



MEC
Consulting Group

ACOUSTIC AIR



Station Road, Market Bosworth
Acoustics Assessment
November 2024

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REGISTRATION OF AMENDMENTS

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October 2024	A	Revised Illustrative Masterplan			
October 2024	B	Revised Development Framework Plan			
November 2024	C	Revised Development Framework Plan			

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1.0 INTRODUCTION

- 1.1 MEC Consulting Group Ltd (MEC) has been commissioned by Richborough, to undertake an Acoustics Assessment for a proposed residential development on Land at Station Road, Market Bosworth (hereafter referred to as ‘the Site’).

Existing Site

- 1.2 The Site, comprised of green field, is bound by the Kyngs Golf and Country Club and Wharf Farm Airfield to the north; existing residential to the east; Station Road to the south, with existing residential and commercial uses located beyond; and the Battlefield Line Railway to the west.
- 1.3 The principal source of noise affecting the Site is from road traffic using Station Road, coupled with seasonal contributions from the Battlefield Line Railway, along with any contributions from the commercial uses to the south, in particular, the manufacturing of oil pans from within JJ Churchill’s northern building.
- 1.4 In addition, the Kyngs Golf and Country Club has planning permission granted for the erection of a 50 bedroom golf and leisure hotel, and the new George Hall Clubhouse (application ref: 24/00019/FUL).
- 1.5 An approximate redline boundary is presented in Figure 1.1

Figure 1.1: Approximate Redline Boundary



- 1.6 Development proposals for the Site comprise the erection of residential dwellings, with associated infrastructure and access via Station Road.
- 1.7 The development framework plan is provided in **Appendix A**.

Assessment Scope

- 1.8 The assessment scope has been discussed and agreed with the Local Planning Authority's (LPA) Environmental Health Officer (EHO), and the relevant correspondence is presented in **Appendix B**.
- 1.9 The following scope of works has been undertaken:
- An environmental sound survey has been undertaken within the Site in order to determine the prevailing conditions;
 - Assessment of the neighbouring JJ Churchill has been undertaken in accordance with BS 4142¹, based upon noise assessments prepared on behalf of JJ Churchill;
 - An Acoustic model has been created in order to predict sound levels across the Site, based upon the measured sound level data for Station Road and the Battlefield Line Railway, which includes internal noise 'break-out' using indicative reverberant sound levels from the Kyngs Golf and Country Club's clubhouse for the night-time assessment scenario; and
 - Embedded façade mitigation measures in the form of glazing and whole-dwelling ventilation specifications have been provided to demonstrate compliance with the guidance contained within ProPG², BS 8233³; and AVOG⁴.
- 1.10 It should be noted that assessment of the neighbouring Wharf Farm Airfield has been scoped out of the following assessment, due to the fact that the airfield only operates one annual charity event a year, consisting of light historic and recreational aircraft, with infrequent and occasional light usage throughout the remainder of the year.
- 1.11 The conclusions of this report aim to demonstrate to the LPA that external and internal acoustic conditions will be compliant with the relevant British Standards and Acoustics Guidance.

Disclaimer

- 1.12 MEC has completed this report for the benefit of the individuals referred to in Paragraph 1.1 and any relevant statutory authority which may require reference in relation to approvals for the proposed development. Other third parties should not use or rely upon the contents of this report unless explicit written approval has been gained from MEC.
- 1.13 MEC accepts no responsibility or liability for:
- The consequence of this documentation being used for any purpose or project other than that for which it was commissioned;
 - The issue of this document to any third party with whom approval for use has not been agreed.

¹ BS 4142:2014 +A1:2019 '*Methods for rating and assessing industrial and commercial sound.*'

² Professional Practice Guidance on Planning and Noise, May 2017.

³ BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*'

⁴ Acoustics Ventilation and Overheating, Residential Design Guide, V1.1. January 2020.

2.0 STANDARDS AND GUIDANCE

General

2.1 An acoustics glossary is provided in **Appendix C** to assist the reader.

Summary of Guidance and Standards

2.2 The following guidance and standards relevant to the assessment are outlined below:

- National Planning Policy Framework (NPPF) 2023;
- Noise Policy Statement for England (NPSE) 2010;
- BS 4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound.*';
- Calculation of Road Traffic Noise 1988;
- TRL Method for Converting the UK Road Traffic Noise Index $L_{A10,18hr}$ to the EU Noise Indices for Road Noise Mapping;
- Professional Practice Guidance on Planning and Noise (ProPG) 2017;
- BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*'; and
- Acoustics Overheating and Ventilation Guide (AVOG) 2020.

2.3 For conciseness, the guidance and standards most appropriate to this assessment are summarised in this section.

BS 4141

2.4 BS 4142 describes methods for rating and assessing industrial and/or commercial sound and includes, but is not limited to, the assessment of:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical equipment;
- Sound from the (un)loading of goods and materials at industrial/commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes such as that from forklift trucks on or around an industrial and/or commercial site.

2.5 The methods described in BS 4142 use outdoor sound levels to assess the likely effects of sound on people who are typically outside residential premises. Although indoor effects can be indicated where the façade composition is known. A summary of the approach set out in BS 4142 is set out below:

- Establish or predict the specific sound level of the source(s) by considering both the ambient (includes the source to be assessed) and residual (excludes the source to be assessed but includes all remaining sources) sound level;
- Measure the representative background sound levels, typically by measuring close to the receptor location;
- Rate the specific sound level to account for any distinguishing characteristics (see below);
- Estimate the impact by subtracting the background sound level from the rating level; and
- Consider the initial estimate of impact, as determined above, in the context of the noise and its environment.

- 2.6 The specific sound level is rated to account for distinguishing characteristics by using penalties for tonality, impulsivity, intermittency and other sound characteristics. The dominant acoustic characteristic should be applied to avoid large penalties which is in accordance with the Institute of Acoustics response to BS 4142.
- 2.7 The character corrections are flexible according to whether the acoustic character is just perceptible at the noise receptor, or is clearly perceptible or highly perceptible, and range from 0 to 6 dB for tonal noise, 3 to 9 dB for impulsive noise, and 3 dB for other non-tonal/impulsive acoustic characteristics.
- 2.8 An initial estimate of impact of the specific sound is obtained by subtracting the background sound level from the rating level. Typically, the greater the difference, the greater the magnitude of impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
 - A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;
 - At differences lower than +5 dB a low impact is likely, depending on the context. The lower the rating level is to the measured background sound level, the less likely it is that the specific sound source will have an impact.
- 2.9 The results of the initial assessment should then be considered in light of all pertinent contextual factors.

Calculation of Road Traffic Noise

- 2.10 CRTN sets out standard procedures for calculating noise levels from road traffic. The calculation methods use a number of input variables, including traffic flow volume, average vehicle speed, percentage of heavy-duty vehicles (HDVs), type of road surface, site geometry and the presence of noise barriers or acoustically absorptive ground.
- 2.11 CRTN predicts the $L_{A10,18hr}$ for any receptor point at a given distance, up to 300m from the road.
- 2.12 CRTN also documents procedures for the measurement of road traffic noise. Three methods of road traffic noise measurement are described, the first entitled 'The Measurement Method', for direct measurement of the $L_{A10,18hr}$ noise level, the second entitled the 'Shortened Measurement Procedure', for measurement of the $L_{A10,3hr}$ noise level from which the $L_{A10,18hr}$ level can be derived and the third entitled 'Comparative Measurements' which is a procedure to establish noise levels from a single road traffic route at various points, provided that the route remains the dominant source.
- 2.13 CRTN states that if the Shortened Measurement Procedure is followed, a correction of -1 dB can be applied to the determined $L_{A10,3hr}$ noise level to approximate the $L_{A10,18hr}$ noise level.

TRL Method

- 2.14 The 'TRL Method' presents a procedure for converting $L_{A10, 18hr}$ values to $L_{Aeq, T}$ values suitable for noise mapping and assessment of alternative acoustic standards. For the Site, the correction factors are applicable to non-motorway roads and are presented in Table 2.1.

Table 2.1: $L_{A10,18hr}$ to $L_{Aeq,T}$ conversions

Time period	Non-motorway conversion
07.00 – 21.00	$L_{day} = 0.95 \times L_{A10,18hr} + 1.44$
21.00 – 23.00	$L_{evening} = 0.97 \times L_{A10,18hr} - 2.87$
23.00 – 07.00	$L_{night} = 08.90 \times L_{A10,18hr} - 3.77$
07.00 – 23.00	$L_{Aeq\ 16hr} = 10 \log_{10} ((12 \times (10^{L_{day}/10}) + 4 \times (10^{L_{evening}/10})/16)$

ProPG

- 2.15 ProPG seeks to secure good acoustic design for new residential developments. The guidance includes a framework to enable situations where noise is not an issue but to help identify the extent of risk at noisier sites. The guidance does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy.
- 2.16 The guidance is restricted to sites that are exposed predominantly to noise from transportation sources. Where industrial or commercial noise is present on the site but is “not dominant”, its contribution may be included in the noise level used to establish the degree of risk. However, if the industrial/commercial source is dominant, an assessment in accordance with BS 4142 should be conducted.
- 2.17 A two-stage approach is considered whereby:
- Stage 1 – an initial noise risk assessment of the proposed development site is undertaken;
 - Stage 2 – a systematic consideration of internal and external noise levels is considered ensuring good acoustic design and consideration of other relevant issues is recognised.
- 2.18 ProPG also references the World Health Organisation (WHO) guidance on maximum noise levels at night. Guidance from the WHO states that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10 – 15 times per night. ProPG indicates that individual noise events do not exceed 45 dB L_{AFmax} more than 10 times a night and therefore this is considered as criteria in addition to that outlined in Table 2.2.
- 2.19 Whilst ProPG does not define a measurement interval for the assessment of L_{AFmax} levels, research⁵ has been undertaken which indicates that, for Maximum Event Level assessments, a sampling interval of between 1 and 3 minutes relates most closely to how awakening events are experienced by people in reality when compared to longer sampling periods.
- 2.20 For brevity, within the study, the majority of people (circa 75-85%) under test returned to a sleep state by approximately 2.5 minutes after the initial awakening event.
- 2.21 In summary, a longer sampling period can result in the under assessment of the 10th highest maximum level, therefore, based upon research and the recommendation of the Institute of Acoustics (IOA), a sample measurement of 2 minutes has been used to inform this assessment.

⁵ Paxton et al., Assessing L_{max} for residential development: The AVO Guide Approach, Institute of Acoustics, 2019

- 2.22 Upon completion of the ProPG's Stage 1 and 2 assessments, the findings should enable one of four possible recommendations to be presented to the decision maker, namely to grant permission without conditions, grant with conditions, 'avoid' or 'prevent'.

BS 8233

- 2.23 BS 8233 provides recommendations for the control of noise in and around buildings. The guidance provided includes appropriate internal and external noise level criteria which are applicable to residential buildings exposed to steady external noise sources. It is stated in the British Standard that it is desirable for internal ambient noise levels to not exceed the criteria set out in Table 2.2.

Table 2.2: BS 8233: 2014 Table 4 – Indoor Ambient Noise Levels for Dwellings

Activity	Location	07:00 – 23:00 L _{Aeq,16hr} dB	23:00 – 07:00 L _{Aeq,8hr} dB
Resting	Living Room	35	-
Dining	Dining Room/Area	40	-
Sleeping (daytime resting)	Bedroom	35	30

- 2.24 Additional guidance in BS 8233 indicates that appropriate ventilation should be provided, if relying on closed windows to meet the guide values, and that such ventilation should not compromise the façade insulation and resulting noise levels.
- 2.25 BS 8233 additionally includes guidance on external amenity areas whereby it states that external noise levels should not exceed 50 dB L_{Aeq,T} with an upper guideline of 55 dB L_{Aeq,T} which would be acceptable in noisier environments.

