Hawthorne Court, Ryefield Crescent, Northwood HA6 1LJ

784-B078979

Noise Impact Assessment

Hamways Ltd

April 2026

TETRA TECH

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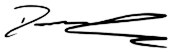
Document:	Noise Impact Assessment
Project:	Hawthorne Court, Ryefield Crescent, Northwood HA6 1LJ
Client:	Hamways Ltd
Project number:	784-B078979
File origin:	\\lds-dc-vm-101\Data\Projects\784-B078979_Hawthorne_Court\60_Output\

Revision:	N/A	**Prepared by:**	Naveen Simha Senior Consultant	
Date:	02/04/2026	**Checked by:**	Kanvin Chen Principal Noise Consultant	Pp 
Status:	First Issue	**Approved by:**	Dawit Abraham Head of Noise and Acoustics	
Description of revision:				

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Acronyms/Abbreviations

Acronyms/Abbreviations	Definition
CADNA	Computer Aided Noise Abatement
DMRB	Design Manual for Roads and Bridges
HGV	Heavy Goods Vehicle
PPG	Planning Practice Guidance
UDP	Unitary Development Plan
UKAS	United Kingdom Accreditation Service

Executive Summary

A noise assessment has been undertaken in support of a support a planning application for conversion of ground floor commercial units into 15No. residential apartments at Hawthorne Court, Ryefield Crescent, Northwood, HA6 1LJ in accordance with Class MA of the Town and Country Planning (General Permitted Development) (England) Order 2015.

The noise levels at the location of the indicative facades of the development were calculated using a 3D noise model and further calculations were carried out to determine the internal noise levels in habitable rooms of the development.

The results of the initial assessment show that internal night-time maximum noise levels are not met at the northern, western and eastern elevations of the development with standard thermal double glazing and ‘hit-and-miss’ type trickle ventilators.

It has been predicted that with enhanced glazing and acoustic trickle ventilators, as specified in Section 6.0, the internal night-time maximum noise levels are within the BS8233 criteria and hence results in low impact due to noise intrusion.

1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a noise assessment to support a planning application for conversion of ground floor commercial units into 15No. residential apartments at Hawthorne Court, Ryefield Crescent, Northwood, HA6 1LJ in accordance with Class MA of the Town and Country Planning (General Permitted Development) (England) Order 2015. A description of the existing noise environment in and around the site is provided. Noise surveys have been undertaken and the results used to verify predictions of the short-term and long-term effects of noise.

A list of acoustic terminology used in this report is provided in Appendix A.

1.2 Legislative Context

This report is intended to provide information relevant to the local planning authority and their consultees in support of a planning application for the above proposed development. Policy guidance with respect to noise is found in the National Planning Policy Framework (NPPF), published in December 2024. With regard to noise and planning, the NPPF contains the following statement at Paragraph 198:

> "198. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:
>
> (a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
>
> (b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason […]

> "200. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.
>
> "201. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

Planning Practice Guidance (PPG): Noise provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England (NPSE), is to **"identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."**

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the PPG and repeated below in Table 1.1.

Table 1.1: PPG Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No Specific Measures Required
No Observed Adverse Effect Level (NOAEL)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No Specific Measures Required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The NPPF, NPSE and PPG do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, within the context of the Proposed Development, national planning policy and appropriate guidance documents including ‘BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings’ (2014) and ‘BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound’ (2014) have been used. Section 2.0 presents the noise level criteria used as a basis of this assessment.

The PPG also states that neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.

Furthermore, the PPG: Noise identifies at Paragraph: 011 Reference ID: 30-011-20190722 the requirement for developments proposals to incorporate measures to mitigating the impact of noise on residential developments. In particular:

"*Noise impacts may be partially offset if residents have access to one or more of:*

- *a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;*
- *a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects;*
- *a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- *a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance).*

1.3 Local & Regional Policy Context

Hillingdon Borough Council does not have any specific requirements with respect to noise and therefore, the below assessment is undertaken in general accordance with BS8233:2014.

1.4 Acoustic Consultants' Qualifications and Professional Memberships

The lead project Acoustic Consultant Naveen Simha. The report has been checked by Kanvin Chen and verified by Dawit Abraham. Relevant qualifications, membership and experience are summarised in Table 1.2.

Table 1.2: Acoustic Consultants' Qualifications & Experience

Name	Education	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Naveen Simha	BEng 2013 MSc 2018	Sep 2017	Mar 2019	Jun 2022
Kanvin Chen	BEng 2018	June 2017	-	-
Dawit Abraham	BSc 2008 MSc 2010	Oct 2010	Jan 2011	Jan 2015

2.0 Assessment Criteria

In order to enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 2.1 presents equivalent noise levels and associated actions with the target noise level criteria identified. The noise level criteria detailed below have been derived from standards and design guidance:

- BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings – Code of practice'
- The Town and Country Planning (General Permitted Development) (England) Order 2015
- World Health Organisations (1999) 'Guidelines for Community Noise'

The permitted development right is subject to the conditions in paragraph MA.2; this requires prior approval of the local planning authority in relation to transport and highways impacts of the development, contamination risks of the site, flood risk and 'impacts of noise from commercial premises on the intended occupiers of the development.'

