

Station Road, Market Bosworth

Noise impact Assessment

Miller Homes

Project number: 60716351
60716351_501_P01

16 May 2024

Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position

Distribution List

#	Hard Copies	PDF Required	Association / Company Name

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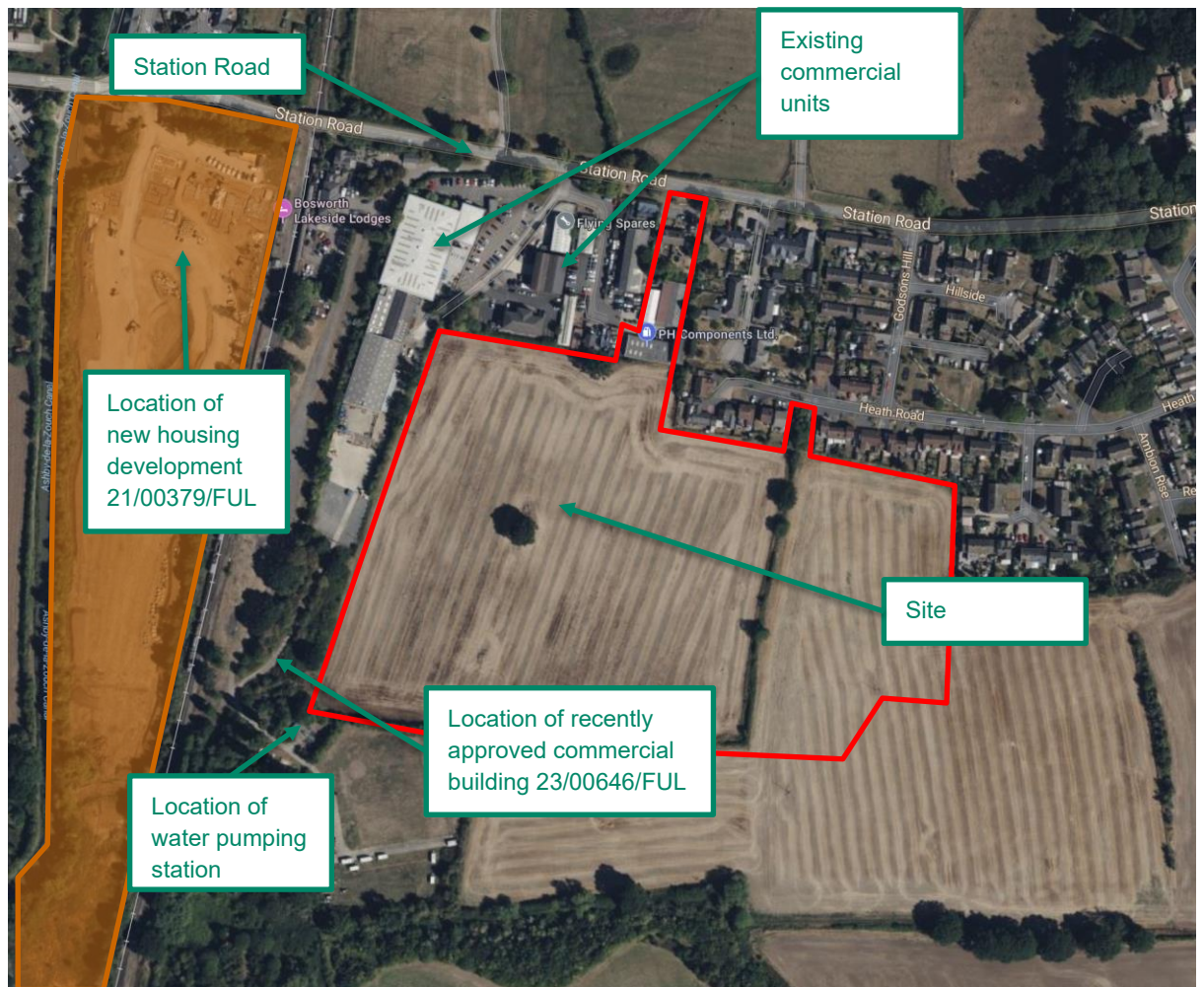
1. Introduction

Overview

- 1.1 Miller Homes are submitting a planning application to develop the land south of Station Road in Market Bosworth (the site).
- 1.2 The site will include 140 dwellings and an area allocated for future employment uses.
- 1.3 AECOM has been instructed by Miller Homes to complete a noise impact assessment of the site to support the full planning application for the residential aspects of the site and an outline application for the commercial aspects of the site.

Site Description

- 1.4 The site currently is predominantly agricultural land. There are commercial units to the north of the site, some of which will be demolished as part of the development.
- 1.5 There are existing commercial units to the west of the site which will remain, a water pumping station to the south-west, agricultural parcels of land to the south and existing residential dwellings to the east.
- 1.6 A new residential development has been recently built to the west of the site (planning reference: 21/00379/FUL) with the heritage railway running along its eastern boundary.
- 1.7 Permission for a new commercial building associated with JJ Churchill at the south west of the site has recently been approved (planning reference: 23/00646/FUL).
- 1.8 The main sound source is traffic on Station Road which runs laterally to the north of the site. Plant noise from the existing commercial units is audible across the majority of the site during lulls in road traffic. A heritage railway runs longitudinally to the west of the existing commercial units, however based on the distance from the site boundary and the very limited number of trains, this has not been identified as a significant sound source.
- 1.9 The site location is shown in Figure 1 including the redline boundary.

Figure 1 Site location

Source: 2024 TomTom, OpenStreetMap, Vexcel Imaging, 2024 Microsoft

Proposed Development

- 1.10 The current application relates to 140 dwellings and an area allocated for future employment as shown in Figure 2. There is the possibility in the future for additional dwellings to be constructed to the east of the current site boundary. As a worst case approach, the 2044 traffic data was used in this noise assessment which includes the traffic associated with this possible additional phase. This is discussed further below.
- 1.11 A 3 m high earth bund topped with a 2 m high acoustic barrier is proposed on the boundary between the existing commercial units to the west/north and the new development. The bund/barrier is to control existing and future industrial noise from the existing and recently approved commercial buildings owned by JJ Churchill.
- 1.12 An additional 2 m high acoustic barrier is also proposed to the east of the new access road, off Station Road along the boundary with existing dwellings. The acoustic barriers will have minimum mass of 10-15 kg m² and will be well constructed and maintained, with no gaps at the base or between individual panels/posts.