AVOG

- 2.26 The AVOG was published by the Association of Noise Consultants (ANC) and The Institute of Acoustics (IOA) in 2020. The guide outlines a methodology for the assessment of airborne sound during overheating conditions, and emphasises the co-dependency of acoustics, ventilation and overheating design.
- 2.27 Many developments require closed windows to provide good internal acoustic conditions. This is in direct contrast to the fact that residents typically open windows in order to keep a building cool. These opposing requirements are becoming a major issue in the design of buildings, in particular for housing, especially as the aim is to avoid widespread use of mechanical ventilation and cooling systems.
- 2.28 AVOG prescribes a two-level assessment procedure, as follows:
- Level 1 – Site Risk Assessment, based on external free-field noise levels (similar to that of ProPG); and
 - Level 2 – Assessment of Adverse Effect, based on internal ambient noise level and duration.
- 2.29 An AVOG Level 2 assessment gives consideration to internal noise levels on a sliding scale depending on the likelihood and duration of overheating.
- 2.30 This report considers an AVOG Level 1 assessment.

3.0 ENVIRONMENTAL SOUND SURVEY

3.1 An environmental sound survey was undertaken between Thursday 27th June and Monday 1st July 2024. The survey was undertaken in full accordance with the guidance set out in BS 7445⁶.

3.2 Sound Level Meters (SLMs) were installed at two locations, as follows:

- Continuous Measurement 1 (CM1): Approximately 60m from the carriageway edge of Station Road, at a position indicative of new dwellings; and
- Continuous Measurement 2 (CM2): on the western boundary with the Battlefield Line Railway.

3.3 The measurement positions are identified in Figure 3.1.

Figure 3.1: Measurement Positions



Equipment

3.4 Measurements were taken using Class 1 integrating/averaging SLMs housed in environmental protection apparatus. The SLMs were installed in a free field position at a height of 1.5m above local ground level, and field calibrated before and after the survey using a Class 1 calibrator, with no significant drift in calibration noted.

3.5 The SLMs were set up to capture the following parameters at a minimum: L_{Aeq} , L_{A90} and L_{AFmax} values, and full details of the equipment used to undertake the sound and vibration survey are presented in Table 3.1.

⁶ BS 7445-1:2003 'Description and measurement of environmental noise, Part 1: Guide to quantities and procedures.'

Table 3.1: Equipment and Calibration Details

Measurement Position	Description	Manufacturer & Type No.	Serial No.	Calibration Due Date
CM1	Sound Level Meter	Type NOR140	1407773	27/03/2025
	Pre-Amplifier	Type 1209	23168	
	Microphone	Type 1225	413180	
	Calibrator	Norsonic 1255	125525494	18/09/2024
CM2	Sound Level Meter	Type NOR140	1407932	26/02/2025
	Pre-Amplifier	Type 1209	23695	
	Microphone	Type 1225	505583	
	Calibrator	Norsonic 1255	125525772	21/11/2024

Meteorological Conditions

- 3.6 During setup of the monitoring equipment, weather conditions were sunny and warm, with westerly winds of up to 4.1 m/s. On collection, weather conditions were overcast, with westerly winds of up to 3 m/s.
- 3.7 It can therefore be concluded that there were no significant adverse meteorological conditions that could influence the survey outcomes.

Observations

- 3.8 Site notes indicate the dominant source of noise across the Site to be from road traffic using Station Road.
- 3.9 During the attended measurement period, sporadic metal 'banging' and external plant from earthworks within the under construction, residential development to the west of JJ Churchill, were noted.
- 3.10 However, there was no audible noise from the neighbouring JJ Churchill, or any other commercial usage to the south at any point during the attended measurement periods, and certainly no dominant noise that would warrant assessment of these sources under BS 4142. Nevertheless, further consideration to the oil pan production within JJ Churchill has been given.

Sound Survey Results

- 3.11 Table 3.2 and Table 3.3 provide a summary of measured assessment appropriate sound levels at CM1 and CM2 respectively.
- 3.12 Time history graphs are provided in **Appendix D**.

Table 3.2: Summary of Measured Sound Levels at CM1, dB

Date	Daytime 07:00 – 23:00	Night-time 23:00 – 07:00	
	$L_{Aeq,T}$	$L_{Aeq,8hr}$	Typical Maximum Event Level ^(a) $L_{AFmax,2min}$
Thu 27 th	49 ^(b)	42	61
Fri 28 th	58	41	60
Sat 29 th	51	39	59
Sun 30 th	54	41	60
Mon 1 st	46 ^(c)	-	-
^(a) Maximum noise level not exceeded more than 10 times per night. ^(b) T = 6.5hr ^(c) T = 3.5hr			

3.13 At CM1, the measured daytime $L_{Aeq,T}$ ranged between 46 dB and 58 dB (rounding to the nearest whole number for assessment purposes), while the measured night-time $L_{Aeq,8hr}$ ranged between 39 dB and 42 dB.

3.14 Analysis of the night-time $L_{AFmax,2min}$ levels shows that the individual events did not exceed 61 dB more than 10 times during any measured night-time period. Investigation of the audio recordings shows that all values above 61 dB were caused by vehicular ‘pass-bys’ or bird song, with no significant low frequency spectral content. Therefore, a value of 61 dB $L_{AFmax,2min}$ is considered appropriate for the assessment.

Table 3.3: Summary of Measured Sound Levels at CM2, dB

Date	Daytime 07:00 – 23:00	Night-time 23:00 – 07:00	
	$L_{Aeq,T}$	$L_{Aeq,8hr}$	Typical Maximum Event Level ^(a) $L_{AFmax,2min}$
Thu 27 th	48 ^(b)	41	63
Fri 28 th	55	42	61
Sat 29 th	54	40	63
Sun 30 th	56	40	61
Mon 1 st	45 ^(c)	-	-
^(a) Maximum noise level not exceeded more than 10 times per night. ^(b) T = 6hr ^(c) T = 3.5hr			

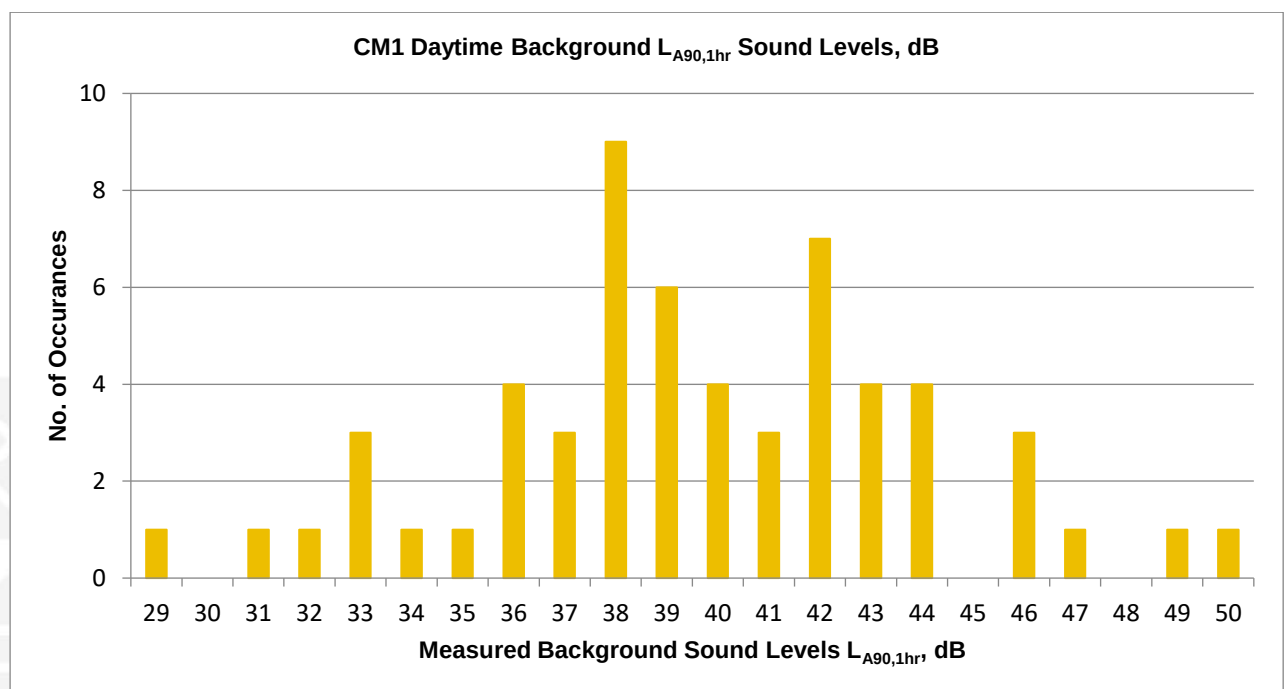
3.15 At CM2, the measured daytime $L_{Aeq,T}$ ranged between 45 dB and 56 dB, while the measured night-time $L_{Aeq,8hr}$ ranged between 40 dB and 42 dB.

3.16 Analysis of the night-time $L_{AFmax,2min}$ levels shows that the individual events did not exceed 63 dB more than 10 times during each measured night-time period. Investigation of the audio recordings show that all relevant maximum values were caused by ‘birdsong’.

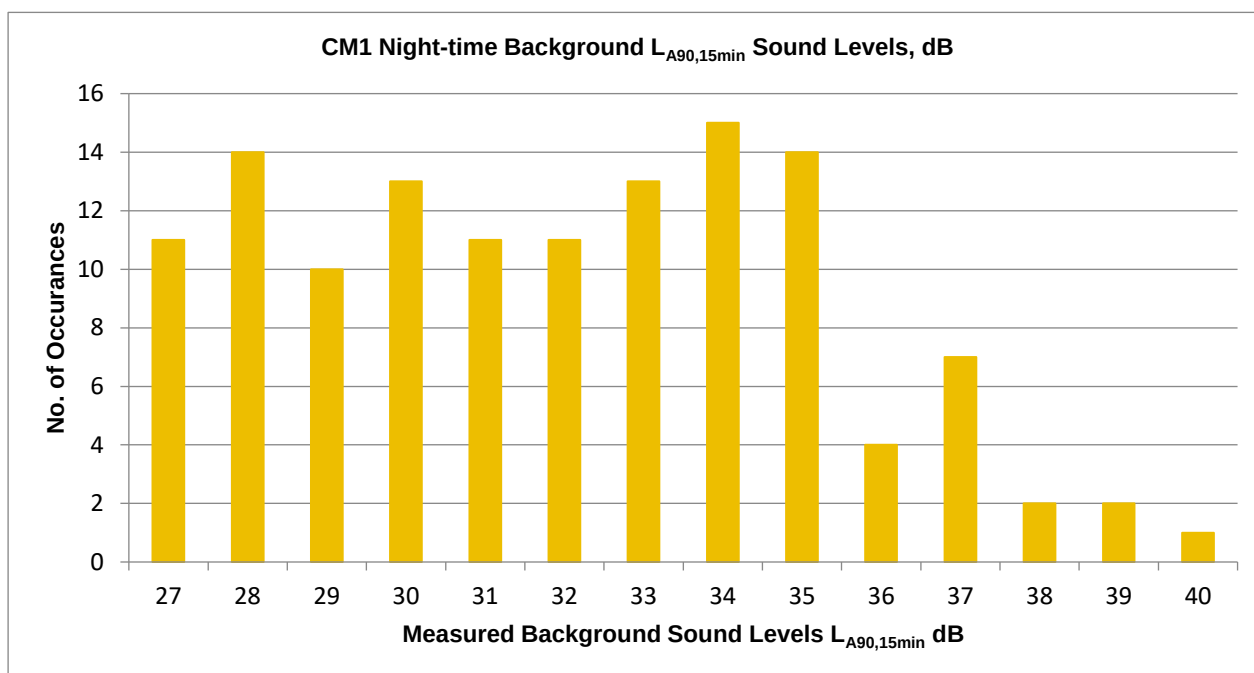
Background Sound Levels

- 3.17 With regard to derivation of the L_{A90} background sound level for assessment purposes, CM1 is considered to be appropriately representative of typical conditions for new dwellings in the absence of noise from JJ Churchill, given that no noise from JJ Churchill was audible during the attended measurement period, or through audio analysis of each respective, loudest, measured 1-hour day and 15-minute night-time period.
- 3.18 Section 8 of BS 4142 makes it clear that the objective of the assessment “*is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.*”
- 3.19 Paragraph 8.14 of BS 4142 similarly remarks that “*The monitoring duration should reflect the range of background sound levels for the period being assessed. In practice, there is no ‘single’ background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.*”.
- 3.20 The subsequent Note 1 states that “*A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value.*”.
- 3.21 A statistical analysis of the daytime $L_{A90,1hr}$ and night-time $L_{A90,15min}$ sound measurements, consistent with the BS 4142 advice, is shown in Figure 3.2 and Figure 3.3.