Therefore, in strict accordance with 'General Permitted Development Order' only noise from commercial sources need to be assessed on this development. However, considering the proximity of non-commercial noise sources (railway line to the north and surrounding road network), it is prudent to consider noise from both commercial and non-commercial sources affecting the development.

A full bibliography of documents referenced within this report is provided within Appendix B.

Table 2.1: Noise Level Criteria and Actions

Noise Sources	Noise Level Criteria	Justification for Effect Level- Action Required
No Observed Adverse Effect Level (NOAEL)		
Absolute internal noise criteria for noise sources including road traffic noise with windows closed.	Noise levels are below: Living Rooms: - 35 dB $L_{Aeq,16hours}$ Kitchens, Dining Rooms, and Studies: - 40 dB $L_{Aeq,16hours}$ Bedrooms: - 35 dB $L_{Aeq,16hours}$ - 30dB $L_{Aeq,8hr}$ - $L_{AFmax,2min}$ noise levels do not exceed: 45dB L_{AFmax} based on 10th highest $L_{AFmax,2min}$ sample)	**Justification for Effect Level:** Less than threshold values in Table 4 in BS8233:2014 and Table 1 in World Health Organisation (1999) Guidelines on Community Noise **Action Required:** None
Lowest Observed Adverse Effect Level (LOAEL)		
Absolute internal noise criteria for noise sources including road traffic noise with windows closed.	Noise levels are between: Living Rooms: - 35-40 dB $L_{Aeq,16hours}$ Kitchens, Dining Rooms, and Studies: - 40-45 dB $L_{Aeq,16hours}$ Bedrooms: - 35-40 dB $L_{Aeq,16hours}$ - 30-35dB $L_{Aeq,8hr}$ - $L_{AFmax,2min}$ noise levels do not exceed 45dB L_{AFmax} based on 10th highest $L_{AFmax,2min}$ sample)	**Justification for Effect Level:** Exceed threshold guidelines in Table 4 of BS8233:2014 and World Health Organisation (1999) Guidelines on Community Noise by no greater than 5dB to achieve reasonable internal conditions as defined by Note 7 to Table 1 in BS8233:2014 **Action Required:** Mitigate and reduce to a minimum the exceedance over the threshold
Significant Observed Adverse Effect Level (SOAEL)		
Absolute internal noise criteria for noise sources including road traffic noise with windows closed.	Noise levels are between: Living Rooms: - 40-45 dB $L_{Aeq,16hours}$ Kitchens, Dining Rooms, and Studies: - 45-50 dB $L_{Aeq,16hours}$ Bedrooms: - 40-45 dB $L_{Aeq,16hours}$ - 35-40dB $L_{Aeq,8hr}$ - 45-55dB $L_{AFmax,2min}$ based on 10th highest $L_{AFmax,2min}$ sample)	**Justification for Effect Level:** Exceeds BS8233:2014 $L_{Aeq,T}$ reasonable criteria by 5dB or exceeds $L_{AFmax,2min}$ (10th highest sample) **Action Required:** Additional mitigation required to achieve effect of LOAEL or less.

Noise Sources	Noise Level Criteria	Justification for Effect Level- Action Required
Unacceptable Observed Adverse Effect Level (UOAEL)		
Absolute internal noise criteria for noise sources including road traffic noise with windows closed.	Noise levels exceed: Living Rooms: - 45 $dBL_{Aeq,16hours}$ Kitchens, Dining Rooms, and Studies: - 50 $dBL_{Aeq,16hours}$ Bedrooms: - 45 $dBL_{Aeq,16hours}$ - 40dB $L_{Aeq,8hr}$ - $L_{AFmax,2min}$ noise levels exceeds 55dB L_{AFmax} based on 10th highest $L_{AFmax,2min}$ sample)	**Justification for Effect Level:** Exceeds BS8233:2014 $L_{Aeq,T}$ reasonable criteria by 10dB or exceeds $L_{AFmax,2min}$ (10th highest sample) by 10dB or more. **Action Required:** Additional mitigation required to achieve effect of LOAEL or less.

3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict noise levels at a number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on ISO 9613-2 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data and model settings as given in Table 3.1 below have been used.