Figure 2 Site layout

Source: Nineteen47 Chartered Town Planners and Urban Designers¹, on behalf of Miller Homes

¹ Site layout used in the noise model file n2258_008 Technical Planning Layout DRAFT 2024 05 10.dxf issued by Nineteen47 on 10th may 2024

2. Guidance used in assessment

Local Authority

- 2.1 AECOM liaised with Hinckley and Bosworth Borough Council (HBBC) regarding the baseline sound survey and assessment methodologies. The Environmental Health Officer (EHO) confirmed that the proposed survey and assessment methodologies used in this report are acceptable.
- 2.2 The EHO confirmed that there are no recent/relevant noise complaints relating to the existing industrial units in the vicinity².
- 2.3 Suitable noise criteria with regard to existing and proposed commercial noise were agreed with HBBC, as outlined below³.

ProPG: Planning and Noise

- 2.4 The Institute of Acoustics (IoA), the Association of Noise Consultants (ANC) and the Chartered Institute of Environmental Health (CIEH) jointly produced a Professional Practice Guidance (ProPG) focussing on new noise sensitive development. 'ProPG: Planning & Noise' (ProPG) describes an approach to encourage good acoustic design in proposed new residential development predominantly exposed to airborne transportation noise but with some commercial noise present. It includes a 2-stage design process consisting of an initial noise risk assessment, followed by a systematic consideration of the following key elements:
 - demonstrating a 'Good Acoustic Design Process';
 - observing internal 'Noise Level Guidelines';
 - undertaking an 'External Amenity Area Noise Assessment'; and
 - consideration of 'Other Relevant Issues'.
- 2.5 An initial noise risk assessment should be performed to 'provide an indication of the likely risk of adverse effects from noise were no subsequent mitigation to be included as part of the development proposal.'
- 2.6 Following on from the initial risk assessment, ProPG states that a planning application should demonstrate good acoustic design has been followed.
- 2.7 The document provides advice on how guidance within British Standard BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' and World Health Organisation (WHO) Guidelines for Community Noise may be applied to improve the consistency and quality of plan-making and decision-taking in relation to acoustic matters.

ProPG Initial Risk Assessment

- 2.8 ProPG recommends that an initial (stage 1) risk assessment of the proposed development site should be conducted to provide an indication of the likely risk of adverse effects from noise were no subsequent mitigation to be included. The risk of adverse effect is determined based on the external day and night-time noise levels across the development as shown below in Table 1 (taken from Figure 1 of the ProPG).

² Email from Giles Rawdon, Environmental Health Officer (Pollution). Dated 10th October 2023

³ Email from Giles Rawdon, Environmental Health Officer (Pollution). Dated 19th March 2024

Table 1. Noise risk assessment

Indicative daytime noise levels $L_{Aeq,16hr}$	Indicative Night-time noise levels $L_{Aeq,8hr}$	Risk	Potential effect without mitigation
> 70 dB	> 60 dB	High	 Increasing risk of adverse effect
60 – 70 dB	50 – 60 dB	Medium	
50 – 60 dB	40 – 50 dB	Low	
< 50 dB	< 40 dB	Negligible	No adverse effect

a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.

b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is 'not dominant'.

c. $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.

d. An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F} > 60$ dB means the site should not be regarded as negligible risk.

ProPG Internal Noise Level Guidelines

- 2.9 Guidance on internal noise levels taken from Figure 2 of ProPG is provided in Table 2. The ProPG is based on BS 8233 with some additions. The relevant additional notes in Figure 2 of ProPG are also included.

Table 2. ProPG internal noise level guidelines

(additions to BS 8233 shown in *teal italics*)

Criterion	Typical situation	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining Room	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$ 45 dB $L_{Amax,F}$ (Note 4)

NOTE 4 Regular individual noise events can cause sleep disturbance. A guideline value may be set in terms of Sound Exposure Level (SEL) or $L_{Amax,F}$ depending on the character and number of events per night. *In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.*

NOTE 5 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 ProPG further advice in Note 3.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. *The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people,*

particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing “unacceptable” noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form.

ProPG External Amenity Space Noise Level Guidelines

- 2.10 ProPG states that the acoustic environment of external amenity areas that are an intrinsic part of the overall design should be assessed and noise levels should ideally not exceed the range 50 – 55 dB $L_{Aeq,16h}$ (free-field). It is acknowledged, however, that this may not be achievable in all circumstances where development is considered desirable. Where this is the case, the development should be designed to achieve the lowest practicable noise levels in these external amenity spaces.
- 2.11 Where, despite following good acoustic design, significant adverse impacts remain on any private amenity area, then this may be partially offset if the residents are provided with access to a nearby relatively quiet external amenity space, either for the sole use by a limited group of residents, or in the form of a protected publicly accessible external amenity space (e.g. a public park or local green).

BS 8233:2014 Ambient sound levels

- 2.12 BS 8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’ provides suggested criteria for the assessment of internal and external sound levels for various uses including dwellings. The suggested criteria for dwellings are given in Table 3 below.

Table 3. Indoor ambient sound levels for residential properties

Criterion	Typical situation	Day 0700 - 2300	Night 2300 - 0700
Resting	Living Room	35 dB $L_{Aeq,16h}$	-
Dining	Dining Room	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

- 2.13 BS 8233 also provides guidance on acceptable levels within external areas such as rear gardens and patios. BS 8233 states 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’.

Approved Document O: Overheating

- 2.14 Approved Document O (ADO) took effect on 15 June 2022 and applies to new residential dwellings in England.
- 2.15 In requirement O1(2)(a), the document indicates to comply with the requirements of ADO, the average sound level within bedrooms must not exceed 40 dB $L_{Aeq, 8 \text{ hours}}$ and the maximum noise events not exceed 55 dB L_{AFmax} more than 10 times during the night (2300 to 0700 hours) during overheating conditions.
- 2.16 If the sound levels stated above are exceeded when windows are open, an alternative overheating mitigation strategy such as the use of ventilated louvres on the external walls, suitably specified mechanical ventilation system, or mechanical cooling system must be adopted.