Figure 3.2: Statistical Analysis of Measured Daytime Background Sound Levels at CM1



- 3.22 During the daytime, the data shows a clear distribution pattern centred around 38 dB, with an overall range of daytime values extending from 29 to 50 dB $L_{A90,1hr}$. Therefore, 38 dB is considered to be an appropriate value to use for assessment purposes during the daytime.

Figure 3.3: Statistical Analysis of Measured Night-time Background Sound Levels at CM1

3.23 During the night-time, the data shows a more linear spread in values, with 34 dB occurring the most. Therefore, 34 dB is considered to be an appropriate value to use for assessment purposes during the night-time.

4.0 ASSESSMENT METHODOLOGY

Acoustic Modelling

- 4.1 An acoustic model of the Site and environs has been generated in Datakustik CadnaA® modelling software. CadnaA® considers various inputs, including topography, buildings and noise sources, and calculates sound levels in accordance with national and international standards; in this case, the relevant UK standards are the procedures set out within ISO 9613-2⁷.
- 4.2 The modelling assumptions and input information for the acoustic model are as follows:
- Digital Terrain Model – Lidar 1m (Environment Agency, downloaded on 3rd May 2024);
 - Open Street Map data (publicly available);
 - Ground absorption for the Site = 0.5 (mixed ground);
 - Building heights estimated following site observations or based upon masterplan;
 - Buildings set to be reflective only with no absorption coefficient;
 - First order reflections included in the modelling;
 - Temperature set to 10°C; and
 - Relative humidity set to 70%.

Assessment Scenarios

JJ Churchill

- 4.3 A noise assessment was undertaken on behalf of JJ Churchill by Acoustic Associates (report ref: AAL/BS12042), which details the internal reverberant noise level of the oil pan manufacturing process as being 89 dB L_{Aeq}. A further noise assessment prepared by Arun Acoustics (report ref: RP.170911.0), sets out the expected sound insulation from the various components of the new building's construction, as providing a weighted sound reduction of 46 dB R_w.
- 4.4 The Design and Access Statement prepared for the same application (ref: 17/00632/FUL) states that *"the proposed external material pallet will include a similar high quality material pallet to tie in with the existing factory"*. Therefore, one would assume that the cladded elements of the existing facades will provide a similar level of attenuation as the proposed new facades referenced above.
- 4.5 However, google imagery indicates a combination of block and panelling for the northern building and therefore, a conservative attenuation for all elements of the façade and roof of 43 dB R_w has been used, with a reduction of 25 dB R_w applied to the roller shutter door on the northern façade.
- 4.6 To provide a robust assessment approach, it has been assumed that the same processes detailed above for the southern extension, will occur within the northern building directly opposite the Site. However, it needs to be recognised that at no point during the attended measurement period, was noise from JJ Churchill audible at positions representative of new dwellings.

⁷ ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.

- 4.7 In addition, analysis of the audio recordings for all loudest 1-hour day and 15-minute night-time periods similarly show that noise from JJ Churchill was not audible.
- 4.8 With reference to the noise criteria outlined in Section 2.0, and the internal reverberant sound levels and expected sound insulation from the building construction referenced above, an acoustic model has been prepared, and used to predict sound levels across the Site in the following BS 4142 assessment scenario:
- Daytime $L_{Aeq,1hr}$ external sound levels at ground floor (1.5m) height, with roller shutter door closed;
 - Night-time $L_{Aeq,15min}$ external sound levels at first floor (4m) height, with roller shutter door closed;
 - Daytime $L_{Aeq,1hr}$ external sound levels at ground floor (1.5m) height, with roller shutter door open; and
 - Night-time $L_{Aeq,15min}$ external sound levels at first floor (4m) height, with roller shutter door open.

Kyngs Golf and Country Club

Vehicle Movements

- 4.9 In the case of the Kyngs Golf and Country Club development, the Transport Statement (TS) undertaken for the application (report ref: HAS/19-090/TS), states that the site incorporates 139-space car park, with an additional 58-space reinforced grass overflow facility.
- 4.10 Trip rates presented within the TS, associated with the worst case combined weekend trip generation, are presented in Figure 4.1.

Figure 4.1: Combined Weekend Trip Generation (With Major Event)

Time Period		Golf Course		Golf Sim / Shop		Wedding		Holiday Lets		Staff		Hourly Totals		
Start	End	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Two-way
0700	0800	6								2		8	0	8
0800	0900	10		2	2				6			12	8	20
0900	1000	10		2	2			1	3			13	5	18
1000	1100	10		2	2			1	2			13	4	17
1100	1200	10		2	2			1	1			13	3	16
1200	1300	10	10	2	2			2	1			14	13	27
1300	1400		10	2	2	100		2	1	5		109	13	122
1400	1500		10	2	2			2	1	5	1	9	14	23
1500	1600		10	2	2			2	1		1	4	14	18
1600	1700		10	2	2		20	2	2			4	34	38
1700	1800		6	2	2		20	3	3			5	31	36
1800	1900						20	2	2			2	22	24
1900	2000						20	2	1			2	21	23
2000	2100						20	2				2	20	22
2100	2200							1				1	0	1
2200	2300							1			10	1	10	11
TOTAL (Arr./Dep.)		56	56	20	20	100	100	24	24	12	12	212	212	424
TOTAL (Two-way)		112		40		200		48		24				
		(Golf total: 152)				(Clubhouse)								

- 4.11 Based on a worst case combined weekend trip generation, i.e., golf club usage and major event such as a wedding, this will amount to approximately 424 vehicle movements/day.
- 4.12 There is no information for the night-time, indicating that the proposed operations would predominantly occur during the day. However, there might be occasional and infrequent vehicle movements during the night, but these would only amount to typically a single vehicle movement at odd times.

- 4.13 While the movement of individual vehicles might be perceptible to local residents subject to where they are at the time a vehicle passes, i.e., whether outside their dwelling or at an open window, the actual noise level would be no greater than those caused by existing vehicle movements in the neighbourhood, nor would they be any different to the types of noise levels experienced by all other dwellings in the UK where car movements are present at neighbouring properties.
- 4.14 Therefore, isolated vehicle movements from within the car park that may occur during the night-time are not considered to represent a significant noise source and subsequently, have not been included within the following assessment.
- 4.15 A road's basic noise level (BNL) represents the free-field noise level at a distance of 10m from the carriageway edge based on the traffic flow, the percentage heavy vehicle composition and the average vehicle speeds. The BNL is expressed as an $L_{A10,18hr}$ value and gives an indication of the noise level expected adjacent to the road.
- 4.16 Using the TRL Method, referenced in Section 2.0, daytime $L_{Aeq,16hr}$ sound levels have been calculated for use in this assessment. It should be noted that the calculations would be applicable to the L_{Aeq} values, i.e., to the total noise exposures values, but would not be applicable to the individual L_{Amax} values, as these are not a function of traffic growth. The calculation steps, and subsequent derived assessment levels, at a distance of 10m from the carriageway edge, are presented in Table 4.1.

Table 4.1: Derived Assessment Level, dB

Parameter	Access Road
BNL – $L_{A10,18hr}$	51
Daytime Ambient – $L_{Aeq,16hr}$	49

- 4.17 Based on 424 vehicle movements/day, a daytime $L_{Aeq,16hr}$ at 10m of 49 dB has been derived, and this value has been applied to both the golf club's access road, and extended to 'loop' around the golf club's carpark, which will represent a robust assessment approach, as it does not take account of reductions associated with vehicle dispersal throughout the carpark.

George Hall Clubhouse

- 4.18 With regard to potential noise break-out from the George Hall Clubhouse during private functions or special events, reverberant noise levels inside the clubroom might reach 80 dB L_{Aeq} , which equates to the first or lower exposure action level defined by the CNWR⁸, for which the daily (or weekly) exposure level (expressed as $L_{EP,d}$) is 80 dB(A).
- 4.19 However, a literature review undertaken by D. Smeatham⁹ on noise levels and exposure of workers in pubs and clubs indicates higher noise levels associated with amplified music, with noise exposure levels ranging

⁸ Health and Safety Executive – The Control of Noise at Work Regulations 2005.

⁹ D. Smeatham, Noise Levels and Noise Exposure of Workers in Pubs and Clubs — A Review of the Literature, (HSE Research Report 026, Health and Safety Executive, 2002).

from 92 – 96 dB $L_{EP,d}$. Therefore, an average level of 94 dB $L_{EP,d}$ has been used to calculate noise 'break-out' associated with the clubhouse during private functions or special events.

- 4.20 The drawings submitted within the planning application (19/01437/FUL) indicate the external façade of the George Hall to be cedar clad brickwork, which would provide a conservative attenuation of approximately 40 dB R_w .

Station Road and the Battlefield Line Railway

- 4.21 With regard to Station Road and the Battlefield Line Railway, noise source emissions have been informed by the environmental sound survey information outlined in Section 3.0.
- 4.22 Based on the environmental sound survey, the sound levels used to calibrate the 3D acoustic model are presented in Table 4.2.

Table 4.2: Sound Levels Used to Calibrated 3D Acoustic Model, dB

Parameter	Station Road	Battlefield Line Railway
Daytime Ambient $L_{Aeq,16hr}$	58	56
Night-time Ambient $L_{Aeq,8hr}$	42	42
Night-time Maximum $L_{AFmax,2min}$	61	N/A ^(a)
^(a) All relevant night-time maximum events attributed to birdsong		

- 4.23 In addition to the BS 4142 scenarios outlined above, an additional model has been prepared to predict impacts from Station Road, the Battlefield Line Railway and the Kyngs Golf and Country Club for the following scenarios:

- Daytime $L_{Aeq,16hr}$ external sound levels at ground floor (1.5m) height;
- Night-time $L_{Aeq,8hr}$ external sound levels at first floor (4m) height; and
- Night-time $L_{Amax,1mins}$ external sound levels at first floor (4m) height.