Table 3.1: Modelling Parameters Sources and Input Data

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	DEFRA	LiDAR topographical survey data
Building heights – around site	Tetra Tech Observations	• 4.0m height for one-storey properties • 8.0 m height for two storey properties • 3.0m per additional storey
Receptor positions*	Tetra Tech	• 1.5 m for ground floor properties • 4.0m height for first-floor properties • 1.5m height for monitoring validation locations.
Modelling Parameters	Tetra Tech	• Ground Absorption: 0.5 • Order of Reflections: 3 • Noise Contour Plot Grid Receiver Spacing: 10x10
Proposed Plans	rg+p	Drawing Title: Proposed Ground Floor Plan – 19/10/2022 Drawing No:101-173/(P)011I
*All receptors modelled 1.0m from building façade unless otherwise stated.		

It is acknowledged that a number of the values of parameters chosen will affect the overall noise levels presented in this report. However, it should be noted that the values used, as identified above, are worst-case.

4.0 Noise Survey

4.1 Noise Survey Details

A monitoring survey was undertaken to characterise ambient and background noise levels currently experienced on the site. Equipment used during the survey included

Table 4.1: Baseline Noise Survey Measurement Equipment

Equipment Type	Model	Serial Number
Sound Level Meter	Rion NL-52	01087404
Sound Level Meter	Rion NL-52	00410085
Sound Level Meter	Rion NL-52	00732145
Calibrator	Rion NC-75	34145521

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

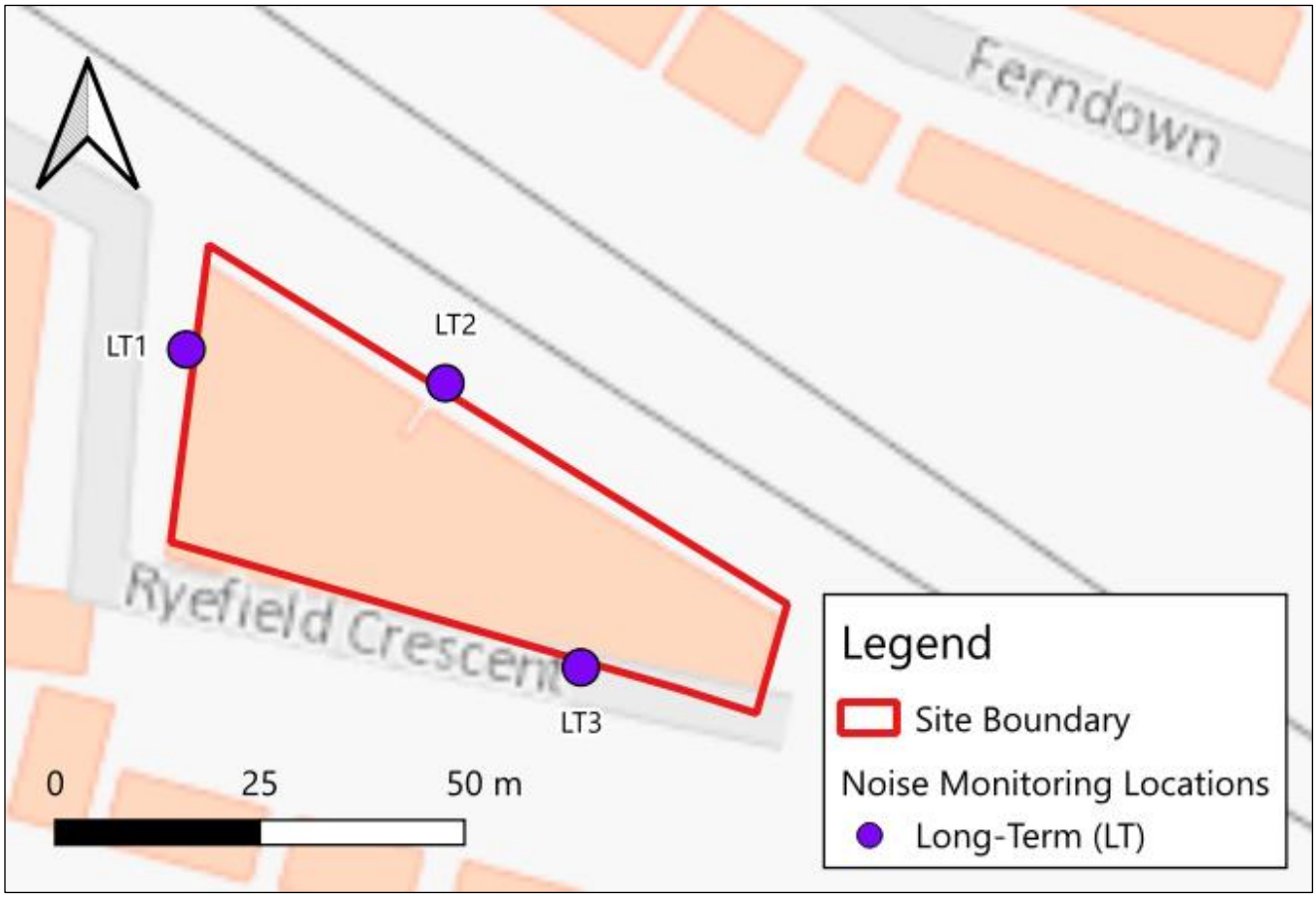
A baseline monitoring survey was undertaken at three locations (as specified in Table 4.2 and shown in Figure 4.1 below) from Friday 20 March 2026 to Wednesday 25 March 2026. Unattended Long-Term (LT) locations were used at all three measurement positions over a period of approximately 120 hours. The raw data collected from the long-term monitoring is available upon request.