BS 4142:2014 Commercial noise

- 2.17 British Standard BS 4142:2014 + A1:2019 'Methods for rating and assessing industrial and commercial sound' (BS 4142) is the most relevant guidance document for assessing the impact of an existing commercial/industrial noise source potentially affecting new residential properties. The basis of BS 4142 is a comparison between the background sound level in the vicinity of residential locations and the rating level of the sound source under consideration.
- 2.18 The relevant parameters in this instance are as follows:
- *Ambient sound level* – $L_{Aeq,T}$ – defined in the Standard as the 'A' weighted totally encompassing sound in a given situation, usually composed of sound from many sources near and far over a given time interval, T;
 - *Background sound level* – $L_{A90,T}$ – defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels;
 - *Specific sound level* – $L_{Aeq,Tr}$ – the equivalent continuous 'A' weighted sound pressure level produced by the *specific sound source* at the assessment location over a given time interval, T;
 - *Residual sound level* – $L_{Aeq,T}$ – the equivalent continuous 'A' weighted sound pressure level at the assessment location in the absence of the *specific sound source* under consideration, over a given time interval, T; and
 - *Rating level* – $L_{Ar,Tr}$ – the *specific sound level* plus any adjustment made for the characteristic features of the sound such as tonality, impulsivity and intermittency.
- 2.19 When comparing the *background sound level* and the *rating level*, the standard states that:
- a. 'Typically, the greater the difference, the greater the magnitude of impact.
 - b. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context.
 - c. A difference of around +5 dB is likely to be an indication of an adverse impact, depending upon the context.
 - d. The lower the *rating level* is to the measured *background sound level*, the less likely it is that the specific sound 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 upon the context.'
- 2.20 Importantly, as indicated above, BS 4142 requires that the *rating level* of the sound source under assessment be considered in the context of the environment when defining the overall significance of the impact. The standard suggests that in assessing the context, all pertinent factors should be taken into consideration, including the following:
- 'The absolute level of sound;
 - The character and level of the residual sound compared to the character and level of the specific sound; and
 - The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.'
- 2.21 The *background sound level* is determined by evaluation, analysis, and judgement of the sound measurements. While a range of *background sound levels* occur, the value judged to be the most typical *background sound level* is utilised in the assessment, in line with the guidance in BS 4142.
- 2.22 AECOM has liaised with the EHO at Hinckley and Bosworth Borough Council (HBBC) in regard to assessing plant noise at the proposed new dwellings³.
- 2.23 AECOM have agreed that achieving a *rating level* of 0 dB above the daytime *background sound level* in all rear gardens would demonstrate that the proposed development is acceptable.
- 2.24 A higher rating level during the day and night at the front facades of the closest proposed dwellings to the commercial noise sources would be acceptable, as long as with windows closed and alternative

ventilation provided, internal noise levels are 10 dB or more below the BS 8233 internal noise criteria for bedrooms, and with windows partially open these BS 8233 internal criteria are met.

Road traffic noise

- 2.25 The Design Manual for Roads and Bridges (DMRB) LA111 provides guidance on the magnitude of the impact due to changes in road traffic noise levels.

Table 4. DMRB traffic noise level changes

Change in traffic noise level $L_{A10,18h}$ dB	Magnitude of change
0.0	No change
0.1 to 0.9	Negligible
1.0 to 2.9	Minor
3.0 to 4.9	Moderate
≥ 5.0	Major

- 2.26 Negligible and minor changes are generally classed as not significant and moderate and major changes classed as significant.

3. Noise Survey

Methodology and Equipment

- 3.1 A baseline sound survey was carried out between the 6th and 7th February 2023. Existing sound levels were measured at various locations around the site as shown in Figure 3.
- 3.2 It was not possible to leave unattended monitoring equipment on site. Therefore, an extended attended survey was completed. Measurements were taken at key times and locations to establish how the existing sound environment will affect the proposed new development. Additionally, background sound measurements were taken to represent the quietest periods of the day and night.

Figure 3 Baseline measurement locations



Source: 2024 TomTom, OpenStreetMap, Vexcel Imaging, 2024 Microsoft

- 3.3 Attended sound level measurements were taken at positions marked 1 to 7. A description of the positions is provided in Table 5. Full measurement data is shown in Appendix A.
- 3.4 Location CM1 is also marked on Figure 3 as this is the location used in a recent planning application at the JJ Churchill site, the data from which is useful in the BS 4142 assessment of the impact of commercial noise on the proposed new dwellings. All measurements were approximately 1.5m from ground level and in free-field conditions. This is discussed in section 3.8 and 3.9 below.

Table 5. Summary of measurement positions

Measurement position	Notes
1	Used to determine ambient noise levels during the day
2	Used to determine ambient noise levels during the day
3	Used to determine ambient noise levels during the quietest period of the night
4	Used to determine ambient noise levels during the quietest period of the night
5	Existing water pumping station at a distance of 15m
6	Existing plant at JJ Churchill at a distance of 15m (Compressors)
7	Existing plant at JJ Churchill at a distance of 15m (Coolant handling farm)

- 3.5 All sound measurements were taken using sound level meters that meet the requirements of Class 1 of instrumentation standard BS EN 61672:2013 and calibrated using a field calibrator before and after the measurements with a maximum deviation of 0.1dB. Details of the equipment used are shown in Appendix A. Equipment calibration certificates are available upon request.

Measured Noise Levels - Ambient

- 3.6 The measured ambient daytime noise levels are summarised in Table 6. They were influenced by construction noise to the west of the site and as such do not inform the design of the site. They do however demonstrate the site is relatively quiet, even when including construction noise.

Table 6. Summary of measured ambient daytime noise levels

Measurement position	Daytime average ambient noise level dB L _{Aeq,T}
1	52*
2	50*

* Measured levels were influenced by construction noise from the new housing development to the west

- 3.7 The typical background noise levels are shown in Table 7. Noise levels during the daytime were influenced by construction noise associated with the residential development to the west.
- 3.8 A noise impact assessment (doc ref 23380-ENV-0401) was produced by Mewies Engineering Consultants Limited (MEC) in 2023 to successfully support the application for a new commercial building to the southwest of the JJ Churchill site (planning ref 23/00646/FUL).
- 3.9 As part of MEC's noise impact assessment background sound levels were measured at the position defined as 'CM1' shown in Figure 3. Background sound levels during the night were the same as measured by AECOM at location 4, however daytime levels at location 2 were 6 dB lower. A -6 dB correction has therefore been applied to the daytime background sound level measured by AECOM and used in the BS 4142 assessment to ensure a conservative approach which minimises uncertainty and risk.

Table 7. Summary of measured background sound levels

Measurement position	Daytime typical background sound level dB L _{A90,T}	Night time typical background sound level dB L _{A90,T}
1	45*	-
2	42*	-
3	-	38
4	-	32
CM1	36	32

* Measured levels were influenced by construction noise from the new housing development to the west

- 3.10 Night-time L_{AFmax} sound levels from road traffic on Station Road are generally negligible within the site at locations 3 and 4. Typical L_{AFmax} noise levels, without local fauna, were ≤43 dB. Night-time L_{AFmax} noise levels are therefore not a cause for concern and have been excluded from further assessment.

Measured Noise Levels – Existing Plant

- 3.11 Noise levels from existing plant around the site are shown in Table 8. The levels reported are based on those monitored at night, when no interference from construction activities at the residential development site to the west occurred. All the identified plant is understood to operate constantly 24 hours a day.