5.0 ACOUSTICS ASSESSMENT

BS 4142 Assessment

- 5.1 For conciseness, the most exposed indicative receptor to JJ Churchill (Plot X) will be assessed within the body of this report, with the remainder of the Site assessed through the various sound level contour drawings presented within the appendices of this report.
- 5.2 BS 4142 assessments are undertaken at 3.5m from reflective structures, i.e., representing each receptor's garden area away from the reflective effect of the building, therefore, no facade reflection effects are included in the daytime assessment. However, during the night-time, as residents are likely to be asleep within bedrooms, a first floor façade level has been assessed.
- 5.3 BS 4142's character corrections are flexible according to whether the acoustic character is just perceptible at the noise receptor, or is clearly perceptible or highly perceptible, and range from 0 to 6 dB for tonal noise, 3 to 9 dB for impulsive noise, and 3 dB for other non-tonal/impulsive acoustic characteristics.
- 5.4 As indicated in the Acoustic Associates report, there is no reason why the noise from JJ Churchills should be particularly tonal or impulsive. Therefore, coupled with the fact that noise from JJ Churchill was inaudible at positions representative of new dwellings on the Site, no acoustic character corrections have been applied within the assessment.

Initial Numerical Impact Assessment

- 5.5 The resulting Initial Numerical Impact Assessment (INIA) for the most exposed indicative receptor, without and with the roller shutter door open, are presented in Table 5.1 and Table 5.2.

Table 5.1: Plot X – Initial Numerical Impact Assessment – Roller Shutter Door Closed

Assessment Step	Daytime	Night-time
Modelled Specific Sound Level [A]	21 dB $L_{Aeq,1hr}$	24 dB $L_{Aeq,1hr}$
Acoustic Character Correction [B]	+0 dB	+0 dB
Rating Level [C = A + B]	21 dB $L_{Ar,1hr}$	24 dB $L_{Ar,1hr}$
Background Sound Level [D]	38 dB $L_{A90,1hr}$	34 dB $L_{A90,1hr}$
Rating over Background [E = C – D]	-17 dB	-10 dB
Estimation of Impact ^(b)	Low	Low
^(a) First floor (4m) façade level.		
^(b) Impact dependent upon context and other pertinent factors.		

- 5.6 With the roller shutter door closed, the Rating Level due to operational noise levels lies below the background sound level during both the day and night-time. Therefore, the overall conclusion in accordance with BS 4142 is that *“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 on the context”*.

Table 5.2: Plot X – Initial Numerical Impact Assessment – Roller Shutter Door Open

Assessment Step	Daytime	Night-time
Modelled Specific Sound Level [A]	45 dB $L_{Aeq,1hr}$	48 dB $L_{Aeq,15min}$
Acoustic Character Correction [B]	+0 dB	+0 dB
Rating Level [C = A + B]	45 dB $L_{Ar,1hr}$	48 dB $L_{Ar,15min}$
Background Sound Level [D]	38 dB $L_{A90,1hr}$	34 dB $L_{A90,15min}$
Rating over Background [E = C – D]	+7 dB	+14 dB
Estimation of Impact ^(b)	Adverse	Significant Adverse
(a) First floor (4m) façade level.		
(b) Impact dependent upon context and other pertinent factors.		

- 5.7 With the roller shutter door open, the Rating Level due to operational noise exceeds the background sound level by +7 dB during the daytime, and +14 dB during the night-time, which is an indication of the specific sound source having an Adverse to Significant Adverse impact respectively in accordance with BS 4142, depending on context.

INIA Discussion – Context

- 5.8 The Adverse to Significant Adverse impacts during the day and night-time respectively are based on a worst case scenario, whereby the louder oil pan manufacturing process from within the southern extension is being undertaken within the northern building, while the roller shutter door is in the open position.
- 5.9 BS 4142 indicates that “*in general, there will be a relationship between the incidence of complaints and the level of general community annoyance*”. In all scenarios, the greatest impact would occur at the closest existing dwelling located at approximately 30m from the northwest corner of the building. Therefore, the lack of any existing noise complaints, from a dwelling that is closer to the source, is a good indicator that even if the roller shutter door were to be left open, the impacts are not so great that they would adversely affect any new dwelling on the Site.
- 5.10 This is evidenced by the fact that during the attended measurement period, there was no audible noise from JJ Churchill at positions representative of new dwellings, and the audio analysis of the long-term measurement data supports the conclusion that operational noise from JJ Churchill was not present at a position representative of the most exposed dwellings on the Site.
- 5.11 In any event, it is important to note that BS 4142 recognises that where a new noise sensitive receptor is introduced, the industrial sound forms part of the acoustic environment and, in such circumstances, other guidance and criteria in addition to BS 4142 is applicable.
- 5.12 BS 4142 emphasises the need for matters to be placed into context, and in this respect, it mentions several matters for consideration, which include whether dwellings or other premises used for residential purposes will incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:
- facade insulation treatment;

- ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
- acoustic screening.

5.13 Therefore, additional noise mitigation measures such as the standard of glazing coupled with the use of acoustic ventilators and garden screening, will represent a means of preventing the potential adverse impacts.

ProPG Initial Noise Risk Assessment

5.14 For conciseness, this report assesses the most exposed indicative dwellings as Plot X overlooking Station Road, Plot Y overlooking the Battlefield Line Railway, and Plot Z overlooking the Kyns Golf and Country Club, in tabulated format. The remainder of the Site is assessed through sound level contour maps, shown in the various appendices of this report.

5.15 As required by the ProPG, an Initial Noise Risk Assessment (INRA) is presented Table 5.3, based on the modelled sound levels.

Table 5.3: Initial Site Noise Risk Assessment, dB

Risk	Negligible		Low		Medium		High	
Period	Day	Night	Day	Night	Day	Night	Day	Night
Pro PG Threshold	< 50	< 40	50 – 60	40 – 50	60 – 70	50 – 60	> 70	> 60
Plot X			59	44				
Risk Assessment			Low					
Plot Y		38	56					
Risk Assessment		Negligible	Low					
Plot Z		36	46					
Risk Assessment		Negligible	Low					

5.16 Based on the modelled sound levels, the most exposed receptor overlooking Station Road (Plot X) falls within the ProPG risk category of 'Low' during both the day and night-time, for which the guidance states the Site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed.

5.17 For new receptors overlooking the Battlefield Line Railway (Plot Y) and the Kyns Golf and Country Club (Plot X), the most exposed receptors similarly fall within the ProPG risk category of 'Low' during the daytime. However, the noise exposure reduces to a 'Negligible' risk during the night-time, for which the guidance states *"these noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds."*

5.18 This report is considered to form the basis of the 'Acoustic Design Statement', which considers appropriate design measures to achieve suitable acoustic conditions for residential amenity.

BS 8233 External Amenity Criteria

- 5.19 The acoustics criterion often the most difficult to meet in residential environments situated next to busy transportation sources is BS 8233's criterion of 55 dB $L_{Aeq,16hr}$ applicable to private external amenity spaces such as gardens.
- 5.20 The daytime $L_{Aeq,16hr}$ sound level contour map, shown on drawing 20442_04_120_05 in **Appendix E**, indicates that, for an illustrative layout based on the development framework plan, BS 8233's criterion of 55 dB $L_{Aeq,16hr}$ will be satisfied across the Site through the provision of standard 1.8m high close boarded timber fencing, with the majority of garden areas satisfying the lower-level criterion of 50 dB.

BS 8233 Internal Acoustic Criteria

- 5.21 Table 5.4 presents the required external to internal reduction requirements for the most exposed indicative dwellings.

Table 5.4: Required Façade Performance, dB

Plot	Parameter	External Level	Internal Criteria	Required Reduction
X	Daytime Ambient $L_{Aeq,16hr}$	59	35	24
	Night-time Ambient $L_{Aeq,8hr}$	50 ^(a)	30	20
	Night-time Maximum $L_{AFmax,2min}$	64	45	19
Y	Daytime Ambient $L_{Aeq,16hr}$	56	35	21
	Night-time Ambient $L_{Aeq,8hr}$	38	30	8
	Night-time Maximum $L_{AFmax,2min}$	57	45	12
Z ^(b)	Daytime Ambient $L_{Aeq,16hr}$	46	35	11
	Night-time Ambient $L_{Aeq,8hr}$	36	30	6
^(a) Combined impact from BS 4142 'roller shutter door open' Rating Level from Table 5.2 (49 dB $L_{Ar,15min}$) and road traffic impact from Table 5.3 (44 dB $L_{Aeq,8hr}$). ^(b) Impact relates to noise 'break-out' from clubhouse and therefore, no L_{Amax} assessment is included.				

- 5.22 For the most exposed indicative dwellings, the results in Table 5.4 show that sound reductions of up to 24 dB will be required to achieve all internal $L_{Aeq, T}$ and L_{AFmax} criteria.

AVOG Level 1 Assessment

- 5.23 AVOG prescribes a two-stage assessment. Level 1 looks to determine if overheating needs to be considered further, based on the predicted external façade levels for the most exposed receptors.
- 5.24 The initial Level 1 assessment is presented in Table 5.5.

Table 5.5: AVOG Level 1 Assessment

Plot	Parameter	Predicted External Level dB	Level 1 Risk Grading	Level 2 Advised?
X	Daytime Ambient $L_{Aeq,16hr}$	59	Medium	Optional but recommended
	Night-time Ambient $L_{Aeq,8hr}$	50 ^(a)	Low	Optional
Y	Daytime Ambient $L_{Aeq,16hr}$	56	Low	Optional
	Night-time Ambient $L_{Aeq,8hr}$	38	Negligible	Not required
Z	Daytime Ambient $L_{Aeq,16hr}$	46	Negligible	Not required
	Night-time Ambient $L_{Aeq,8hr}$	36	Negligible	Not required
^(a) Combined impact from BS 4142 'roller shutter door open' Rating Level from Table 5.2 (49 dB $L_{Ar,15min}$) and road traffic impact from Table 5.3 (44 dB $L_{Aeq,8hr}$).				

- 5.25 The results demonstrate that at the most exposed receptors, an AVOG Level 2 assessment is optional due to the low levels of noise.

6.0 MITIGATION

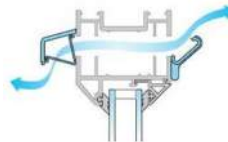
External Sound Levels

- 6.1 For an illustrative layout based on the development framework plan, BS 8233's criterion of 55 dB $L_{Aeq,16hr}$ will be satisfied across the Site through the provision of standard 1.8m high close boarded timber fencing, with the majority of garden areas satisfying the lower-level criterion of 50 dB.

Internal Sound Levels

- 6.2 Acoustic modelling has demonstrated potential façade sound levels and, in accordance with BS 8233, ProPG and AVOG, sound reduction performance requirements of the façade have been determined.
- 6.3 In terms of acoustics, windows and ventilation strategies are the 'weakest' acoustics point in any façade and subsequently, the composite sound reduction performance is typically dominated by these elements. Therefore, minimum performance requirements to be provided by the glazing and ventilation elements at all dwellings are presented herein.
- 6.4 Drawing on the above, and the acoustic modelling undertaken, Table 6.1 provides typical reduction requirements and potential glazing and ventilation solutions across the Site in order to demonstrate compliance with the internal sound level criteria outlined in BS 8233, ProPG, and the ventilation requirements of AD-F¹⁰.
- 6.5 However, for the avoidance of doubt, all habitable rooms across the Site can comply with the relevant acoustic criteria through standard double glazing and direct airpath window mounted trickle ventilators.
- 6.6 For the reference in Table 6.1, the sound reduction performance requirements, in octave band and weighted reduction format, are presented in **Appendix F**.

