sound level meters. 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 with an average wind speed of < 2 m/s. Measurements consisted of A–weighted broadband parameters, together with linear octave band L_{eq} levels with a 5 second logging interval.

3.04 The following tables contain a summary of the measurement data rounded to the nearest decibel.

Table 3.1 – Summary of Noise Measurement Data, 16/11/2017

Position	Date	Time	$L_{Aeq,T}$ (dB)	L_{AFMax} (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)	Comment
MP1	16/11/17	14:09-14:31	66	77	69	59	Road traffic noise on Fieldside Road dominant. Typical L_{AFmax} of vehicle pass ≤ 72 dB.
MP1	16/11/17	15:01-15:26	65	75	68	60	Road traffic noise on Fieldside Road dominant. Typical L_{AFmax} of vehicle pass ≤ 72 dB.
MP1	16/11/17	16:02-16:21	66	77	68	60	Road traffic noise on Fieldside Road dominant. Typical L_{AFmax} of vehicle pass ≤ 72 dB.
MP1	16/11/17	23:50-00:20	56	75	60	43	Distant and intermittent local traffic. Typical L_{AFmax} of vehicle pass ≤ 72 dB.
MP1	17/11/17	00:24-00:34	54	70	57	43	Distant and intermittent local traffic. Typical L_{AFmax} of vehicle pass < 70 dB.
MP2	16/11/17	14:36-14:50	67	78	71	56	Road traffic noise on Fieldside Road dominant. Typical L_{AFmax} of vehicle pass ≤ 75 dB.
MP2	16/11/17	15:30-16:00	69	79	73	56	Road traffic noise on Fieldside Road dominant. Typical L_{AFmax} of vehicle pass ≤ 75 dB.
MP2	17/11/17	00:40-01:33	55	78	52	38	Distant and intermittent local traffic. Typical L_{AFmax} of vehicle pass ≤ 75 dB.

Table 3.2 – Summary of Noise Measurement Data, 6/03/2018

Position	Date	Time	$L_{Aeq,T}$ (dB)	L_{AFMax} (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)	Comment
MP2	6/3/18	12:55-13:55	67	81	72	51	Road traffic noise on Fieldside Road dominant. Typical L_{AFmax} of vehicle pass ≤ 77 dB.
MP2	6/3/18	13:55-14:55	68	81	73	52	Road traffic noise on Fieldside Road dominant. Typical L_{AFmax} of vehicle pass ≤ 77 dB.
MP2	6/3/18	14:55-15:55	68	82	73	52	Road traffic noise on Fieldside Road dominant. Typical L_{AFmax} of vehicle pass ≤ 77 dB.

3.05 The main source was road traffic noise associated with Fieldside Road. No significant commercial noise sources were noted. Note: the wind direction on 16/11/2017 was from a northerly quadrant (site downwind of the A635) and the background noise climate at MP2 was influenced by A635 traffic noise. On 6/3/2018, the wind direction was from a southerly quadrant, i.e. site upwind of the A635.

3.06 Based on the above, 68 dB $L_{Aeq,T}$ has been taken as representative of the road frontage noise level of the plots during the daytime and 56 dB $L_{Aeq,T}$ / 77 dB L_{AFmax} have been taken as representative of the road frontage noise level of the plots during the night time.

4.00 NOISE IMPACT ASSESSMENT CRITERIA

4.01 The National Planning Policy Framework (NPPF) is a material consideration in planning decisions. At the heart of the NPPF is a presumption in favour of sustainable development, and the policies in Paragraphs 18 to 219 of the NPPF, taken as a whole, constitute the Government's view on what sustainable development in England means in practice for the planning system.

4.02 The NPPF states that there are three dimensions to sustainable development, which include an economic role (contributing to building a strong, responsive and competitive economy), a social role (providing the supply of housing required to meet the needs of present and future generations) and an environmental role (which includes minimising waste and pollution).

4.03 The NPPF supersedes Planning Policy Guidance Note 24 (PPG 24). The main policy statement in relation to noise is Paragraph 123 of the NPPF, which states

Planning policies and decisions should aim to:

- *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

4.04 In relation to 'adverse impacts', the NPPF refers to the Explanatory Note to the Noise Policy Statement for England (NPSE) for guidance.

4.05 The Noise Policy Statement for England (NPSE) and associated Explanatory Note were published by DEFRA in 2010 and set out the Government's noise management strategy to enable noise management decisions to be made within the wider context (i.e. guiding principles of sustainable development), in a cost-effective manner and in a timely fashion.

4.06 Fundamental to this approach is '*there is a need to integrate consideration of the economic and social benefit of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focussing solely on the noise impact without taking into account other related factors'*.

4.07 The noise policy aims of NPSE are to (i) avoid significant adverse impact on health and quality of life, (ii) mitigate and minimise adverse impacts on health and quality of life, and (iii) where possible, contribute to the improvement of health and quality of life. The policy aims are always to be considered within the context of the Government's policy on sustainable development.