Table 8. Summary of measured specific noise levels from existing plant

Measurement position	Specific noise level dB L _{Aeq,T}	Description
5	45	Existing water pumping station at a distance of 15m
6	58	Existing plant at JJ Churchill at a distance of 15m (Compressors)
7	56	Existing plant at JJ Churchill at a distance of 15m (Coolant handling farm)

5. Assessment

ProPG initial noise risk assessment

- 5.1 A 3D acoustic model of the site has been built using CadnaA (2023 MR1) by Datakustik. It was calibrated using onsite noise levels due to the existing and proposed commercial noise sources and includes the future 2044 with development traffic count data provided by ADC Infrastructure, shown in Appendix B.
- 5.2 It is noted that all the traffic on the access road has been assumed on the main internal road which loops around the site. In practice the traffic flows on the access road will decrease as the road extends into the site, in particular, traffic accessing the proposed employment zone at the first junction on the access road.
- 5.3 The noise modelling results include a 3m high bund with a 2m high acoustic barrier on top on the western/northern site boundary with the JJ Churchill site, and a 2m high acoustic barrier to the east of the new access off Station Road along the boundary with existing dwellings.
- 5.4 With the mitigation in place, Figure 4 and Figure 5 shows the areas of risk during the day at ground floor level (1.5m) and night-time at first floor level (4m) respectively when compared to the guidance in ProPG, as set out in Table 1. The acoustic model indicates that the majority of the site is in the negligible to low risk categories. There is a small number of dwellings in the medium risk category during the night-time.

Figure 4. ProPG areas of risk, daytime, 1.5m above ground contour, $L_{Aeq,16hour}$



Source of mapping: Nineteen47 Chartered Town Planners and Urban Designers, on behalf of Miller Homes

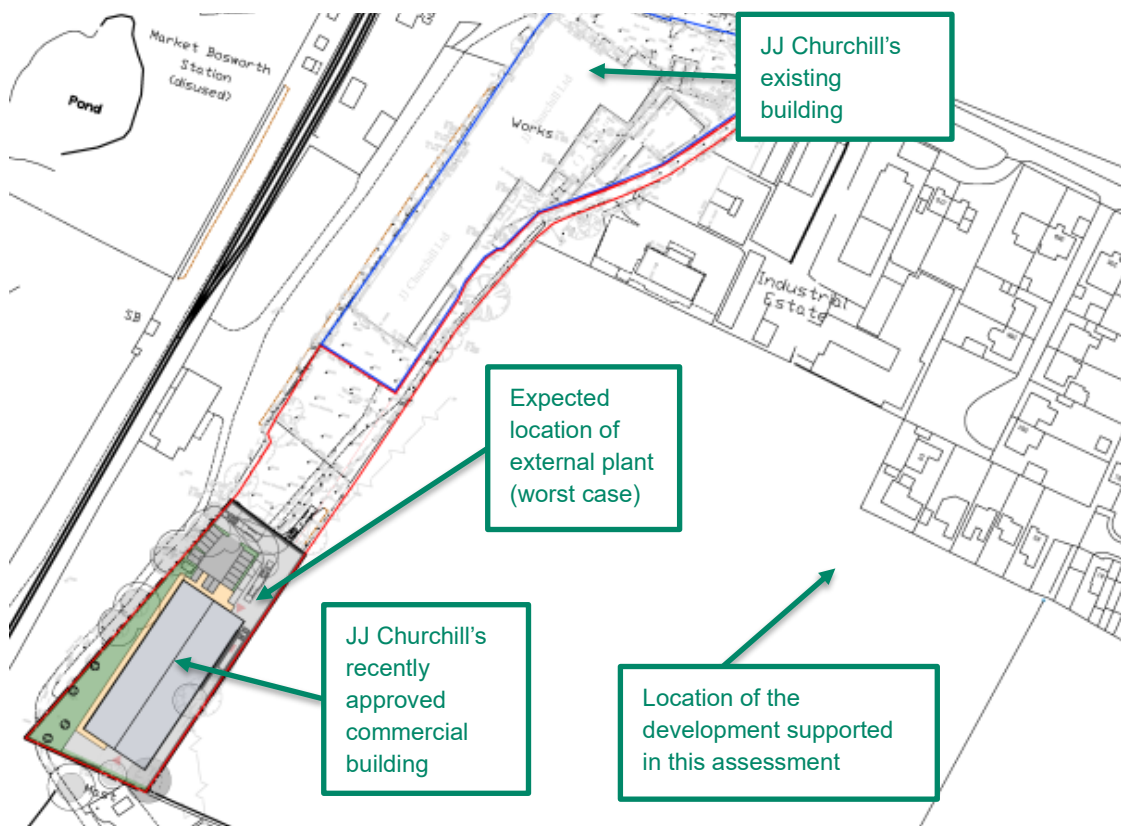
Figure 5. ProPG areas of risk, night-time, 4m above ground contour $L_{Aeq,8hour}$ 

Source of mapping: Nineteen47 Chartered Town Planners and Urban Designers, on behalf of Miller Homes

Commercial noise from outside the site

- 5.5 There is existing external mechanical plant at one of the existing commercial units to the northwest, JJ Churchill. There is also noise from the water pumping station to the south-west.
- 5.6 The plant at JJ Churchill consists of a bank of three compressors and a coolant handling farm. The plant was found to be operating 24 hours a day at a consistent rate. The water pumping station noise is trickling water and is not dominant within the proposed development site.
- 5.7 Third octave band data (as shown in Appendix A.3) measured at 15m from each source show that the specific noise of all the existing plant contains no tonal elements, when assessed in accordance with Annex C of BS 4142 and is constant and non-impulsive in nature. Therefore, none of the existing plant noise has any definable acoustic characteristics.
- 5.8 There is a recently approved (but unbuilt) commercial building to the southwest of the site associated with JJ Churchill. The noise impact assessment used to support the application produced by Mewies Engineering Consultants (MEC) Limited (report ref 23380-ENV-0401) considered noise breakout from the new building, new external plant and HGV movements in the yard to the north of the new building.
- 5.9 At the time of writing the actual proposed plant items were not yet known. Therefore, the MEC assessment did not assess specific items of plant, instead it set a plant noise limit at a position in the new housing development to the west of the site. No comparable plant noise limit was set at the Station Road development to the east of JJ Churchill (assessed in this report).
- 5.10 AECOM held a meeting with JJ Churchill on 11 March 2024. JJ Churchill have confirmed that the external plant associated with the new building will most likely be the same as the external plant items at their existing building to the north (which were operating during the baseline sound survey, which consists of compressors and a coolant farm). JJ Churchill also advised on the likely worst case location of the new external plant relative to the Station Road development, as well as the expected location of HGV movements. The location of the recently approved building and assumed location of the plant is shown in Figure 6.