Measurements were taken in general accordance with BS 7445-1:2003 The Description and Measurement of Environmental Noise: Guide to quantities and procedures. Weather conditions during the survey period were observed as being dry. Anemometer readings confirmed that wind speeds were less than 5 ms-1 at all times during the survey, with a predominant northerly wind direction during the survey.

Table 4.2: Noise Monitoring Location

Ref	Description
LT1	1m from the western façade of the site overlooking Ryefield Crescent and commercial units.
LT2	1m from the northern façade of the site overlooking the railway line.
LT3	1m from the southern façade of the site overlooking Ryefield Crescent and residential gardens.

Figure 4.1: Noise Monitoring Location



4.2 Noise Survey Results

The dominant noise sources found in the area include noise from train pass bys on the railway line to the north of the site, commercial units on Ryefield Crescent and distant road traffic noise.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period). For the long-term (LT) locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5-minute measurement over the stated survey period.

Table 4.3: Meteorological Conditions During the Survey

Survey Location	Date & Time	Temperature (ºC)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
LT1	20/03/2026 15:30	7	3-4	N	2	Distant road traffic and commercial units on Ryefield Crescent
LT2	20/03/2026 15:00	7	3-4	N	2	Train pass bys on the railway line to the north of the site
LT3	20/03/2026 14:30	7	3-4	N	2	Distant road traffic

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re: 2 x 10^{-5} Pa).

Table 4.4: Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 - 23:00	46 Hours	20/03/2026 15:30	LT1	60.7	100.8	42.2	60.7	52.0
Weekday Night-time 23:00 – 07:00	24 hours	20/03/2026 23:30		53.0	75.8[1]	30.3	50.6	36.0
Weekend Daytime 07:00 - 23:00	32 Hours	21/03/2026 07:00		61.8	95.7	33.0	62.0	51.0
Weekend Night-time 23:00 – 07:00	16 Hours	21/03/2026 23:00		49.1	71.7[1]	29.4	50.0	43.0

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 - 23:00	46 Hours	20/03/2026 15:00	LT2	63.1	92.3	31.6	59.0	46.0
Weekday Night-time 23:00 – 07:00	24 hours	20/03/2026 23:30		56.3	84.9[1]	25.7	50.4	38.0
Weekend Daytime 07:00 - 23:00	32 Hours	21/03/2026 07:00		59.4	95.6	34.8	57.5	46.0
Weekend Night-time 23:00 – 07:00	16 Hours	21/03/2026 23:00		55.0	82.1[1]	28.6	49.1	34.0
Weekday Daytime 07:00 - 23:00	46 Hours	20/03/2026 14:30	LT3	52.4	90.2	34.5	52.7	42.0
Weekday Night-time 23:00 – 07:00	24 hours	20/03/2026 23:30		47.9	69.7[1]	25.9	47.4	30.0
Weekend Daytime 07:00 - 23:00	32 Hours	21/03/2026 07:00		50.1	86.1	29.9	51.4	40.0
Weekend Night-time 23:00 – 07:00	16 Hours	21/03/2026 23:00		47.7	67.9[1]	22.8	45.9	38.0

[1] 10th Highest maximum occurring event

4.3 Model Verification (Existing Ambient Noise Climate)

Traffic noise from surrounding roads has been verified by modelling a measured daytime monitoring location for the 'existing' scenario. The comparison between the monitored and modelled results for the site is shown in Tables 4.5-4.7.

Table 4.5: Modelled vs. Monitored Results $L_{Aeq;\ daytime\ 07:00 – 23:00}$

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
LT1	61.8	62.1	+0.3
LT2	63.1	63.2	+0.1
LT3	52.4	52.0	-0.4

All values are sound pressure levels in dB re: 2x 10-5 Pa

Table 4.6: Modelled vs. Monitored Results $L_{Aeq;\ night-time\ 23:00 – 07:00}$

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
LT1	53.0	53.6	+0.6
LT2	56.3	56.2	-0.1
LT3	47.9	48.4	+0.5

All values are sound pressure levels in dB re: 2x 10-5 Pa

Table 4.7: Modelled vs. Monitored Results $L_{Max;\ night-time\ 23:00 – 07:00}$

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
LT1	75.8	75.4	-0.4
LT2	84.9	85.2	+0.3
LT3	67.9	67.4	-0.5

