

Our ref: NIA/9223/20/9218/v1/Abbey Lane, Preston

13th August 2020

Mr. Ian K Barraclough
Barraton Design

By email only: ian@barratondesign.com



Dear Sir

**NOISE IMPACT ASSESSMENT FOR A PROPOSED RESIDENTIAL DEVELOPMENT
LAND TO THE SOUTH OF ABBEY LANE, PRESTON, HULL**

EAST RIDING OF YORKSHIRE COUNCIL PLANNING APPLICATION REFERENCE 18/03925/PLF

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Limited (ENS) has been commissioned by Barraton Design to carry out a noise impact assessment for a proposed residential development at land to the south of Abbey Lane, Preston, Hull Knowsley (hereafter referred to as the application site).

1.02 Planning Permission (ref: 18/03925/PLF) for the development was granted by East Riding of Yorkshire Council in June 2020, subject to conditions. Condition 17 relates to the control of noise as follows:

17. *No development shall take place above damp proof course level until a noise survey has been conducted to determine noise levels at the site from the nearby commercial enterprise of Cranswick Country Foods to the west. The results of the noise survey shall be submitted to and approved in writing by the Local Planning Authority along with proposals for a sound insulation scheme and measures to bring internal and external noise levels within the proposed dwellings to an acceptable level if noise levels are found to be of a level where disturbance to future occupants would be likely. The development shall then be carried out in accordance with any agreed mitigation measures which shall thereafter be retained.*

1.03 The objectives of the noise impact assessment were therefore to:

- Determine at the application site the noise levels associated with Cranswick Country Foods
- Assess the potential noise impact of Cranswick Country Foods 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

1.04 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 aid in the discharge of Condition 17 of Planning Permission 18/03925/PLF.

1.05 This report has been prepared for Barraton Design 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 Barraton Design 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 APPLICATION SITE SETTING AND PROPOSED RESIDENTIAL DEVELOPMENT

2.01 The application site is located within the village of Preston to the east of Hull and is bound by (see site location plan in Appendix 2):

- Abbey Lane to the north
- Abbey House (existing residential dwelling) and paddock to the west
- Existing residential dwellings to the east
- Open agricultural fields to the south

2.02 The proposed residential development consists 9 no. dwelling houses with associated estate road and landscaping.

2.03 Cranswick Country Foods is located circa 125 metres to the west of the application site. The factory operates 24/7 and forms the ambient noise climate at the application site during both daytime and night time.

3.00 BASELINE NOISE SURVEY

3.01 In order to establish the ambient noise levels at the application site, a baseline noise survey was carried out during the daytime on Thursday 23rd July and during the night time (early hours) of Friday 24th July 2020. It was confirmed that Cranswick Country Foods was operating normally during the survey.

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 on the western boundary of the application site
- MP2 was located on the northern boundary of the application site

3.03 Noise measurements were undertaken in free field conditions at a height of 1.5 metres using Bruel & Kjaer 2250 Type 1 integrating sound level meters. 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.

3.04 Measurements consisted of A-weighted broadband parameters, together with linear 1/3rd octave band L_{eq} levels.

3.05 Ambient noise levels throughout the application site were due to constant, broadband plant associated with Cranswick Country Foods, with daytime and night time ambient noise levels at MP1 measured at circa **49 dB $L_{Aeq, T}$** and **47 dB $L_{Aeq, T}$** respectively.

3.06 In addition, occasional impacts were also noted from the site. Maximum noise levels from impacts were measured at circa **50–60 dB L_{AFMax}** during the night time (early hours) at MP1. However, as a robust scenario, the worst-case maximum noise level of **66 dB L_{AFMax}** , as measured during the daytime at MP1, is adopted for the night time assessment.