Figure 6 JJ Churchill's recently approved new commercial building



Source: ima Architects. Drawing number 223008-IMA-ST-XX-DR-A-050101. Planning application 23/00646/FUL

- 5.11 To assess the potential plant noise impact from the recently approved JJ Churchill development, the noise model uses the measured data of the existing JJ Churchill external plant collected during the baseline sound survey and information from JJ Churchill to develop a worst case future scenario.
- 5.12 The noise model also includes noise levels from HGVs associated with the recently approved commercial building taken directly from MEC's noise impact assessment, though it is noted that the contribution from HGVs is low. Noise breakout from inside the new JJ Churchill building is not included in the noise model as the MEC assessment concluded noise breakout from the new building would be minimal, less than 30 dB at the boundary of the JJ Churchill site with the Station Road proposed development.
- 5.13 The noise model therefore contains all the identified existing commercial plant noise sources (JJ Churchill and the water pumping station) and the future commercial noise sources at the recently approved JJ Churchill building (plant noise and HGV movements). The noise bund/barrier along the boundary between the proposed development and the JJ Churchill site is included in the model. Buildings within the proposed employment zone will provide additional shielding of the proposed new dwellings from existing and future plant noise at the JJ Churchill site. However, it is possible that some of the proposed new dwellings may be occupied before the employment zone is developed. Therefore, a conservative approach has been adopted and no benefit from the shielding from buildings in the employment zone has been assumed in the assessment.
- 5.14 Using the results from the noise model and baseline survey, the likelihood of adverse impact at the proposed new dwellings has been assessed using the guidance in BS 4142. As gardens are not expected to be used between 23:00-07:00, they have been assessed as daytime only.
- 5.15 Table 9 shows the cumulative plant noise assessment at the worst affected new residential properties, including the existing and future expected plant at JJ Churchill's factory. At properties further away from the JJ Churchill site and shielded by intervening new dwellings the predicted plant noise levels are reduced.

Table 9. Plant noise BS 4142 assessment

	Sensitive gardens (Day)	Worst affected facades of dwellings (Day)	Worst affected facades of dwellings (Night)
Specific noise level at nearest noise sensitive receptor dB $L_{Aeq,T}$	≤ 36	40	40
Acoustic character corrections dB	0 The plant is neither tonal, impulsive, or intermittent. It is not expected to be readily distinctive against the residual acoustic environment.		
Plant noise rating level dB $L_{A,r,tr}$	≤ 36	40	40
Typical background sound level dB $L_{A90,T}$	36	36	32
Difference between Rating Level and background level dB	≤ 0	+4	+8
Likelihood of adverse impact depending on context	Low	Adverse / Significant adverse impact depending on context	

- 5.16 The results show that existing and future expected plant noise from JJ Churchill is unlikely to cause an adverse impact in rear gardens at the proposed new dwellings, HBBCs preferred criterion of a rating level 0 dB above the background sound level is met in the sensitive gardens during the day.
- 5.17 At the front facades of some dwellings facing the factory the existing and future expected plant noise at JJ Churchill is likely to cause an adverse or significant adverse impact, depending on context.
- 5.18 Contextually, it's unlikely that residents will spend significant time outside the front of their homes, and therefore the primary concern at these facades is the potential for disturbance of residents inside the properties. AECOM have agreed with HBBC that a higher rating level at the front facades of the closest proposed dwellings to the existing/proposed commercial noise sources would be acceptable as long as with windows closed and alternative ventilation provided, internal noise levels are 10 dB or more below

the BS 8233 internal noise criteria for bedrooms, and with windows partially open the internal criteria are met.

- 5.19 The next section of this report addresses internal noise levels and demonstrates that these criteria can be met through the selection of appropriate glazing and ventilation. Therefore, an adverse or significant adverse impact due to existing and future commercial noise sources located outside the site boundary is not anticipated.

Internal noise levels

- 5.20 A combination of standard thermal double-glazed windows and trickle ventilators (in open position) can typically provide attenuation of at least 24 dB. Windows partially open for ventilation provide approximately 15 dB of attenuation.
- 5.21 No dwelling requires acoustically upgraded features. Appropriate internal noise levels can be achieved using standard thermal double glazing and standard background ventilators. This is based on the results of the noise modelling for the site, which includes existing and future commercial noise from premises outside the site and 2044 road traffic on Station Road and the access road within the site.
- 5.22 Section 7.71 of BS 8233 states that the guidance noise level is for '*noise without a specific character, previously termed 'anonymous noise'*'. BS 8233 continues to state that '*noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content*'. Based on BS 8233, the plant noise from JJ Churchill qualifies as 'anonymous noise'. With windows partially open for ventilation the plant noise level in bedrooms is expected to be ≤ 30 dB $L_{Aeq,8hrs}$ which is equal to or below the BS 8233 guidance criterion of 30 dB $L_{Aeq,8hrs}$ for bedrooms. This means that all residents will be able to use partially open windows for additional ventilation if so desired and still meet the BS 8233 guidance on internal levels.

Overheating

- 5.23 As discussed in Section 2, Approved Document O (ADO) took effect on 15 June 2022 and applies to new residential dwellings in England.
- 5.24 The Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O (June 2022) states that a simplified method can be used when external levels are less than 49 dB $L_{Aeq,8h}$ in moderate risk locations. It states that 'the resulting outside-to-inside level difference for window openings necessary to satisfy the simplified method of ADO are expected to be approximately 9 dB for 'medium' risk locations' such as the proposed development site.
- 5.25 Whilst a detailed consideration of the requirements of ADO will be required at the detailed design stage for Building Regulations, an indicative assessment against the above thresholds is included below.
- 5.26 The night-time noise levels indicate that noise in most bedrooms will be below the threshold as set out in ADO with windows partially open during overheating conditions when using the simplified method for medium risk locations.
- 5.27 Some bedrooms will require dynamic thermal modelling (TM59) to demonstrate compliance with Building Regulations at detailed design stage. These are shown in Figure 7.

Figure 7. Bedrooms that will require dynamic thermal modelling to demonstrate compliance with Approved Document O



Red Facades Dynamic Thermal Modelling (TM59) needed to demonstrate compliance with ADO

Unmarked Facades Partially open windows acceptable to control overheating in bedrooms

Source of mapping: Nineteen47 Chartered Town Planners and Urban Designers, on behalf of Miller Homes

External amenity area sound levels

- 5.28 BS 8233 states 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.
- 5.29 The acoustic model, which includes existing and future commercial noise from premises outside the site and 2044 with development road traffic on Station Road and the access road within the site, indicates that this is achievable in all amenity spaces. This is demonstrated by the green areas in Figure 8.

Figure 8. Noise contour daytime at 1.5m above ground, dB $L_{Aeq,16\text{ hours}}$



Source of mapping: Nineteen47 Chartered Town Planners and Urban Designers, on behalf of Miller Homes

Traffic noise impact on existing dwellings

- 5.30 The operation of the development will result in changes in road traffic on surrounding local roads. The change in traffic noise levels in 2029 (the opening year) and 2044 (15 years after opening) at key locations has been calculated using traffic count data provided by ADC Infrastructure Limited. The Basic Noise Level (BNL) for each link has been calculated with and without the development in 2029 and 2044 using the standard UK traffic noise prediction methodology: Calculation of Road Traffic Noise (CRTN). The BNL is the traffic noise level at 10m from the kerb based on the 18hr traffic flow, percentage of heavy-duty vehicles (HDV), and speed.
- 5.31 The location of each link is shown in Appendix B.