4.08 In relation to the mitigation and minimisation of adverse impacts, NPSE considers that '*in reality, although not always stated, the aim has tended to be to minimise noise 'as far as is reasonably practical'*. This is reinforced in Paragraph 2.24 of the Explanatory Note, which requires that '*all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur'*.

4.09 In relation to explaining the 'significant adverse' and 'adverse' effects quoted in the NPPF, NPSE uses the two established concepts from toxicology that are currently being applied to noise impacts, for example by the World Health Organisation (WHO), these 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 noise.

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

4.10 The NPSE then extends these concepts to lead to a SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.

4.11 No specific criteria are presented in the NPSE, to provide the necessary policy flexibility until further evidence and suitable guidance is available. In lieu of specific criteria, for this assessment, ENS makes reference to existing guideline documents, which are summarised in the following paragraph(s).

4.12 BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' (BS 8233) sets guideline indoor ambient noise levels for dwellings, for steady external noise sources, which it is desirable are not exceeded. These levels are reproduced in Table 4.1 and are based on guidelines issued by the World Health Organisation (WHO). The Standard also states that where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The Standard considers that for regular individual noise events, a guideline value may be set in terms of SEL or L_{AFmax} depending on the character and number of events per night. The WHO Guidelines on Community Noise (1999) considers that if negative effects on sleep are to be avoided, noise events exceeding 45 dB L_{Amax} should be limited.

Table 4.1 – Indoor Ambient Noise Levels in Dwellings (as recommended in BS 8233:2014)

Activity	**Location**	**07:00 – 23:00**	**23:00 – 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 $L_{Aeq,8hour}$

4.13 For traditional external areas that are used for amenity space, such as gardens and patios, BS 8233 considers that 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. BS 8233 also states '*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'.*

4.14 With reference to the BS 8233 guidelines, by definition, 'reasonable internal conditions' cannot represent a significant adverse impact (the prevention of which is the 1st aim of NPSE). With cognisance to the 2nd aim of NPSE (to minimise noise impact), the internal ambient noise levels detailed in Table 4.1 are considered appropriate.

4.15 Likewise, for external amenity space, a design range of 50 to 55 dB $L_{Aeq,T}$ is considered appropriate to comply with the requirements of the NPPF. Furthermore, the BS 8233 guidance that in certain circumstance '*development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited',* is considered to be in keeping with the NPSE Explanatory Note, which requires that '*all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such*

adverse effects cannot occur'.

4.16 On the basis of the above, for the residential development of the application site, the following criteria are considered to be in keeping with the aims of the NPPF:

- 35 dB $L_{Aeq(0700\text{-}2300)}$ in living rooms and bedrooms during the daytime.
- 30 dB $L_{Aeq(2300\text{-}0700)}$ in bedrooms at night.
- 45 dB L_{AFmax} not normally exceeded in bedrooms at night.
- Guideline range of 50 - 55 dB $L_{Aeq(0700\text{-}2300)}$ in gardens during the daytime and where this is not achievable, design to achieve the lowest practicable levels.

5.00 SOUND ATTENUATION SCHEME PROPOSALS

5.01 The following sound attenuation scheme proposals are based on the noise criteria specified above and with reference to the proposed layout. Should layout changes be considered, ENS should be consulted with regards to the effect on the sound attenuation scheme proposals.

5.02 In order to calculate the sound insulation requirements of the building envelope for habitable rooms throughout the development, 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, 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} and L_{AFmax} in this case). For the calculations, a standard masonry construction has been assumed.

5.03 Based on the measured noise data, road frontage external design noise levels have been taken as 68 dB $L_{Aeq,07:00\text{-}23:00}$, 56 dB $L_{Aeq,23:00\text{-}07:00}$ with typical event maxima of ≤ 77 dB L_{AFmax}.

Glazing and Ventilation

5.04 Habitable rooms on the road frontage elevations should be fitted with glazing rated at $\geq$ 32 dB R_w+C_{tr}, such as a generic 10 mm float glass (6-20 mm air gap) 6 mm float glass double glazing configuration.

5.05 In order to provide whole house ventilation to the habitable rooms on the road frontage elevations, acoustic trickle vents should be provided which have a vent open $D_{n,e,w} + C_{tr}$ of ≥ 38 dB per 5000 mm^2 EA (e.g. Greenwood 5000EAW.AC2 vent, or equivalent).

5.06 A standard thermal double glazing system with standard window frame trickle vents is considered appropriate for the rear elevations.

5.07 Roof constructions are commonly weak acoustically. For the room-in-roof construction, it is recommended that the road frontage pitch consists of a tiled/slated roof, with insulation between rafters and a plasterboard lining to the inside of the rafters consisting of two layers of dense 12.5 mm plasterboard with staggered joints (e.g. British Gypsum SoundBloc board or equivalent).

Garden Areas

5.08 The main garden areas to the plots are predominantly located to the rear (east) of the dwellings and, as such, screened from Fieldside Road by the dwellings themselves. From experience, screening by the dwellings will provide circa 15 dB attenuation, resulting in noise levels in the screened garden areas within the design range of 50 – 55 dB $L_{Aeq,07:00\text{-}23:00}$.