Table 6.1: Suggested Internal Mitigation Measures

Example Glazing Solution	Example Whole Dwelling Ventilation Solution (AD-F)
4mm pane 12mm air space 4mm pane Approx. $R_w + C_{tr} = 27$ dB	<u>Standard Non-Acoustic Trickle Vent</u> Slots typically located in the window frame.  Approx. $D_{n,e,w} + C_{tr} = 32$ dB

¹⁰ The Building Regulations 2010, Ventilation, Approved Document F, 2021 Edition.

7.0 CONCLUSIONS

7.1 MEC has been commissioned by Richborough, to undertake an Acoustics Assessment for a proposed residential development on Land at Station Road, Market Bosworth.

7.2 Assessment has been undertaken in accordance with BS 4142, with consideration given to the guidance contained in BS 8233, ProPG and AVOG.

BS 4142

7.3 The assessment indicates that, based on a roller shutter door closed scenario, the Rating Level due to operational noise from JJ Churchill lies below the background sound level during both the day and night-time. Therefore, the overall conclusion in accordance with BS 4142 is that *“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 on the context”*.

7.4 With the roller shutter door open, the Rating Level due to operational noise exceeds the background sound level by +7 dB during the daytime, and +14 dB during the night-time, which is an indication of the specific sound source having an Adverse to Significant Adverse impact respectively in accordance with BS 4142, depending on context.

7.5 With regard to context, BS 4142 indicates that *“in general, there will be a relationship between the incidence of complaints and the level of general community annoyance”*. In all scenarios, the greatest impact would occur at the closest existing dwelling located at approximately 30m from the northwest corner of the building. Therefore, the lack of any existing noise complaints, from a dwelling that is closer to the source, is a good indicator that even if the roller shutter door were to be left open, the impacts are not so great that they would adversely affect any new dwelling on the Site.

7.6 This is evidenced by the fact that during the attended measurement period, there was no audible noise from JJ Churchill at positions representative of new dwellings, and the audio analysis of the long-term measurement data supports the conclusion that operational noise from JJ Churchill was not present at a position representative of the most exposed dwellings on the Site.

7.7 In any event, it is important to note that BS 4142 recognises that where a new noise sensitive receptor is introduced, the industrial sound forms part of the acoustic environment and, in such circumstances, other guidance and criteria in addition to BS 4142 is applicable.

7.8 BS 4142 emphasises the need for matters to be placed into context, and in this respect, it mentions several matters for consideration, which include whether dwellings or other premises used for residential purposes will incorporate design measures that secure good internal and/or outdoor acoustic conditions.

7.9 Therefore, when considering context and, internal and external acoustic conditions, residential amenity can be protected through pragmatic mitigation measures.

BS 8233 and ProPG

- 7.10 Acoustic modelling has demonstrated that, for an illustrative layout based on the development framework plan, BS 8233's criterion of 55 dB $L_{Aeq,16hr}$ will be satisfied across the Site through the provision of standard 1.8m high close boarded timber fencing, with the majority of garden areas satisfying the lower-level criterion of 50 dB.
- 7.11 With regards to internal acoustic conditions, the most exposed dwellings will satisfy the criteria in BS 8233 and ProPG through the provision of standard thermal double glazing and window mounted trickle ventilators to achieve the whole-dwelling ventilation requirements of AD-F.

AVOG

- 7.12 When considering the planning guidance outlined in AVOG, an open window acoustics strategy is permissible during periods of overheating, however, further investigations may be required under AD-O at Building Control stage. Nevertheless, as this is not a planning consideration the application should not be delayed on these grounds.

Summary

- 7.13 In conclusion, it is considered that with the implementation of the recommended mitigation strategy, the Site is suitable for residential development.

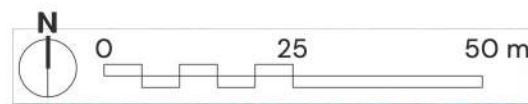


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APPENDICES



APPENDIX A



KEY

	APPLICATION BOUNDARY 7.964 HECTARES / 19.679 ACRES		PROPOSED NATIVE HEDGEROW PLANTING
	ACCESS VIA STATION ROAD		MIXED SCRUB / NEUTRAL GRASSLAND
	RESIDENTIAL DEVELOPMENT		WILDFLOWER PLANTING
	PUBLIC OPEN SPACE (INC. SUDS)		PRIORITY HABITAT POND
	PRIMARY TREE LINED MOVEMENT ROUTE INCORPORATING CYCLE AND PEDESTRIAN MOVEMENT		PROPOSED ORNAMENTAL PLANTING
	SECONDARY MOVEMENT ROUTE INCORPORATING RAINWTARE GARDENS		COMMUNITY ORCHARD PLANTING
	TERTIARY STREET		COMMUNITY KITCHEN GARDEN
	PRIVATE LANE		LOCALLY EQUIPPED AREA FOR PLAY (LEAP)
	RETAINED FARM TRACK ACCESS FOR WHARF AND GODSON'S HILL FARM		LOCAL AREA FOR PLAY (LAP)
	PRIMARY PEDESTRIAN / CYCLE MOVEMENT ROUTE		NATURAL PLAY TRAIL LOCATIONS
	PEDESTRIAN MOVEMENT ROUTE		AREA OF NATURALISED PLAY
	MOWN PATH MOVEMENT ROUTE		POTENTIAL CAR PARK
	EXISTING VEGETATION WITH ROOT PROTECTION AREA		ACCESS TO EXISTING WHARF FARM AND KYNGS GOLF AND COUNTRY CLUB
	PROPOSED STRUCTURAL WOODLAND PLANTING		PROPOSED PUMP STATION
	PROPOSED LOW-RISE NATIVE HEDGEROW / SHRUBBERY		SUSTAINABLE DRAINAGE SOLUTIONS WITH REEDBED PLANTING

KEY PRINCIPLES

1. PRIMARY ACCESS POINT VIA STATION ROAD;
2. PROPOSED PRIMARY KEY MOVEMENT ROUTE PROVIDING CYCLE AND PEDESTRIAN MOVEMENT THROUGHOUT THE DEVELOPMENT;
3. SECONDARY MOVEMENT ROUTES CREATING CONNECTED STREETS;
4. TERTIARY STREETS SERVING SMALL CLUSTERS OF DEVELOPMENT;
5. MAXIMISE OUTWARD FACING DEVELOPMENT FOR NATURAL SURVEILLANCE;
6. FULLY CIRCULATORY CYCLE / PEDESTRIAN ROUTES PROVIDING ACCESS TO ALL AREAS OF PUBLIC OPEN SPACE;
7. MAXIMUM RETENTION OF EXISTING VEGETATION;
8. PROPOSED TREE AND HEDGEROW PLANTING TO STRENGTHEN EXISTING VEGETATION;
9. AREA OF BIO-DIVERSITY ENHANCEMENTS INCORPORATING NATIVE HEDGEROW PLANTING, PRIORITY HABITAT PONDS, TREE PLANTING AND WILDFLOWER/NEUTRAL GRASSLAND PLANTING WITH LIMITED PUBLIC ACCESS;
10. RELOCATION OF PRIORITY HABITAT PONDS FOR THE GREAT CRESTED NEWT POPULATION;
11. KITCHEN GARDEN AND ORCHARD COMMUNITY SPACES;
12. AREAS OF EQUIPPED PLAY AND RECREATION FOR ALL AGES AT BOSWORTH COMMON, ASH GREEN AND BIRCH GREEN;
13. VIEWING CORRIDORS WITH LONG DISTANCE VIEWS TO WIDER COUNTRYSIDE; AND
14. VILLAGE GREEN PROVIDING SPACE TO MEET AND RELAX.

Rev 1: Amendment to play spaces (2012/12/14)
Rev 2: Update to landscaping, including tree and hedgerow (2013/01/14)
Rev 3: Update to landscaping, including tree and hedgerow (2013/01/14)
Rev 4: Update to landscaping, including tree and hedgerow (2013/01/14)
Rev 5: Update to landscaping, including tree and hedgerow (2013/01/14)
Rev 6: Update to landscaping, including tree and hedgerow (2013/01/14)
Rev 7: Update to landscaping, including tree and hedgerow (2013/01/14)
Rev 8: Update to landscaping, including tree and hedgerow (2013/01/14)
Rev 9: Update to landscaping, including tree and hedgerow (2013/01/14)
Rev 10: Update to landscaping, including tree and hedgerow (2013/01/14)

Expertly Done.

DESIGN | ECONOMICS | ENVIRONMENT | HERITAGE | LAND & PROPERTY | PLANNING | TRANSPORT & INFRASTRUCTURE

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LAND NORTH OF STATION ROAD – DEVELOPMENT FRAMEWORK PLAN

PEGASUS
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| PEGASUSGROUP.CO.UK | TEAM/DRAWN BY: MC | APPROVED BY: JW | DATE: 19.07.24 | SCALE: 1:1000@A1 | DRWG: P24-1644_DE_003-01 | REV: 1 | CLIENT: RICHBOROUGH



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APPENDICES



APPENDIX B

From: Giles Rawdon <[REDACTED]>
Sent: 05 July 2024 12:14
To: Neil Forsdyke
Subject: RE: 20442 - Station Road, Market Bosworth

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Neil

All good here thanks, hope all is well with you.

The approach sounds sensible. With regard to the Churchill site there was a fairly recent application on the site (23/00646/FUL) but I can see that M-EC did the acoustic report for that.

No problem discussing this over the phone if that helps.

Thanks

Giles Rawdon
Environmental Health Officer
(Environmental Protection)
Tel: [REDACTED]
Email: [REDACTED]
Web: www.hinckley-bosworth.gov.uk
Hinckley Hub, Rugby Road, Hinckley, Leics LE10 0FR



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Hinckandbosbc



@Hinckandbosbc

From: Neil Forsdyke <[REDACTED]>
Sent: 02 July 2024 12:31
To: Giles Rawdon <[REDACTED]>
Subject: 20442 - Station Road, Market Bosworth

Hi Giles,

I hope all is well with you and yours?

We have been commissioned to undertake updated noise and air quality assessments for the site at Station Road, Market Bosworth. Given the history of the site, and various refusals, appeals etc, it would be good if we can agree an assessment approach in the first instance. I had hoped to get this done prior to us undertaking any survey work, but unfortunately, given the upcoming school holidays and the client's initial reluctance to scope, I have pressed ahead with this element (see survey plan attached).

Noise

The principal sources of noise will be road traffic from station road, coupled with any contributions from JJ Churchill to the south, and the heritage railway to the west. Additional sources would represent the Kyngs Golf course and any associated applications/proposals, and the Wharf Farm airfield – although I believe this to be a private airfield, operating only one event a year.

Our approach to each noise source would be as follows:

Station Road

Ambient noise levels were monitored continuously over a 5-day period (including weekend), at a position representative of the nearest dwelling to the road, and directly opposite JJ Churchill (Continuous Measurement 1 (CM1) on the attached plan).

JJ Churchill

For CM1 above, an audio recording trigger level of 55 dB LAmax was set in an attempt to differentiate between road traffic impacts and those associated with JJ Churchill, and the highest 1-hour daytime periods and 15-minute night-time periods will be analysed to determine any impact from JJ Churchill. It should be noted that both measurement positions included short attended periods so the surveyor could take notes of any sources.

Previously, we modelled the impact from JJ Churchill using the internal noise levels and building specifications presented within their own applications. As a worst case assessment, this data will be included within the model if it is found to present greater impacts than those monitored at CM1.

Battlefield Railway Line

I believe the line only has two events a year, covering two weekend periods. Therefore, a continuous meter (CM2) was installed adjacent to the railway line, which covered a full weekend period during a typical operational weekend.