Table 10 Change in BNL level per link

Link	Location	2029 Change in BNL dB	2044 Change in BNL dB
1	B585 Wellsborough Road	0.3	0.3
2	A444 Burton Road (N)	0.1	0.1
3	Bosworth Road	0.4	0.4
4	A444 Burton Road (S)	0.1	0.1
5	Station Road (west of access)	0.3	0.3
6	Station Road (east of access)	0.5	0.4
7	Station Road (west of Market Place)	0.4	0.4
8	Main Street (north of Market Place)	0.5	0.4
9	Main Street (north of Park Street)	0.0	0.0
10	Park Street	0.4	0.3
11	The Park	0.4	0.3
12	Rectory Lane	0.4	0.3
13*	Sutton Lane	-	-
14	Market Place (north of Sutton Lane)	0.4	0.4
15	Market Place (south of Main Street)	0.4	0.3
16	Bosworth Road (west of A447)	0.4	0.4
17	A447 (N)	0.1	0.1
18	B585 Bosworth Lane	0.2	0.2
19	A447 Ashby Road (S)	0.1	0.1
20	B585 Bosworth Lane (south of Barlestone Road)	0.2	0.2
21	B585 Barlestone Road (N)	0.0	0.0
22	B582 Barlestone Road (S)	0.1	0.1

* Traffic flows on Sutton Lane both with and without the development in 2029 and 2044 are very low, less than 200 vehicles as an 18hr AAWT, this is well below the 1000 18hr AAWT low flow cut off of the CRTN prediction methodology, and therefore this road is excluded from the assessment

- 5.32 The anticipated change in traffic noise levels on all the selected surrounding existing roads is negligible, therefore no significant adverse effects due to the additional traffic generated by the development along existing roads are anticipated.
- 5.33 The new development has a dedicated site access road that runs alongside existing residential dwellings. Traffic on the access road will cause a change in traffic noise level at the existing dwellings to the east. The change in noise level at the existing dwellings has been assessed using the 3D noise model and is based on the traffic data for 2044, which includes traffic associated with the potential additional area of housing to the east of the current Station Road redline boundary.

- 5.34 The model shows that, with the 2m high acoustic barrier along the eastern side of the access road in place, the change in traffic noise levels at the facades and within gardens of the existing dwellings is not expected to be equal to or greater than 3 dB. Therefore, the adverse effect of traffic on the new access road at the closest existing dwellings is not anticipated to be significant.

Noise from new commercial units

- 5.35 The proposed development includes the outline provision of an employment zone to the west of the site. This shows good acoustic design as once built, the buildings will provide additional acoustic screening between the existing commercial units (JJ Churchill) and the existing and proposed dwellings to the east.
- 5.36 The exact use of the new commercial units is not yet known. Therefore, a detailed assessment is outside the scope of this noise impact assessment. It is anticipated that the new commercial units would be office or light industrial type uses, therefore the potential for significant industrial/commercial noise to be generated is limited. In addition, Miller Homes have confirmed that the employment zone would only operate during daytime hours (07:00-19:00).
- 5.37 To minimise the impact at the new and existing dwellings noise rating limits have been set using British Standard BS 4142:2014 + A1:2019 '*Methods for rating and assessing industrial and commercial sound*' (BS 4142) and with reference to the ANC BS 4142:2014+A1:2019 Technical Note (ANC Technical Note).
- 5.38 Hinckley and Bosworth Borough Council (HBBC) have requested that noise rating limits should not exceed background noise levels. According to BS 4142, this is "*an indication of the specific sound source having a low impact, depending on the context*".
- 5.39 Noise limits, shown in Table 11, have been derived using the typical background noise level and are specified as a rating level i.e. including any BS 4142 penalties for acoustic character. In addition, these limits are the cumulative noise levels from all commercial noise, to be met at the nearest noise sensitive receptors i.e. including any contribution from commercial noise sources outside the site boundary such as JJ Churchill.

Table 11. Commercial noise limits applicable at the closest noise sensitive receptors

Assessment period	Typical background noise level dB $L_{A90,T}$	Commercial noise rating level criterion dB $L_{Ar,Tr}$
Daytime 0700hrs to 2300hrs	36	36
Night-time 2300hrs to 0700hrs	32	32

- 5.40 A detailed assessment of any potentially significant noise sources at each commercial unit should be completed once any such activities/plant items are known or during the Reserved Matters Application for the commercial units.

Uncertainty

- 5.41 As with most measurements of noise, there is a level of uncertainty associated with the noise survey. This is due the potential day to day variation in environmental noise levels based on metrological effects, variation in noise source levels such as road traffic.
- 5.42 The daytime background noise level used by MEC to support application 23/00646/FUL is 6 dB lower during the day than that measured in the AECOM noise survey. This assessment uses the lower MEC background noise level of 36 dB $L_{A90,T}$, minimising risk and uncertainty.
- 5.43 The following steps were taken to minimise the level of uncertainty in the sound measurements:
- Use UKAS calibrated of Class 1 sound level meters.
 - Calibration of equipment of before and after noise measurements.

- Measuring noise levels during non-adverse weather conditions.
 - Partially attended noise survey to determine the source of the measured noise levels.
 - Worst case survey data used in the assessments.
- 5.44 The assessment of the future plant associated with the recently approved JJ Churchill development assumes the worst case position for the external plant relative to the Station Road development site, minimising risk and uncertainty.
- 5.45 The assessment of existing and proposed commercial noise at the JJ Churchill site does not include for the potential shielding which will be provided by the proposed employment zone. Once the employment zone buildings are in place the impact of the commercial noise will be reduced.
- 5.46 The assessment of road traffic noise impacts across the site has adopted a conservative approach using the 2044 traffic data, which includes traffic associated with the possible additional development site to the east of the Station Road redline boundary.