All values are sound pressure levels in dB re: 2x 10-5 Pa

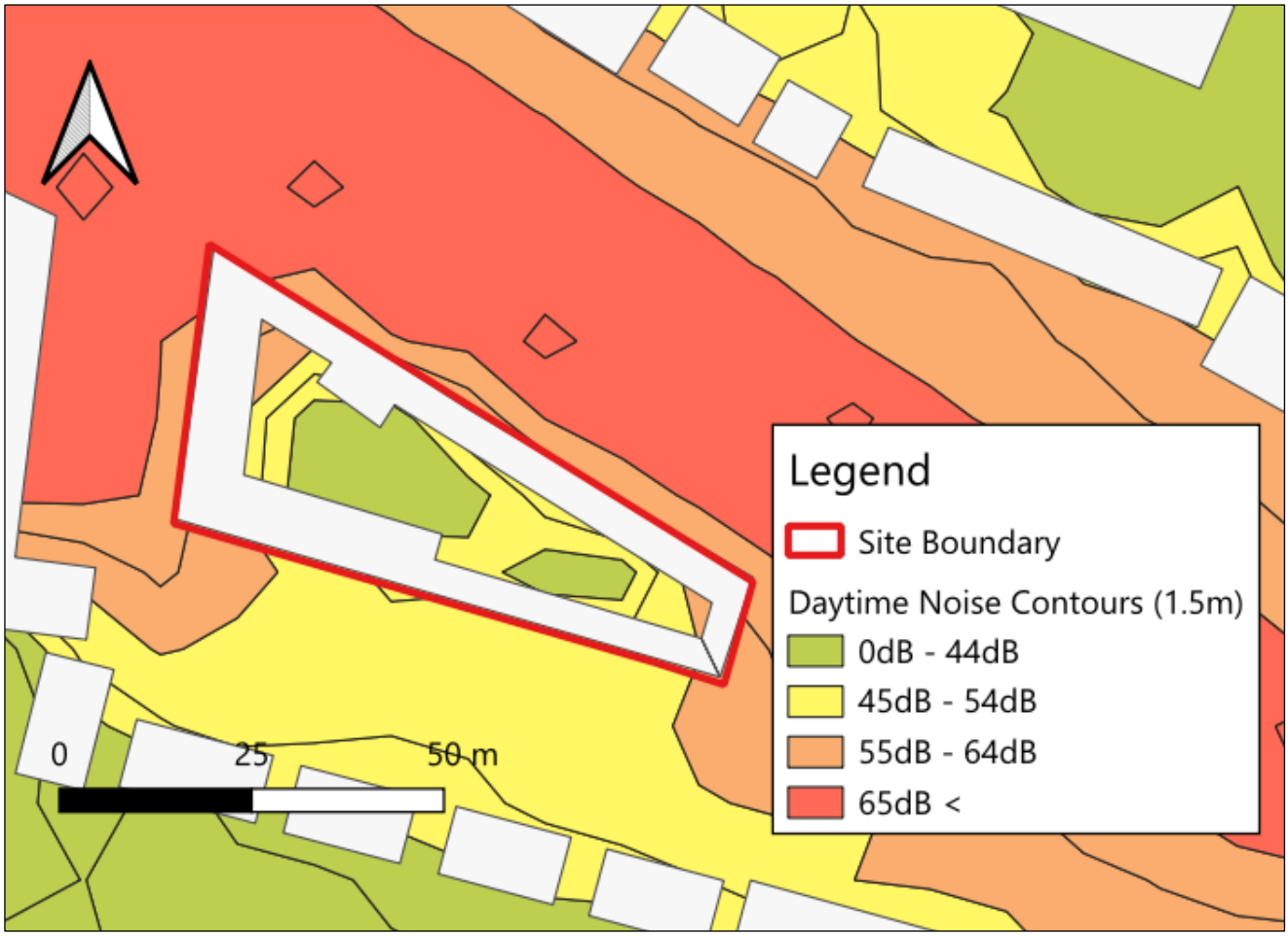
As all of the verification points show a divergence between monitored and modelled results of no more than ±3 dB, the models are considered suitably verified.