Kyngs Golf course

Previously, we utilised trip rates associated with the worst case combined weekend trip generation presented within Transport Statement (report ref: HAS/19-090/TS) undertaken for the application (application ref: 19/01437/FUL). I believe a new application has recently been submitted, but I have not yet had the chance to review this. Nevertheless, the application information will similarly be used to determine impacts from the golf course and neighbouring car park. With regard to noise breakout from the clubhouse, this was previously modelled based on internal reverberant level of 94 dB associated with amplified music, and this will be included within the model.

Wharf Farm airfield

Given there is only 1 event associated with the airfield, and previous assessment has shown there will be little impact for the remainder of the year, it is considered that this element can be scoped out of any further assessment work.

In terms of guidance, assessment will be undertaken against BS 8233, ProPG, AVOG and BS 4142.

Air Quality

Given the local conditions, assessment will be undertaken as agreed for the previous application, as follows:

The need for an air quality assessment would firstly be evaluated in accordance with Defra's LAQM, the EPUK, and the EMAQN.

A review of the Council's published air monitoring and modelling data for the area would be undertaken, so that air pollutant concentrations at the site and its surroundings can be quantified relative to the relevant air quality objectives governed by the Air Quality (England) Regulations.

Relevant air pollutant (nitrogen dioxide and particulate matter) concentrations from nearby local roads would be calculated in accordance with the DMRB air quality screening method. This will require the input of annual average daytime traffic flows (AADT), %HGVs and average speeds, and would enable ambient concentrations of road traffic pollutants to be calculated, for comparison with the air quality objectives.

The potential effects of dust and traffic emissions during construction would be considered, and controls necessary to protect existing sensitive development would be recommended. Information on the proposed methods of construction

during the different phases of construction would be used to undertake a dust risk assessment in accordance with the IAQM construction guidance, and indicative dust control measures would be recommended.

Quite a lot to take in on this one, so happy to discuss over the phone, or via a short teams meeting if you think it's beneficial..

Many thanks,

Neil S Forsdyke MIOA
Senior Acoustics & Air Quality Consultant

[REDACTED]

T: [REDACTED]
W: m-ec.co.uk

Birmingham | Brighton | Leicester



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APPENDICES



APPENDIX C

GLOSSARY OF TECHNICAL TERMS

Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurements, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

Typical sound levels found in the environment

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside a factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft taking off
140 dB(A)	Threshold of pain

Descriptor	Terminology
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level	The sound level is the sound pressure relative to a standard reference pressure of $20\mu\text{Pa}$ (20×10^{-6} Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1 / s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$.
A-weighting (dB(A))	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq, T}$	A noise level index called the equivalent continuous noise level over the time period, T . This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{AFmax, T}$	A noise level index defined as the maximum noise level during the measurement period. L_{Max} is sometimes used for the assessment of discrete loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. It is typically measured using the 'fast' sound level meter response.
$L_{90, T}$	A noise level index. The noise level exceeded for 90% of the time over the period, T . L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10, T}$	A noise level index. The noise level exceeded for 10% of the time over the period, T . L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building facade.
Fast/Slow Time Weighting	Averaging times used in sound level meters.
Octave Band	A range of frequencies whose upper limit is twice the frequency of the lower limit
One-third Octave Band	A frequency band in which the upper limit is $2^{1/3}$ times the frequency of the lower limit.
Rating Level	The specific sound level, plus any adjustment for characteristic feature of sound in BS 4142.
Specific Sound Level	The A-weighted L_{eq} sound level produced by a sound source during a specified period of time. Commonly known as the sound source under investigation as defined in BS 4142.
Typical Maximum Level	The 90 th percentile maximum event level (L_{AFmax}) measured during a period. Used for assessing night-time maximum levels under typical and overheating conditions.



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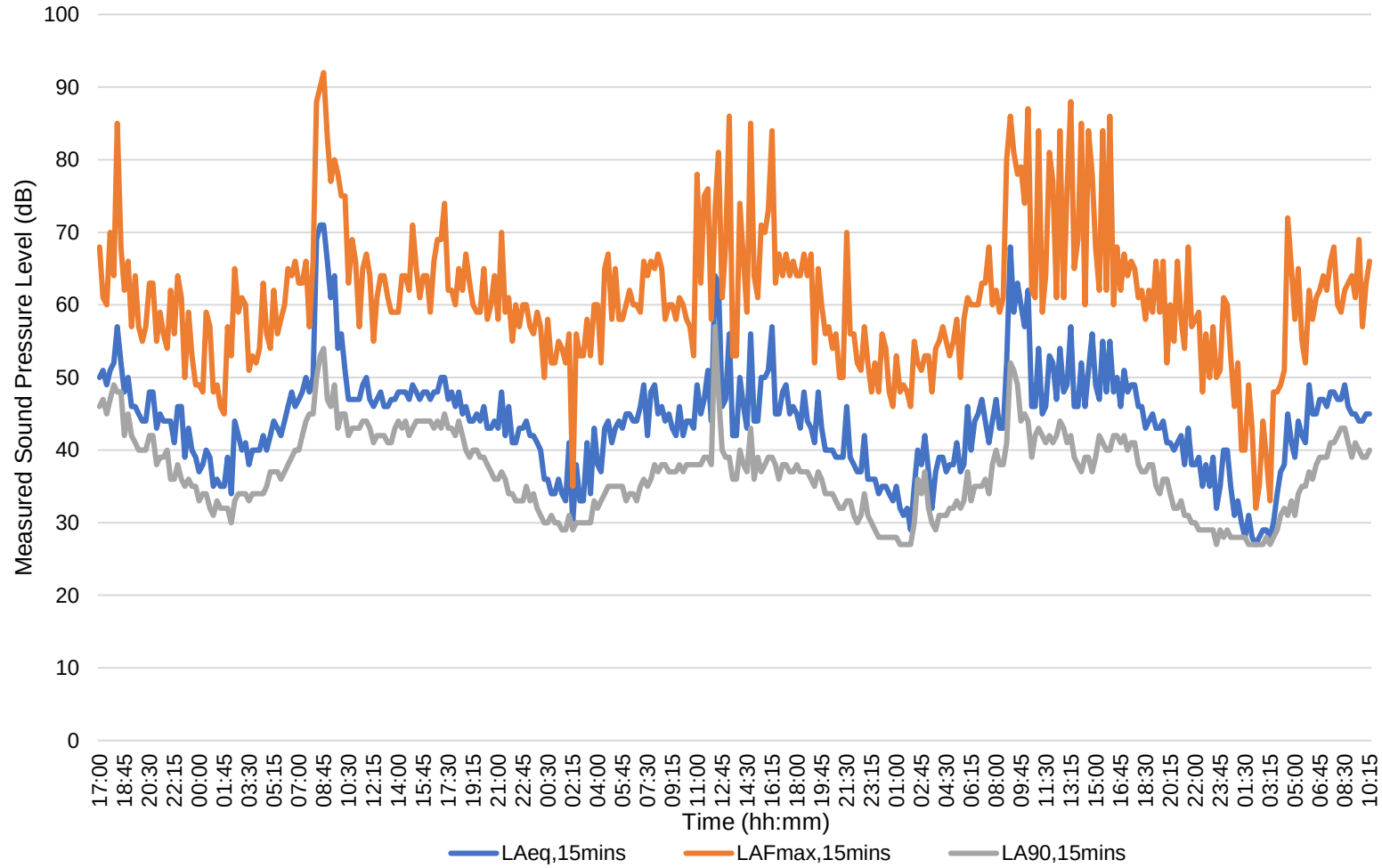
APPENDICES



APPENDIX D

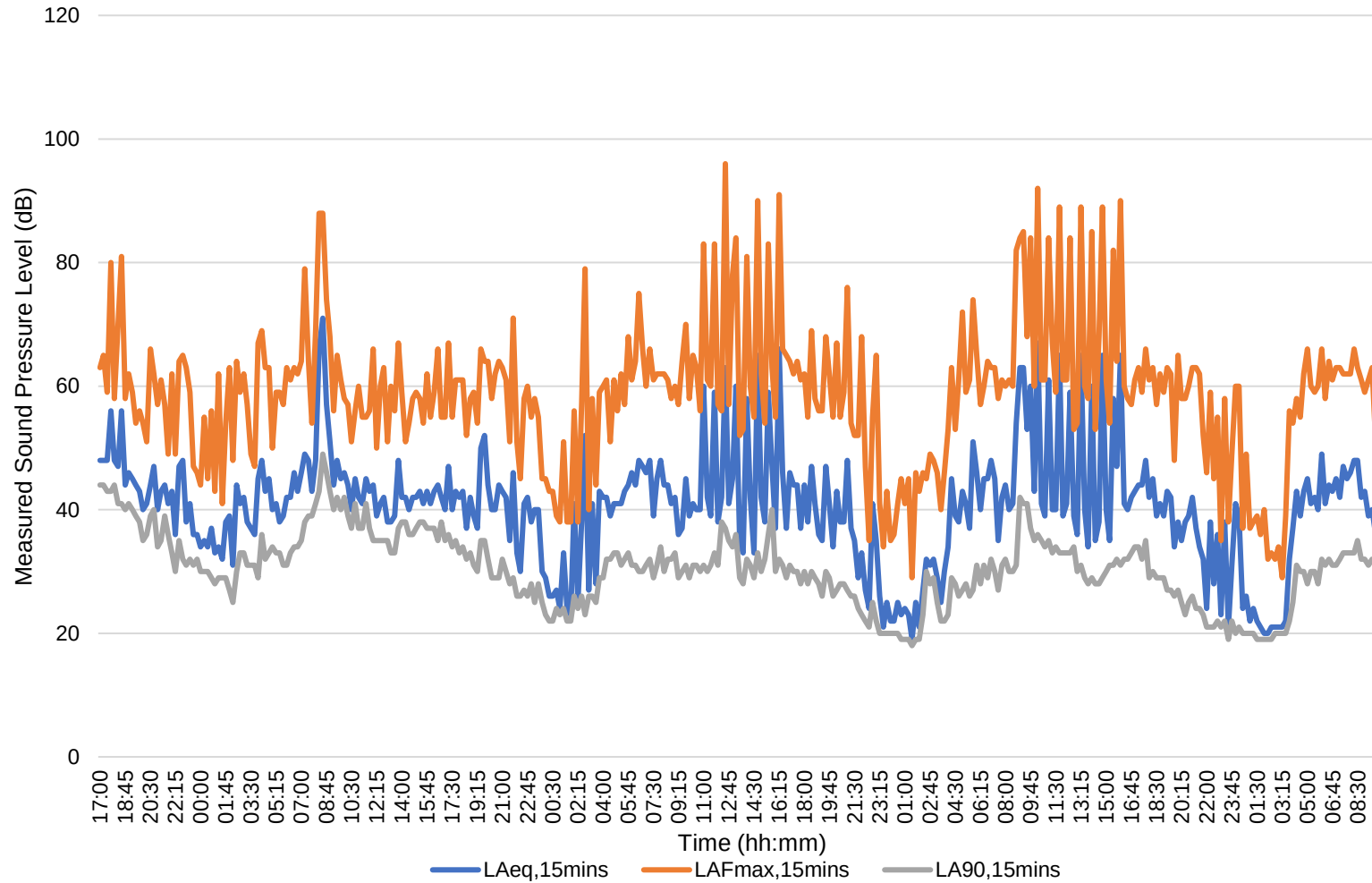
Station Road, Market Bosworth - CM1
Environmental Sound Monitoring Survey Results