5.09 In order to control Fieldside Road traffic noise flanking in between and around the sides of the dwellings, it is recommended that a 1.8 metre high reflective timber barrier is installed in these areas (note: a solid timber gate should be installed where required to accommodate the paths leading from the front to the rear of the dwellings). The barrier should have a mass per unit

area of ≥ 10 kg/m^2, be fully sealed to the ground and fitted with cover strips to prevent gaps forming over time. The proposed locations of the barriers are identified on the layout plan contained in Appendix 2.2.

6.00 CONCLUSIONS

6.01 A noise impact assessment has been undertaken for the proposed residential development of a parcel of land off Fieldside Road and Barnsley Road, Goldthorpe.

6.02 The application site has been assessed in accordance with the requirements of the NPPF. On the basis of the assessment, with the implementation of the recommended attenuation scheme proposals, the ambient noise climate is not considered to represent a constraint to the proposed residential 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,

Richard Pennell
For Environmental Noise Solutions Limited

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.

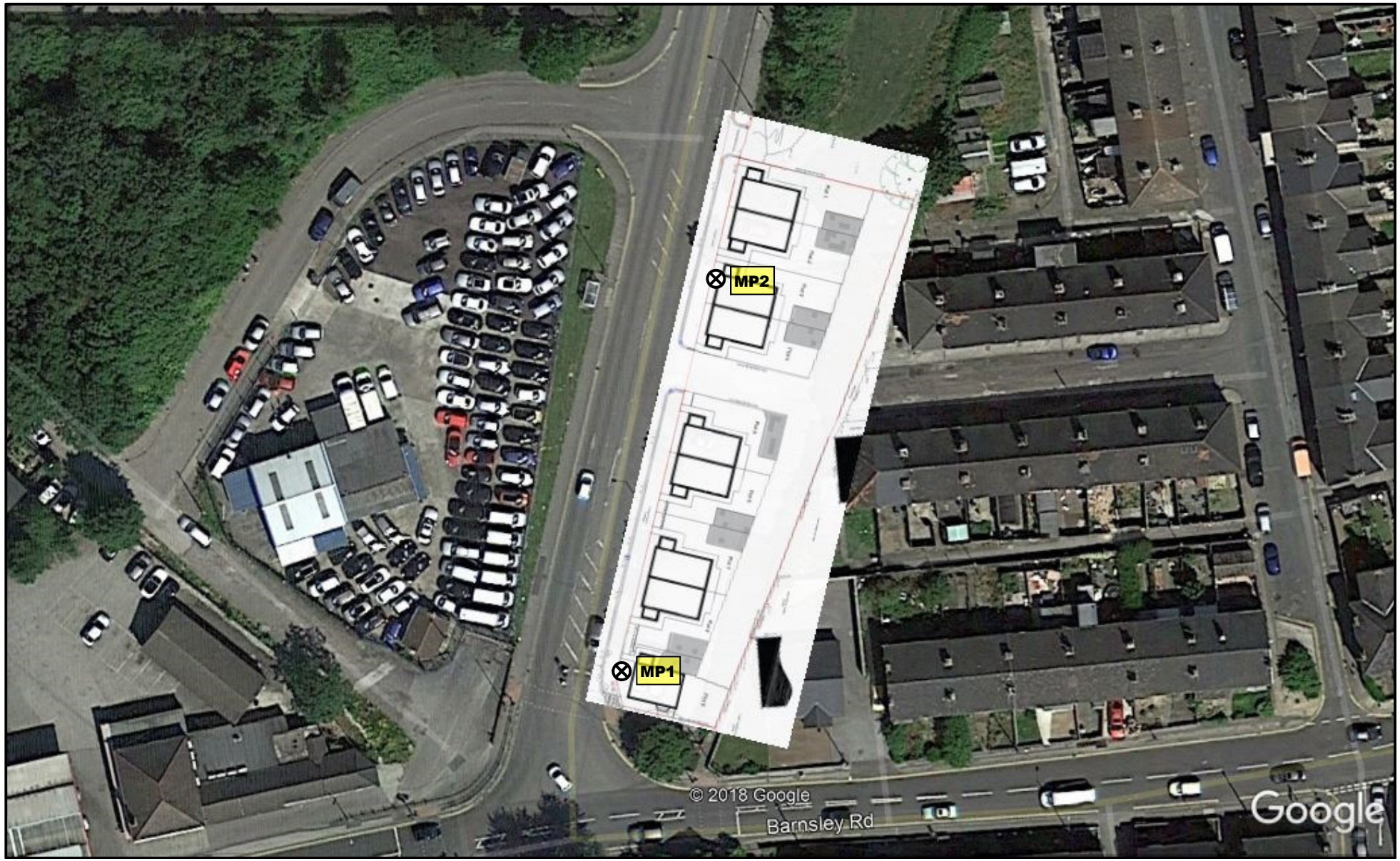
Sound Exposure Level (SEL or L_{AE})

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 2.1: Site location plan indicating the approximate noise monitoring positions (MPs)



Appendix 2.2: Proposed site layout