5.0 Assessment of Effects

5.1 Noise Modelling Results

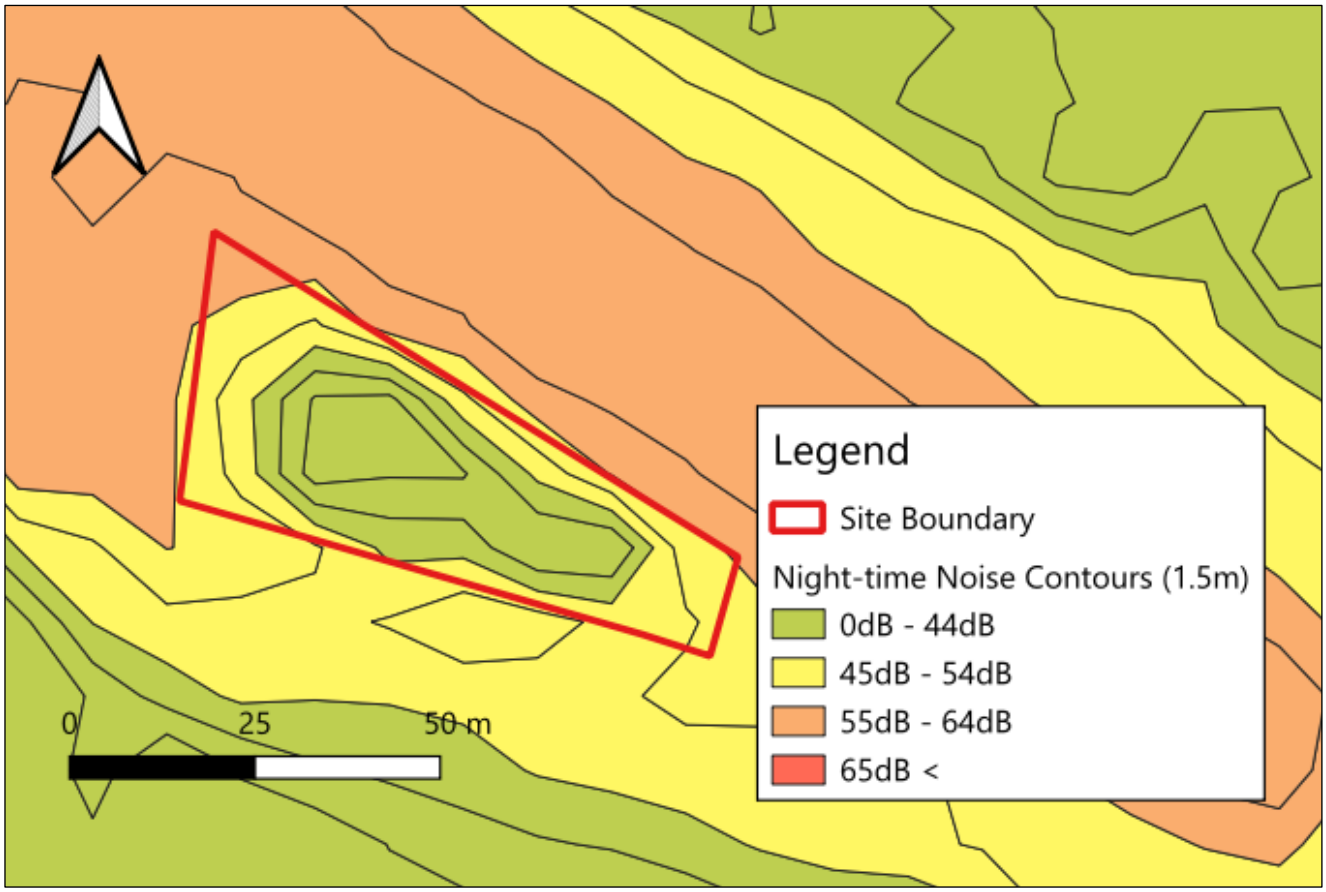
External daytime ambient noise level assessment at the proposed site layout is presented in Figure 5.1 at a grid height of 1.5m.

Figure 5.1: Noise Modelling Results – Grid at 1.5m high (daytime – $L_{Aeq,16hr}$)