$L_{Aeq,15min}$, $L_{AFmax,15min}$ & $L_{A90,15min}$ Measured Sound Levels - 27th June - 1st July 2024



Station Road, Market Bosworth - CM2
Environmental Sound Monitoring Survey Results

$L_{Aeq,15min}$, $L_{AFmax,15min}$ & $L_{A90,15min}$ Measured Sound Levels - 27th June - 1st July 2024





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APPENDICES



APPENDIX E



NOTES:

1. DO NOT SCALE THIS DRAWING.

KEY

	0–40dB(A)
	40–45dB(A)
	45–50dB(A)
	50–55dB(A)
	55–60dB(A)
	>60dB(A)

A	Updated Site Layout	HJ	NE	NP	22.10.24
REV.	AMENDMENTS	EW	NE	AB	24.07.24
		DRN	CHK	APP	DATE

PROJECT: STATION ROAD, MARKET BOSWORTH

DRAWING TITLE: DAY TIME SOUND PRESSURE LEVELS FOR BS 4142 ASSESSMENT OF JJ CHURCHILL WITH SHUTTERS CLOSED

CLIENT: RICHBOROUGH ESTATES LIMITED

DRAWING NUMBER: 20442_04_120_01

REVISION: A	SHEET SIZE: A3	SCALE: NFS
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	45–50dB(A)
	50–55dB(A)
	55–60dB(A)
	>60dB(A)

A	Updated Site Layout	HJ	NE	NP	22.10.24
REV.	AMENDMENTS	EW	NE	AB	24.07.24
		DRN	CHK	APP	DATE

PROJECT: STATION ROAD, MARKET BOSWORTH

DRAWING TITLE: NIGHT TIME SOUND PRESSURE LEVELS FOR BS 4142 ASSESSMENT OF JJ CHURCHILL WITH SHUTTERS CLOSED

CLIENT: RICHBOROUGH ESTATES LIMITED

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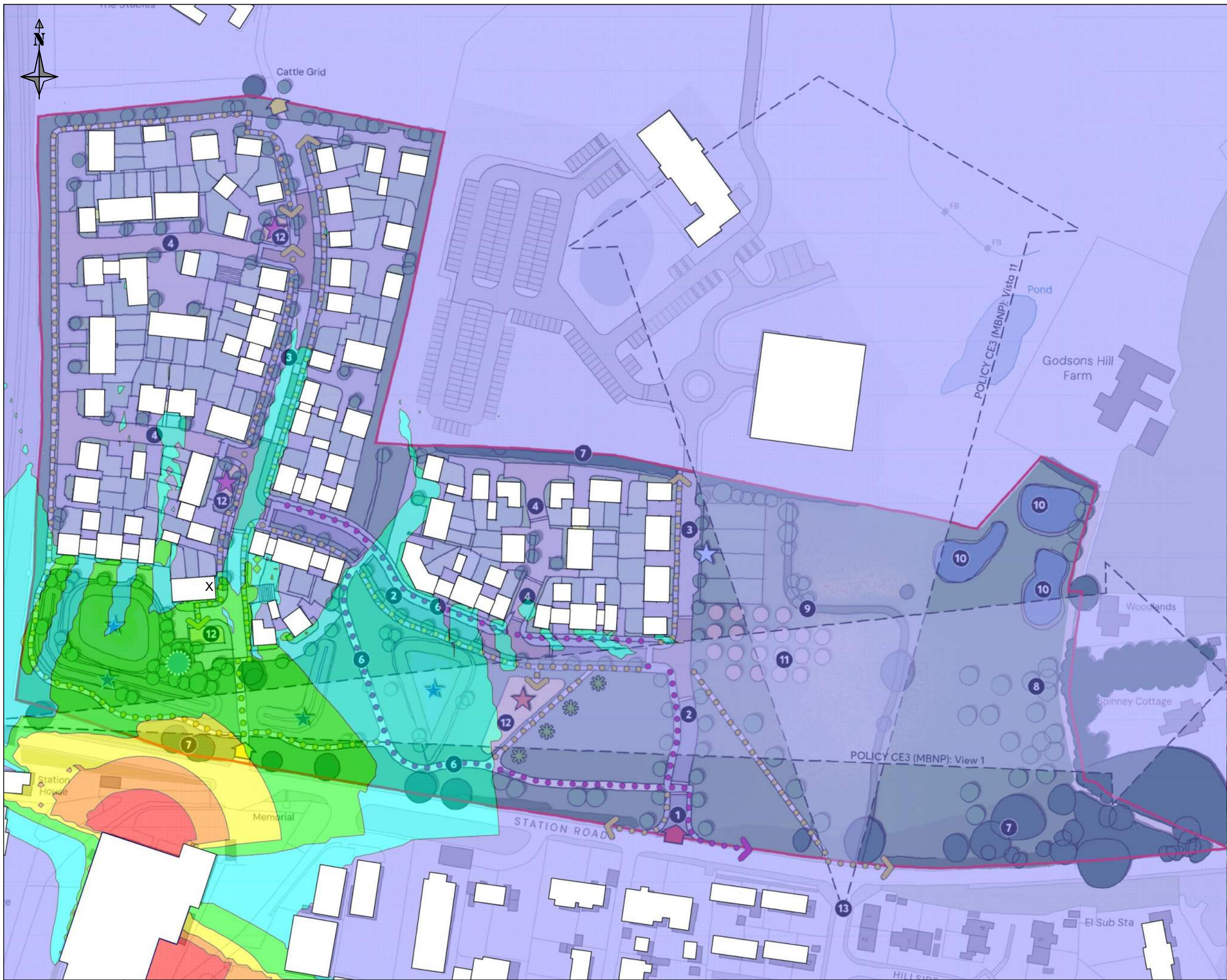
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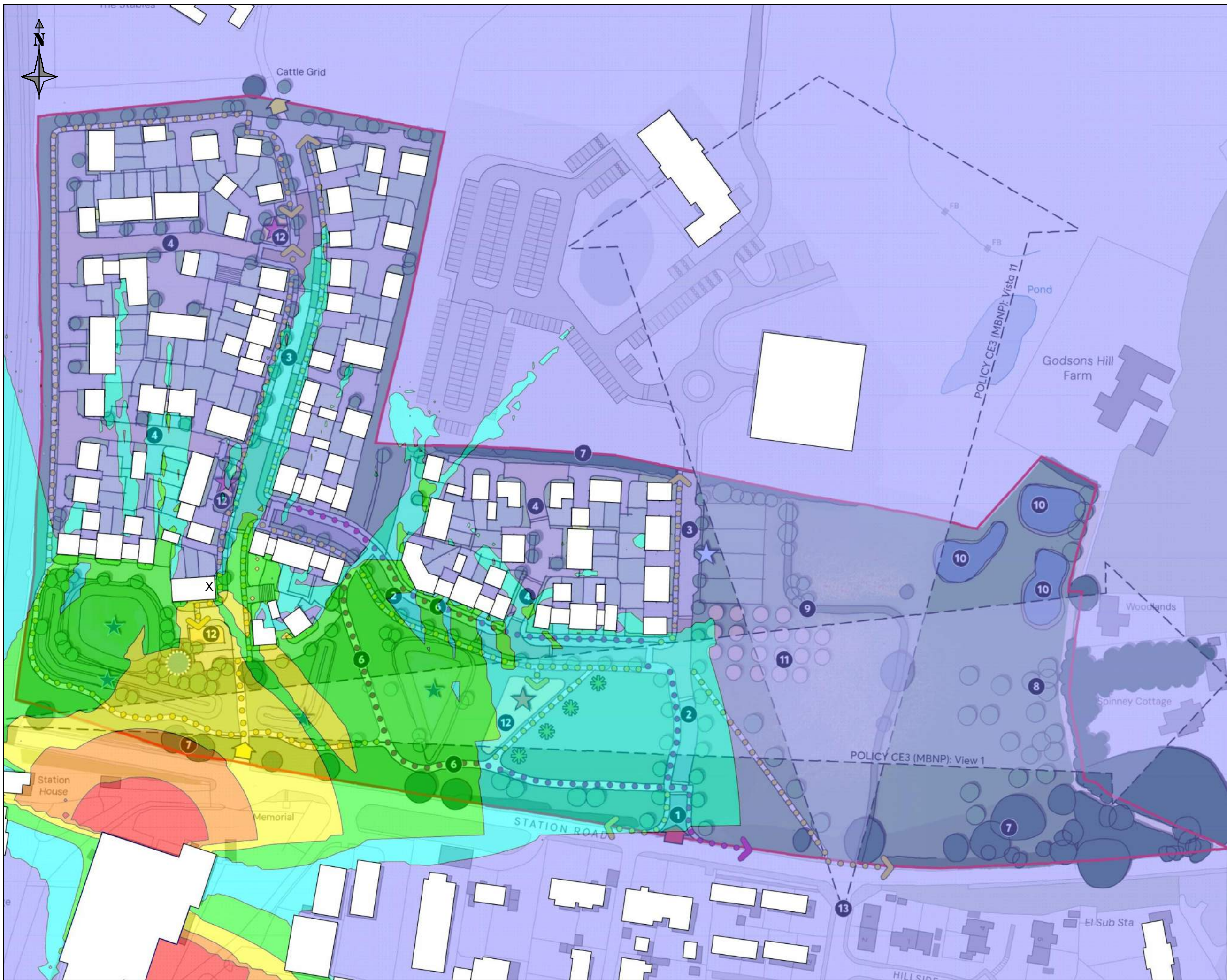
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CLIENT: RICHBOROUGH ESTATES LIMITED					
DRAWING NUMBER: 20442_04_120_03					
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	50–55dB(A)
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REV.	AMENDMENTS	EW	NE	AB	24.07.24
		DRN	CHK	APP	DATE