6. Summary

- 6.1 AECOM has been instructed by Miller Homes to conduct a noise assessment at the proposed Station Road site to support their detailed planning application for 140 dwellings and outline planning application for an employment zone.
- 6.2 The acoustic environment on site is dominated by road traffic noise from Station Road and fixed mechanical plant noise from the existing and future JJ Churchill buildings.
- 6.3 AECOM has liaised with Hinckley and Bosworth Borough Council (HBBC) and have agreed suitable criteria for existing and future commercial noise to ensure acceptable levels are achieved in rear gardens and inside the proposed new dwellings.
- 6.4 Mitigation in the form of a 3m high bund and 2m high acoustic barrier is proposed on the west/north boundary of the site with JJ Churchill. A 2m high acoustic barrier is also proposed on the eastern side of the new access road on the boundary with existing dwellings.
- 6.5 No dwelling requires acoustically upgraded features. Appropriate internal noise levels in all habitable rooms can be achieved with standard thermal double glazing and standard background ventilators.
- 6.6 The predicted night-time noise levels indicate that noise in the majority of bedrooms will be below the threshold as set out in Approved Document O with windows partially open during overheating conditions using the simplified method. Some bedrooms will require Dynamic Thermal Modelling (TM59) to demonstrate compliance with Building Regulations at detailed design stage as shown in Figure 7.
- 6.7 Overall noise levels (road traffic and commercial noise sources) in external amenity areas of dwellings (rear gardens) are not expected to exceed the upper BS 8233 guideline value of 55 dB $L_{Aeq,T}$, as shown in Figure 8. Noise levels in rear gardens due to existing and proposed commercial noise sources located outside the site boundary are not anticipated to result in unacceptable impacts, and meet the criteria for commercial noise agreed with HBBC.
- 6.8 Suitable noise criteria have been set out for any future commercial noise sources associated with the proposed employment zone.
- 6.9 Changes in traffic noise levels along existing surrounding roads are anticipated to be negligible, and at the closest existing dwellings to the access road minor.
- 6.10 On the basis of the completed assessment, the Station Road site is determined as being suitable for residential use in terms of road traffic and commercial noise, and no significant adverse noise effects on existing dwellings are anticipated.

Appendix A Noise survey information

A.1 Details of sound measuring equipment

Table 12. Instrumentation

Measurement Position	Equipment Type	Model Number	Serial Number
1 and 4	Sound Level Meter	Rion NL-52	01021278
2 and 3	Sound Level Meter	Rion NL-52	01021282
5-7	Sound Level Meter	Norsonic Nor-140	1403883
All	Calibrator	Rion NC-74	34425539

A.2 Attended sound data

Table 13. Broadband sound levels, dB

Position	Start Time	Time	Duration	L _{Aeq}	L ₁₀	L _{A90}	L _{Amax}
1	06/11/2023	10:15	15:00	48	50	45	61
1	06/11/2023	10:30	15:00	48	51	45	63
1	06/11/2023	10:45	15:00	51	54	46	63
1	06/11/2023	11:00	15:00	52	54	46	69
1	06/11/2023	11:15	15:00	51	54	46	64
1	06/11/2023	11:30	15:00	52	54	46	69
1	06/11/2023	11:45	15:00	52	55	47	69
1	06/11/2023	12:00	15:00	51	55	45	67
1	06/11/2023	12:15	15:00	51	54	45	70
1	06/11/2023	12:30	15:00	52	55	48	64
1	06/11/2023	12:45	15:00	51	54	46	64
1	06/11/2023	13:00	15:00	52	55	48	61
1	06/11/2023	13:15	15:00	53	56	47	65
1	06/11/2023	13:30	15:00	55	54	45	89
2	06/11/2023	10:45	15:00	50	54	45	64
2	06/11/2023	11:00	15:00	50	53	43	61
2	06/11/2023	11:15	15:00	49	53	44	60
2	06/11/2023	11:30	15:00	48	51	44	62
2	06/11/2023	11:45	15:00	51	54	45	62
2	06/11/2023	12:00	15:00	49	52	42	66
2	06/11/2023	12:15	15:00	49	53	43	66
2	06/11/2023	12:30	15:00	50	53	44	64
2	06/11/2023	12:45	15:00	50	53	43	64
2	06/11/2023	13:00	15:00	53	56	46	70
2	06/11/2023	13:15	15:00	53	56	45	65
2	06/11/2023	13:30	15:00	51	54	42	72
3	07/11/2023	02:15	15:00	46	48	38	62
3	07/11/2023	02:30	15:00	39	40	38	43

Position	Start Time	Time	Duration	L _{Aeq}	L ₁₀	L _{A90}	L _{Amax}
3	07/11/2023	02:45	15:00	46	43	38	64
4	07/11/2023	02:15	15:00	46	46	32	64
4	07/11/2023	02:30	15:00	34	35	32	39
4	07/11/2023	02:45	15:00	47	41	33	66
5	06/11/2023	11:54	02:01	51	52	49	59
5	07/11/2023	02:36	02:32	45	45	45	47
6	06/11/2023	11:39	02:38	59	59	58	74
6	07/11/2023	02:26	02:09	58	58	57	60
7	06/11/2023	11:34	02:32	56	57	55	67
7	07/11/2023	02:28	02:30	56	56	55	58

A.3 Spectra of existing plant

Figure 9. Third octave band sound levels of plant at position 5 (approx. 15m from source – water pumping station)

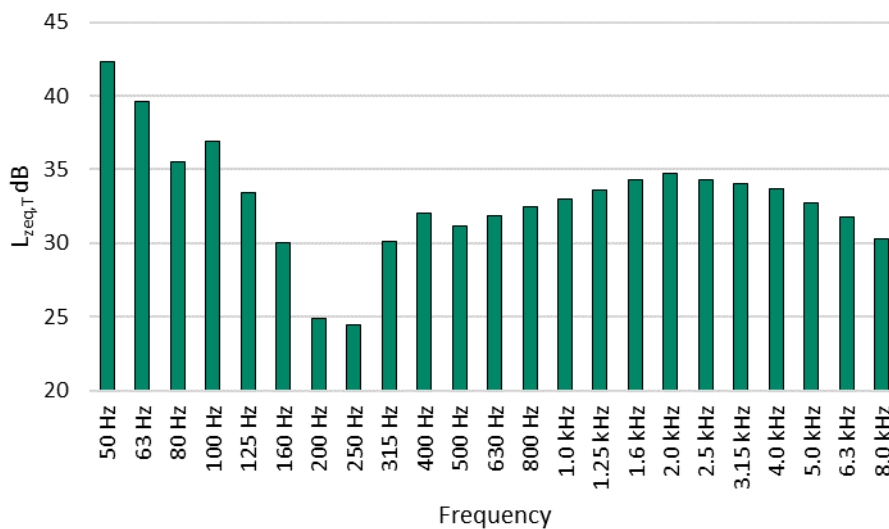


Figure 10. Third octave band sound levels of plant at position 6 (approx. 15m from source – JJ Churchill compressors)