3.07 For reference, ambient noise levels at MP2 were slightly lower to due decreased line-of-sight to the factory plant.

3.08 Table 3.1 overleaf contains a summary of the measurement data for each measurement session, at each measurements 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)	Comment
MP1	23/07/20	1104-1204	49	47	51	Cranswick Foods dominant (continuously running plant, occasional impacts at 60–66 dB L _{AFMax} , FLT and HGV movements), distant road traffic
		1204-1304	49	47	50	
		1304-1404	49	47	51	
		1404-1504	49	47	51	
	24/07/20	0455-0600	47	45	48	Cranswick Foods dominant (continuously running plant, occasional impacts at 50–60 dB L _{AFMax}), distant road traffic
		0600-0700	47	45	49	
Daytime and night time ambient noise level circa 49 dB L_{Aeq,T} and 47 dB L_{Aeq,T} respectively Maximum noise level from impacts circa 60–66 dB L_{AFMax} during the daytime and circa 50–60 dB L_{AFMax} at night						
MP2	23/07/20	1102-1200	46	44	48	Cranswick Foods dominant (continuously running plant, occasional impacts, FLT and HGV movements), distant road traffic
		1200-1300	45	42	46	
		1300-1324	45	43	47	
		1345-1501	46	44	48	
Daytime noise level circa 45–46 dB L_{Aeq,T}						

4.00 NOISE ASSESSMENT CRITERIA

National Planning Policy Framework

4.01 The National Planning Policy Framework (NPPF) was updated in February 2019 and sets out the Government’s planning policies for England and how these are expected to be applied.

4.02 Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 170 where it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

‘preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of.....noise pollution’.

4.03 Paragraph 180 advises that:

‘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.....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’.

4.04 With regard to extant community noise sources and the potential to affect proposed new developments, Paragraph 182 states that:

‘Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.’

- 4.05 The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NPSE) which reinforces and supplements the NPPF

Noise Policy Statement for England

- 4.06 The Noise Policy Statement for England (NPSE) sets out the long-term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This long-term vision is supported by the following aims:

- Avoid significant adverse impacts on health and quality of life.
- Mitigate and minimise adverse impacts on health and quality of life.
- Where possible, contribute to the improvement of health and quality of life.

- 4.07 NPSE describes the following levels at which noise impacts may be identified:

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

Planning Practice Guidance – Noise

- 4.08 In October 2019, Planning Practice Guidance (PPG) was updated online which provides additional guidance and elaboration on the NPPF. It advises that the Local Planning Authority should consider the acoustic environment in relation to:

- Whether or not a significant adverse effect is occurring or likely to occur.
- Whether or not an adverse effect is occurring or likely to occur.
- Whether or not a good standard of amenity can be achieved.

- 4.09 In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

'...the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation'.

- 4.10 The PPG also provides general advice on the typical options available for mitigating noise. It goes on to suggest that Local Plans may include noise standards applicable to proposed developments within the Local Authority's administrative boundary, although it states that:

'Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed'.

British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

- 4.11 British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233) sets guideline indoor ambient noise levels for dwellings, as follows:

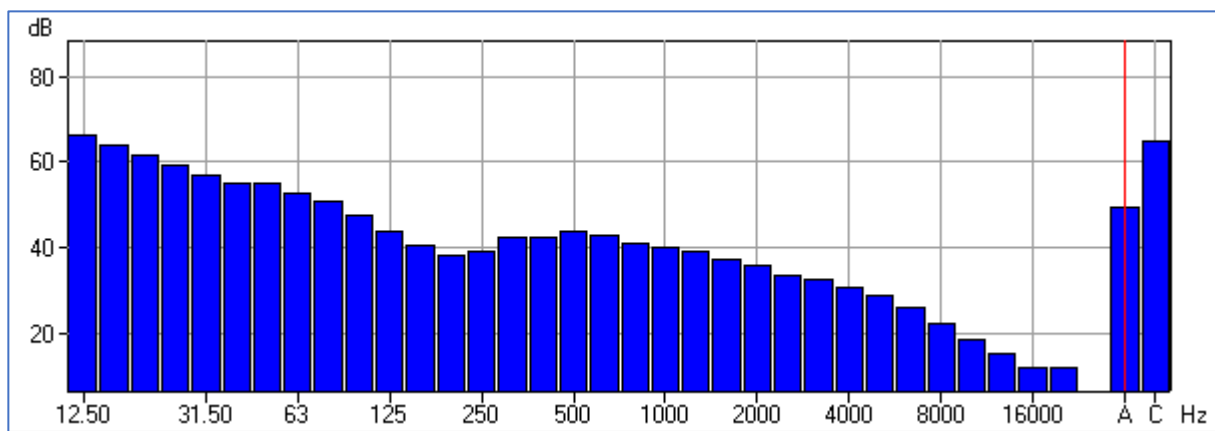
Table 4.1 – Indoor Ambient Noise Levels in Dwellings