PROJECT: STATION ROAD, MARKET BOSWORTH

DRAWING TITLE: NIGHT TIME SOUND PRESSURE LEVELS FOR BS 4142 ASSESSMENT OF JJ CHURCHILL WITH SHUTTERS OPEN

CLIENT: RICHBOROUGH ESTATES LIMITED

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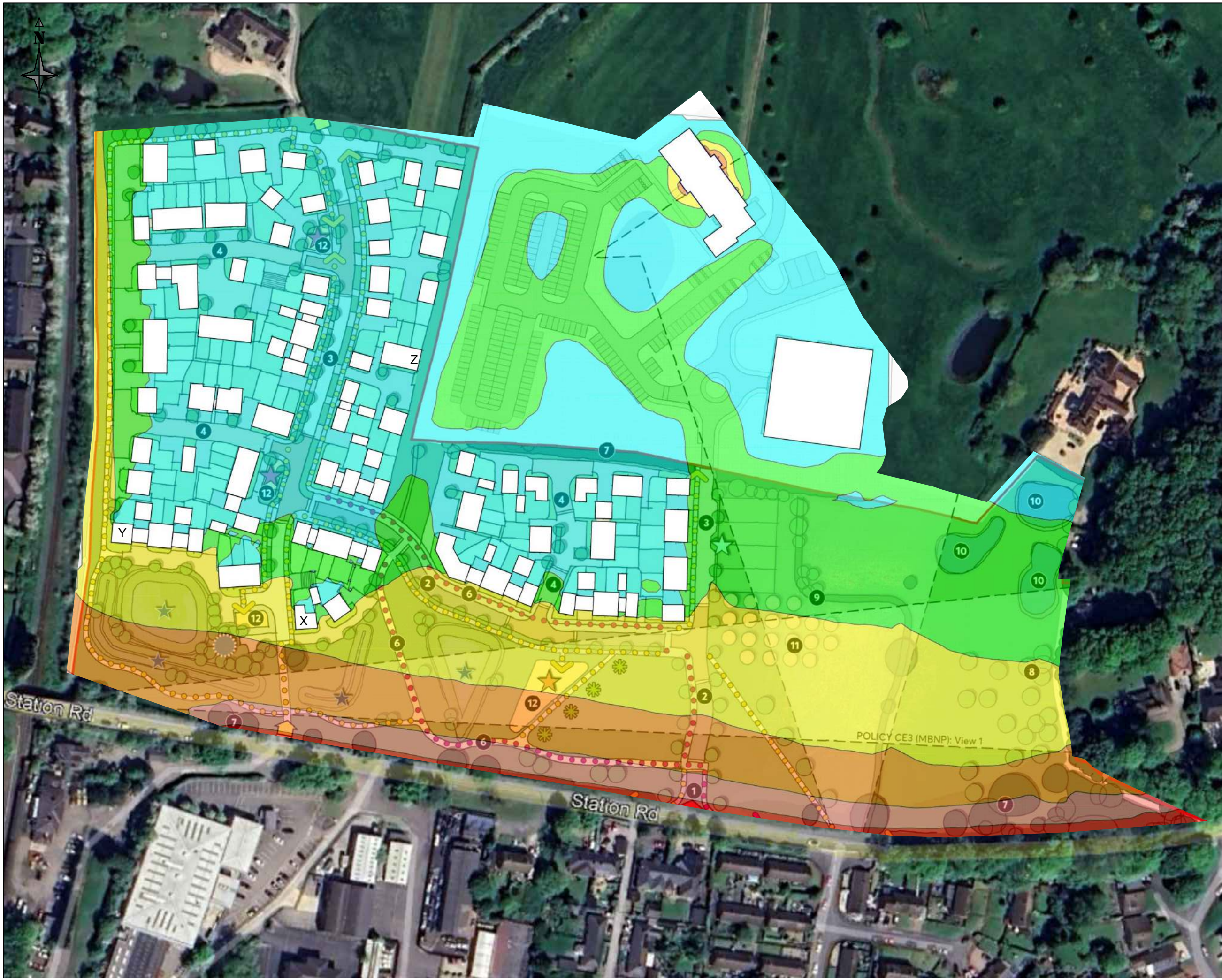
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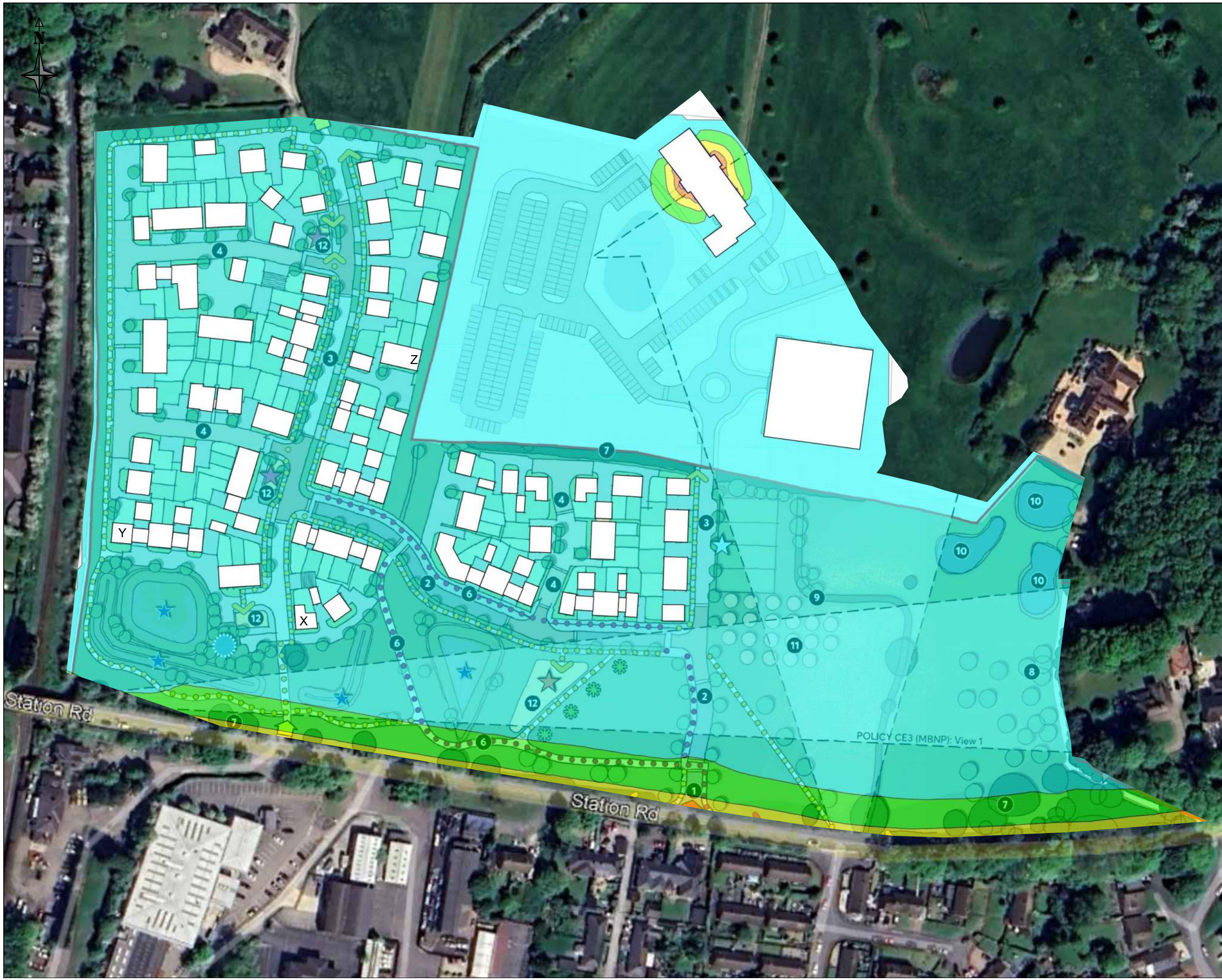
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	70-75dB(A)
	75-80dB(A)
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CLIENT: RICHBOROUGH ESTATES LIMITED						
DRAWING NUMBER: 20442_04_120_05						
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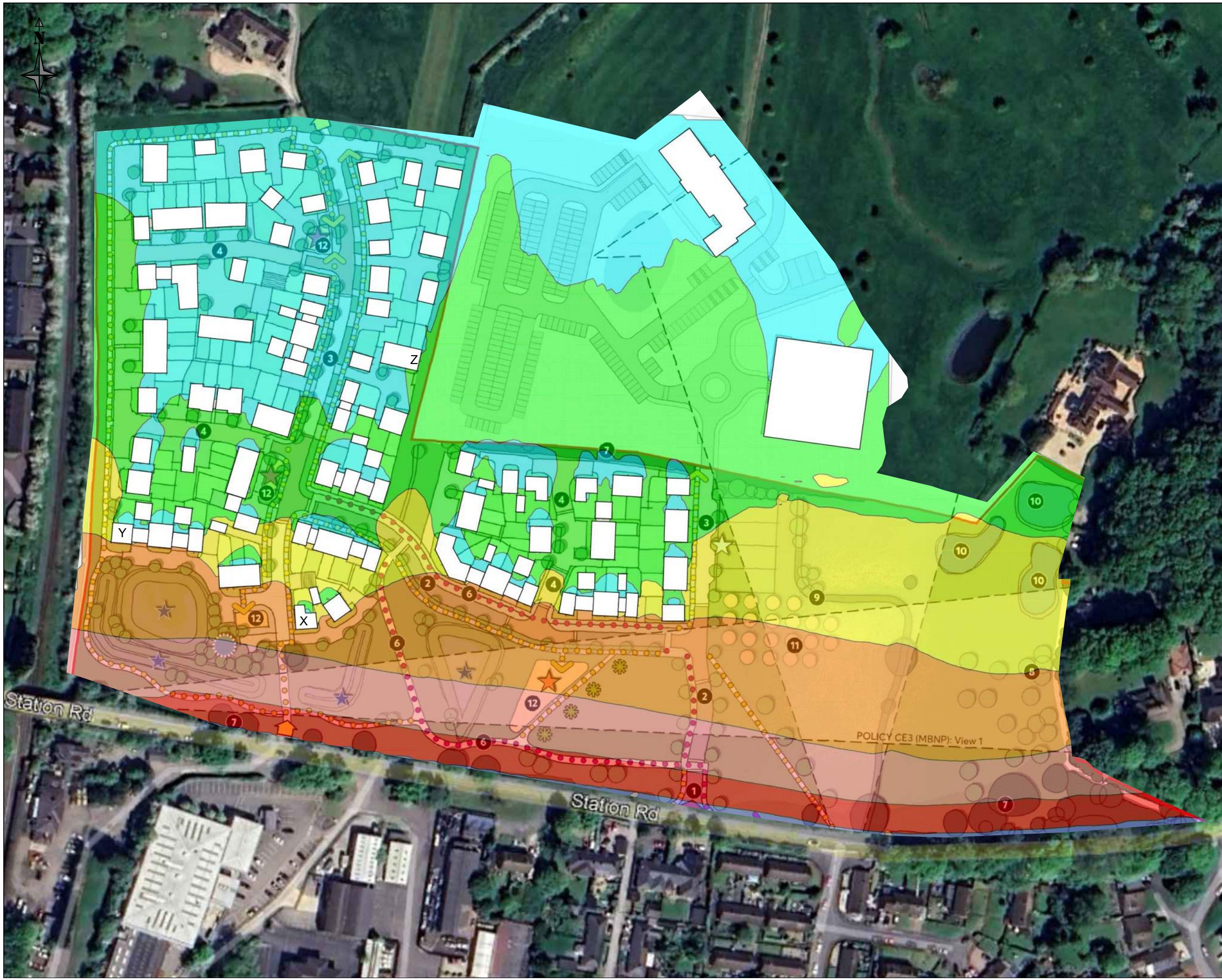
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CLIENT: RICHBOROUGH ESTATES LIMITED					
DRAWING NUMBER: 20442_04_120_06					
REVISION: A	SHEET SIZE: A3	SCALE: NFS			
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	60-65dB(A)
	65-70dB(A)
	70-75dB(A)
	75-80dB(A)
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PROJECT:				DRN:	CHK:	APP:	DATE:
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APPENDIX F

Indicative Performance Requirements

Façade Element	Sound Insulation Performance Requirements (dB) in Octave Band Centre Frequencies (Hz)						$R_w / D_{ne,w}$ (dB)	C_{tr} (dB)
	125	250	500	1k	2k	4k		
Glazing	22	20	26	36	39	31	31	-4
Ventilation (Trickle)	32	32	31	33	31	31	32	0
Ventilation (Overheating)	-	-	-	-	-	-	-	-
The glazing reduction requirements can typically be found in a configuration of 4/12/4, where the information is presented in terms of the thickness of one pane of glass in mm, followed by the size of the air gap in mm, followed by the thickness of the second pane of glass in mm. The background ventilation requirements can be found in standard window mounted non-acoustic trickle ventilators.								

Minimum performance requirements for overheating ventilation only applicable if passive ventilation is used. If mechanical ventilation is chosen, please refer to the main body of the acoustics report for suitable noise limits.

It is appreciated that it is impractical to achieve every octave band minimum performance requirement, therefore, during procurement of solutions, the $R_w + C_{tr}$ or $D_{ne,w} + C_{tr}$ should be adhered to at a minimum.



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