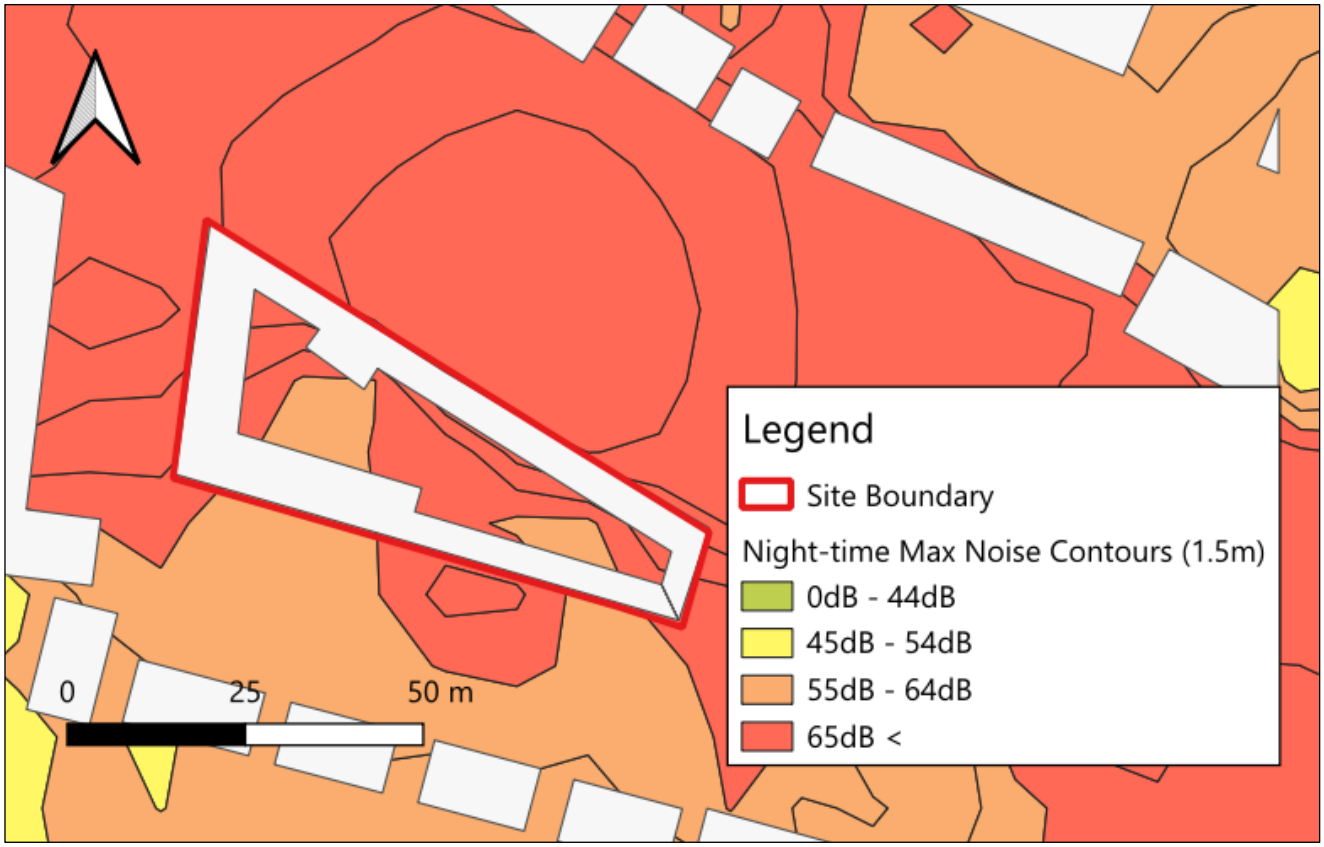
External night-time ambient noise level assessment at the proposed site layout is presented in Figure 5.2 at a grid height of 1.5m.

Figure 5.2: Noise Modelling Results – Grid at 1.5m high (night-time – $L_{Aeq,8hr}$)



External night-time maximum noise level assessment at the proposed site layout is presented in Figure 5.3 at a grid height of 1.5m.

Figure 5.3: Noise Modelling Results – Grid at 1.5m high (night-time – L_{Amax}) – Worst-case Locations



5.2 Noise Intrusion Assessment

Internal noise levels at sensitive receptor locations, from all noise sources including train pass-by's, commercial units on Ryefield Crescent and distant road traffic have been assessed both with windows open, where a reduction from a partially open window of 15 dB has been used, and with windows closed where an assumption of double glazing with a sound reduction of 27 dB $R_{w+}C_{tr}$ has been used.

The noise intrusion calculation has been undertaken based on the following assumptions:

- The external wall and roof are to have a sound insulation performance of about 50 dB R_w and 40 dB R_w, respectively.
- Bedrooms have a volume of 25m^3, an external wall area of 9m^2, a 2m^2 window and 1x trickle ventilator.
- Living / dining rooms have a volume of 40m^3, an external wall area of 15m^2, 5m^2 of window and 1x trickle ventilators.

- The reverberation time in bedrooms and living / dining rooms will be 0.5 seconds.

Results of the noise intrusion assessment for ambient daytime and night-time noise levels are presented within Tables 5.1 and 5.2 respectively, with night-time maximum noise levels presented within Table 5.3.

Please note that external noise level used in the tables below have been corrected to free-field levels by using a -2.5 dB correction.

Table 5.1: Daytime Noise Intrusion Levels $L_{Aeq,16hour}$

Elevation	External Free-Field L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
Western elevation overlooking commercial units	59	44	**33**	35
Northern elevation overlooking railway line	60	45	**34**	
Southern elevation overlooking Ryefield Crescent	49	34	**23**	
Eastern Elevation	58	43	**32**	
All values are sound pressure levels in dBA re: $2x\ 10^{-5}$ Pa.				

Table 5.2: Night-time Noise Intrusion Levels $L_{Aeq,8hour}$

Elevation	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
Western elevation overlooking commercial units	50	35	**24**	30
Northern elevation overlooking railway line	53	38	**27**	
Southern elevation overlooking Ryefield Crescent	45	30	**19**	
Eastern Elevation	51	36	**25**	
All values are sound pressure levels in dBA re: $2x\ 10^{-5}$ Pa.				