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB L _{Aeq} (0700–2300)	-
Dining	Dining Room/Area	40 dB L _{Aeq} (0700–2300)	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq} (0700–2300)	30 dB L _{Aeq} (2300–0700)

- 4.12 Note 4 to the above table 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_{AFMax} depending on the character and number of events per night.*'
- 4.13 In respect of individual noise events, the WHO Guidelines states '*For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10 to 15 times per night (Vallet & Vernet 1991) and most studies show an increase in the percentage of awakenings at SEL values of 55–60 dBA (Passchier-Vermeer 1993; Finegold et al. 1994; Pearsons et al. 1995).*'
- 4.14 Note 5 to the above table states: '*If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.*'
- 4.15 This is consistent with the guidance contained within the PPG, which states that:
'... consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations.'
- 4.16 On the basis of the above, the following criteria (with windows closed and an alternative means of ventilation provided) are considered appropriate for the proposed residential development and considered to represent good resting and sleeping conditions:
- ≤ 35 dB L_{Aeq} (0700-2300) during the daytime
 - ≤ 30 dB L_{Aeq} (2300-0700) and 45 dB L_{AFMax} not regularly exceeded during the night time
- 4.17 With respect to external amenity, BS 8233 states:
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.'
- 4.18 The NPPF PPG requires that the *character* of the noise is taken into account. With cognisance to this, further useful contextual guidance is taken from British Standard BS 4142:2014 'Methods for Rating and Assessing Industrial and Commercial Sound' (BS 4142).

BS 4142:2014 'Methods for Rating and Assessing Industrial and Commercial Sound'

- 4.19 BS 4142 describes methods for determining, at the outside of a building, noise levels from factories or industrial premises and a method for assessing whether the noise is likely to give rise to adverse impacts.
- 4.20 BS 4142 provides guidance on adjustments for the characteristic features of the sound. The character correction relates to whether and to what degree the specific sound is assessed to have an element of tonality, impulsivity and/or characteristics that are readily distinctive against the residual acoustic environment.
- 4.21 In terms of particular acoustic features, noise from the factory was noted to be continuous (i.e. not intermittent) and broadband (i.e. not tonal). The latter observation is corroborated by noise measurement data which illustrates the spectrum is not objectively tonal (in accordance with Annex C of BS 4142). See below for the one-third octave frequency spectrum of noise measurement data as measured at MP1 during the daytime.



- 4.22 Noise associated with the factory did however contain impacts which were clearly perceptible at the application site. On this basis, a **+6 dB impulsivity penalty** is considered robust.
- 4.23 It is considered that applying this correction to worst case noise levels measured at MP1, whilst assessing the development to BS 8233 criteria, represents a robust assessment methodology.

5.00 SOUND ATTENUATION SCHEME PROPOSALS

- 5.01 Allowing for a +6 dB impulsivity penalty, design noise levels across the application site are taken as:
- **≤ 55 dB $L_{Aeq,T}$** during the daytime
 - **≤ 53 dB $L_{Aeq,T}$** during the night time
 - **≤ 66 dB L_{AFMax}** during the night time (robustly adopted from the daytime survey)
- 5.02 In order to calculate the sound insulation performance of the building envelope, 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).
- 5.03 The following BRE building envelope insulation calculation spreadsheets indicate that standard double glazed windows (rated at ≥ 28 dB R_w+C) and standard trickle vents (rated at ≥ 33 dB $D_{n,e,w}$ (vent open)) are appropriate throughout the development.