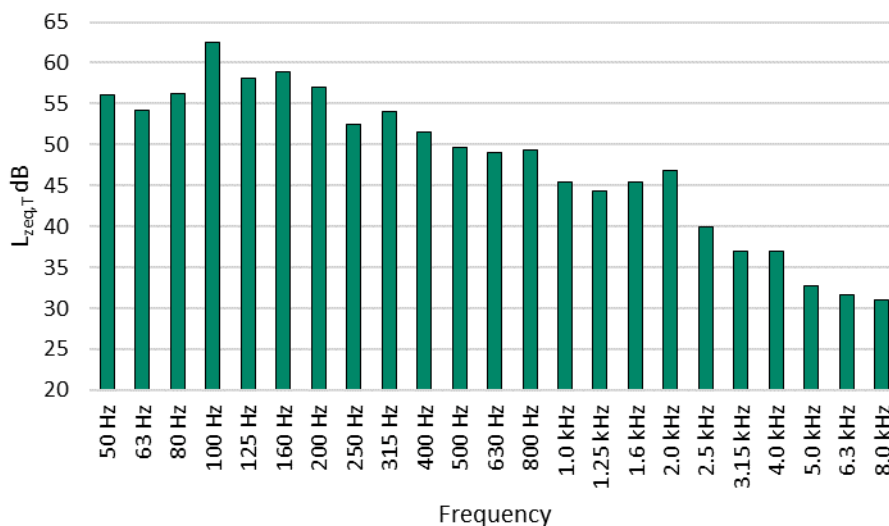
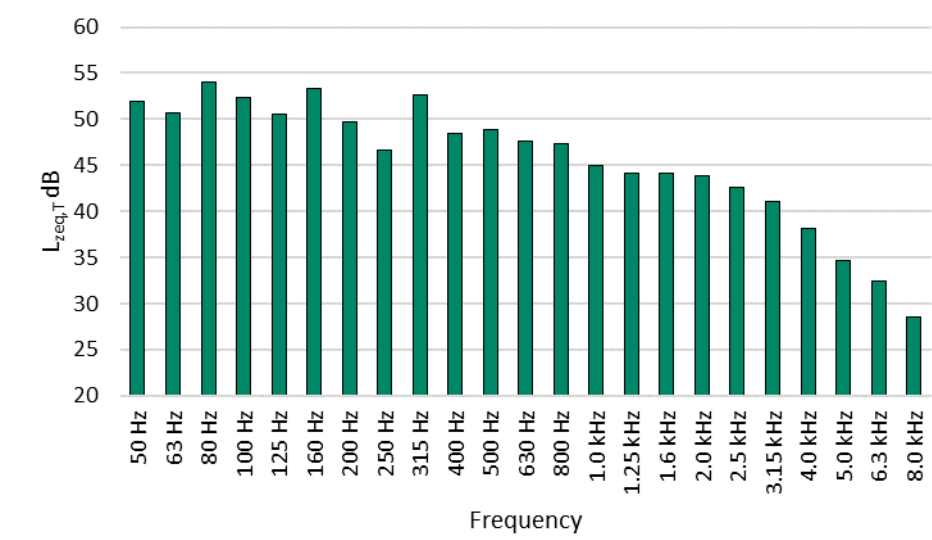


Figure 11. Third octave band sound levels of plant at position 7 (approx. 15m from source – JJ Churchill coolant handling farm)



A.4 Weather conditions

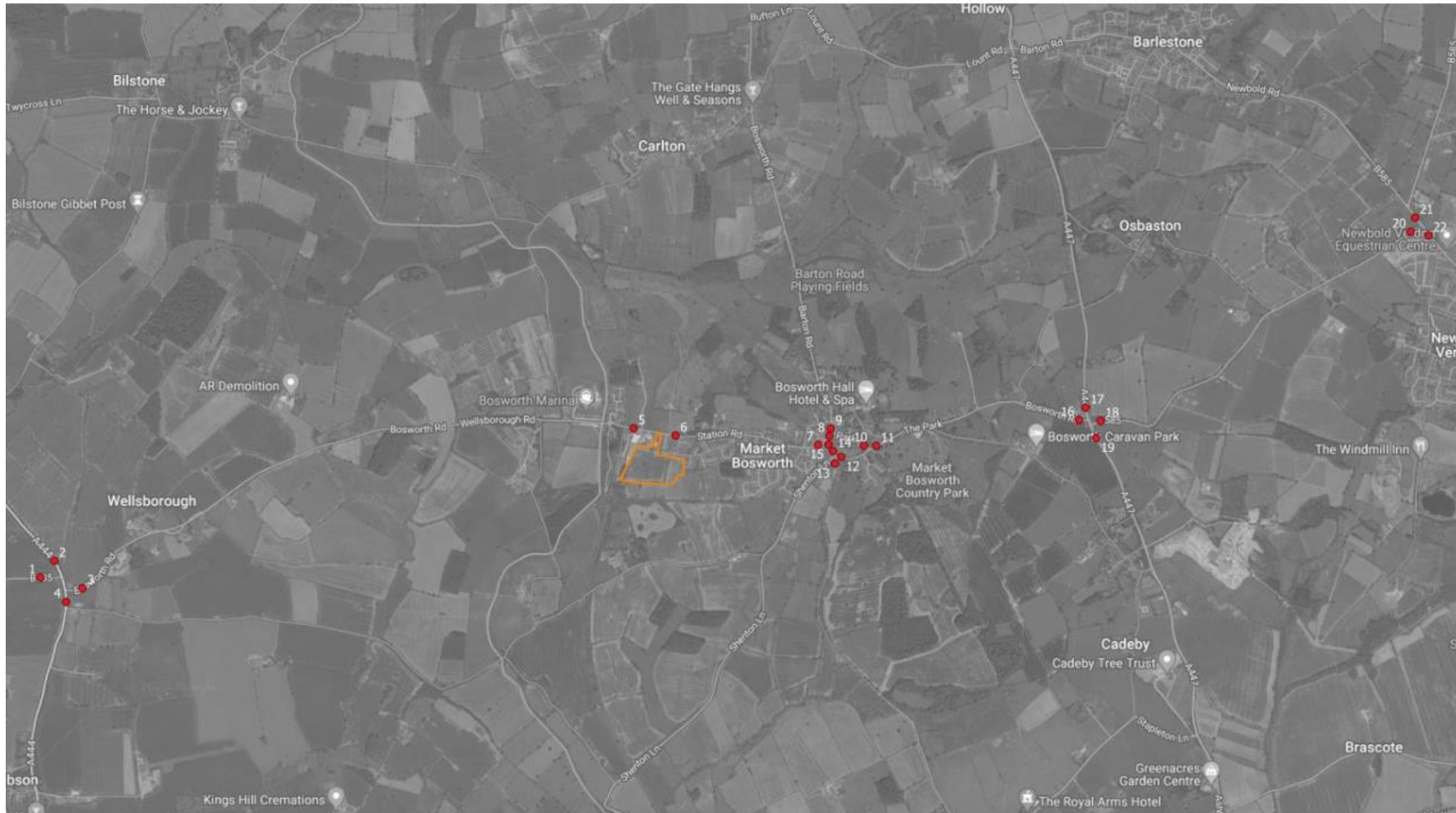
Between 4°C and 6°C

Typical wind speed less than 5 ms⁻¹

No notable precipitation

Appendix B Traffic information

Figure 12. Traffic link locations (development site outlined orange)



Source: ADC infrastructure Limited