BRE Calculation Spreadsheet – Daytime Ambient Noise Level

<h1 style="margin: 0;">BRE</h1>	<h2 style="margin: 0;">Building Envelope Insulation</h2> <p style="margin: 0;">2) Select elements of facade structure, and enter corresponding internal surface area in m² OR enter number of vents.</p> <p style="text-align: right; margin: 0;">HELP</p>	<p style="margin: 0;">Switch to Reverberation Time Calculation</p>	<p style="margin: 0;">4) Select exterior sound level type</p> <p style="margin: 0;">Option (A) <input checked="" type="radio"/> User defined spectrum</p> <p style="margin: 0; text-align: center;">55 dB LAeq Day</p> <p style="text-align: right; margin: 0;">View/Edit Data</p> <p style="margin: 0;">Option (B) <input type="radio"/> Spectrum shape</p> <p style="margin: 0;">Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz)</p> <p style="margin: 0; text-align: center;">L_{Aeq} 55 dB</p> <p style="margin: 0; text-align: center;">ISO 717 - 1 (C)</p> <p style="text-align: right; margin: 0;">View Data</p>																											
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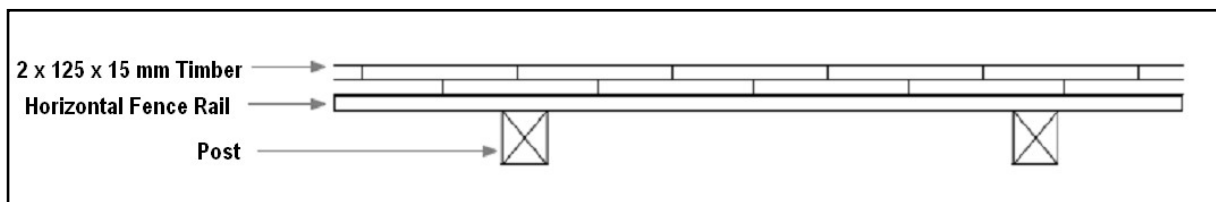
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BRE Calculation Spreadsheet – Night Time Maximum Noise Level

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External amenity (gardens)

- 5.04 Allowing for a robust +6 dB impulsivity penalty, daytime ambient noise levels have been measured/calculated at 55 dB L_{Aeq, T} on the western boundary (MP1). Site layout plan indicate that gardens back onto the western boundary.
- 5.05 Although noise levels are within the BS 8233 guideline values for external amenity areas, it is recommended that gardens along the western boundary are further screened from Cranswick Country Foods with a circa 2-metre-high acoustic fence (see Appendix 3 for fence location).
- 5.06 The acoustic fence should be built in double-thickness solid timber construction as illustrated below. The fence should have no gaps or holes and should be fully sealed at the ground (i.e. include a gravel board).



6.00 CONCLUSIONS

- 6.01 A noise impact assessment has been undertaken for the proposed residential development at land to the south of Abbey Lane, Preston, Hull.
- 6.02 The ambient noise climate at the application site is due to plant, intermittent impacts and vehicle movements associated with Cranswick Country Foods, and distant road traffic.
- 6.03 A scheme of sound insulation (fenestration and ventilation) and boundary treatments has been developed to protect residential amenity from noise associated with Cranswick Country Foods. As a consequence, the ambient noise climate is not considered to represent a constraint to the proposed residential development.
- 6.04 Furthermore, the proposed residential development will not place any unreasonable constraints on Cranswick Country Foods, and is therefore in accordance with the aims of Paragraph 182 of the NPPF.

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 Whitaker BSc (Hons)
MIOA, Diploma in Acoustics and Noise Control
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 μ Pa 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 μ Pa).

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.

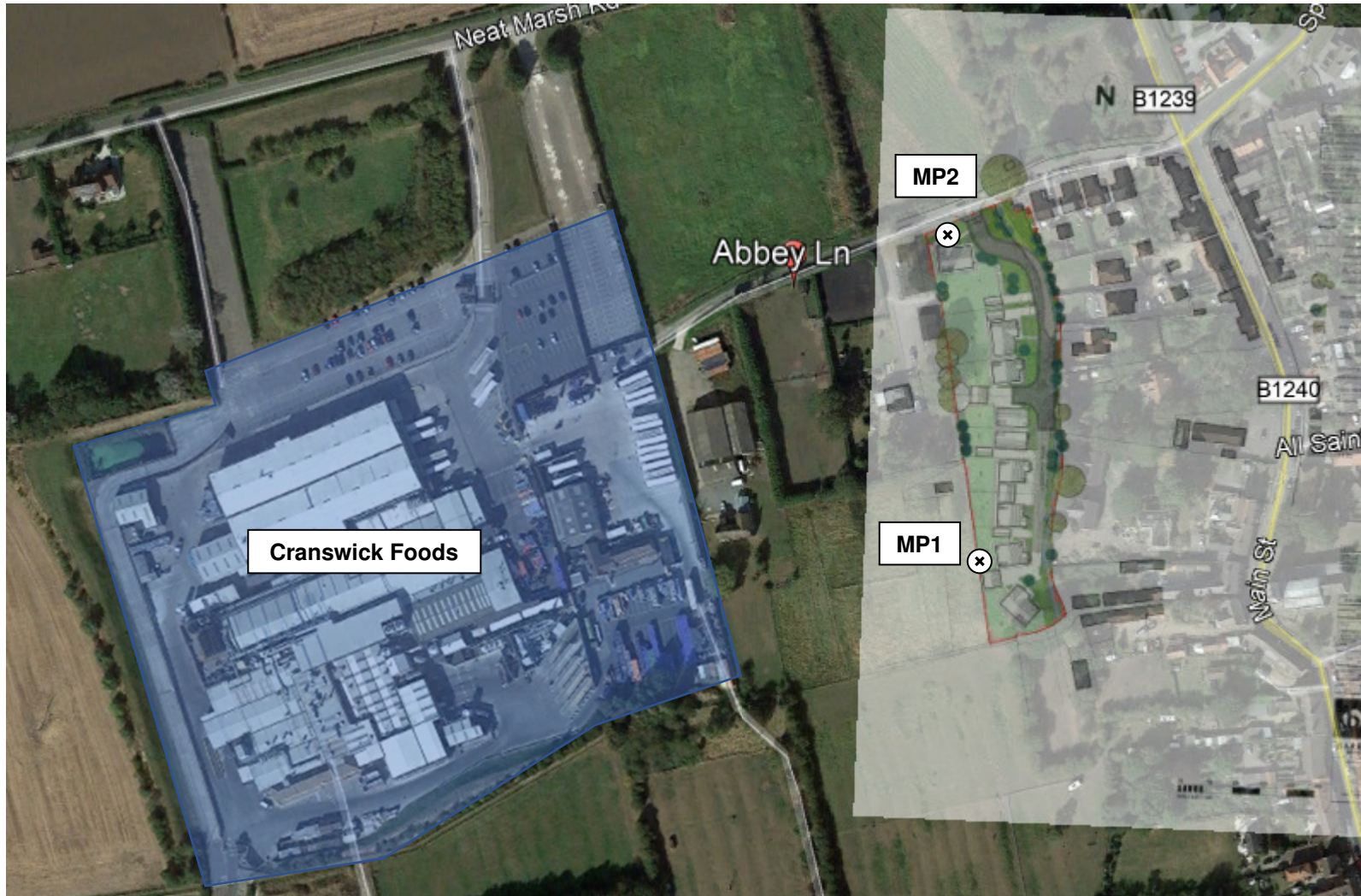
Sound Exposure Level (SEL or L_{AE})

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 Location Plan / Noise Monitoring Position)



Appendix 3 Drawings (Site Layout Plan and Acoustic Fence Location)