Table 5.3 Night-time Noise Intrusion Levels L_{Amax}

Elevation	External L_{Amax}	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria L_{Amax}
Western elevation overlooking commercial units	73	58	**47**	45
Northern elevation overlooking railway line	82	67	**56**	
Southern elevation overlooking Ryefield Crescent	67	52	**41**	
Eastern Elevation	73	58	**47**	
All values are sound pressure levels in dBA re: 2x 10^{-5} Pa.				

As demonstrated within Tables 5.1 to 5.3 above, with windows closed, the predicted daytime and night-time ambient internal noise levels are below the BS8233 criteria with standard thermal double glazing (27 dB $R_w + C_{tr}$) and 'hit and miss' trickle ventilators (33 dB $D_{ne,w}$) for all elevations of the development.

However, with respect to predicted internal night-time maximum noise levels, only dwellings on the southern elevation will be meeting the BS8233 criteria with standard thermal double glazing and 'hit and miss' trickle ventilators and hence results in an UOAEL. As such, mitigation will need to be considered for the reaming three elevations, and this is discussed in Section 6.0 of the report.

6.0 Site Design & Mitigation

6.1 Enhanced Glazing and Acoustic Trickle Ventilators

The initial noise intrusion assessment for the development shows the predicted maximum internal noise levels resulting in an UOAEL during the night-time period and therefore mitigation measures have been proposed.

An enhanced glazing with a performance of 30 dB $R_w + C_{tr}$ and an acoustic trickle ventilator with a performance of 35 dB $D_{ne,w}$ (in open position) is recommended for all bedrooms on the western and eastern elevations.

With respect to bedrooms on the northern elevation (overlooking the railway line), it is recommended that enhanced glazing with a performance of 40 dB $R_w + C_{tr}$ should be used. It is also recommended that ventilation is either provided either through wall vents (approximate performance of 50 dB $D_{ne,w}$) or by mechanical means for bedrooms on the northern elevation.

Results of the noise intrusion assessment for ambient daytime and night-time noise levels after proposed mitigation are presented within Tables 6.1 and 6.2 respectively, with night-time maximum noise levels presented within Table 6.3.

Table 6.1: Daytime Noise Intrusion Levels $L_{Aeq,16hour}$ (with mitigation)

Elevation	External Free-Field L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
Western elevation overlooking commercial units	59	44	**30**	35
Northern elevation overlooking railway line	60	45	**23**	
Southern elevation overlooking Ryefield Crescent	49	34	**23**	
Eastern Elevation	58	43	**29**	
All values are sound pressure levels in dBA re: 2x 10^{-5} Pa.				

Table 6.2: Night-time Noise Intrusion Levels $L_{Aeq,8hour}$ (with mitigation)

Elevation	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
Western elevation overlooking commercial units	50	35	**21**	30
Northern elevation overlooking railway line	53	38	**16**	
Southern elevation overlooking Ryefield Crescent	45	30	**19**	
Eastern Elevation	51	36	**22**	
All values are sound pressure levels in dBA re: 2x 10^{-5} Pa.				

Table 6.3 Night-time Noise Intrusion Levels L_{Amax} (with mitigation)

Elevation	External L_{Amax}	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria L_{Amax}
Western elevation overlooking commercial units	73	58	**44**	45
Northern elevation overlooking railway line	82	67	**45**	
Southern elevation overlooking Ryefield Crescent	67	52	**41**	
Eastern Elevation	73	58	**44**	
All values are sound pressure levels in dBA re: 2x 10^{-5} Pa.				

As demonstrated within Tables 6.1 to 6.3 above, with windows closed, the predicted ambient and maximum internal noise levels are below the BS8233 criteria with enhanced glazing and acoustic trickle ventilators for all dwellings in the development. As such, the site results in NOAEL in terms of noise intrusion.

7.0 Conclusion

A noise assessment has been undertaken in support of a support a planning application for conversion of ground floor commercial units into 15No. residential apartments at Hawthorne Court, Ryefield Crescent, Northwood, HA6 1LJ in accordance with Class MA of the Town and Country Planning (General Permitted Development) (England) Order 2015.

The noise levels at the location of the indicative facades of the development were calculated using the noise model and further calculations were carried out to determine the internal noise levels in habitable rooms of the development.

The results of the initial assessment show that internal night-time maximum noise levels are not met at the northern, western and eastern elevations of the development with standard thermal double glazing and ‘hit-and-miss’ type trickle ventilators.

It has been predicted that, with enhanced glazing and acoustic trickle ventilators as specified in Section 6.0, the internal night-time maximum noise levels are within the BS8233 and WHO guidelines criteria and hence results in low impact due to noise intrusion.

The NPPF provides test points against which the proposed development has been assessed. Considering these points, the following conclusions can be drawn:

NPPF paragraphs 198 and 201

Based upon the assessments presented, it is considered that the development does not adversely affect or put sensitive receptors at risk from noise pollution, and no significant adverse effects are predicted to occur.

NPPF paragraph 200

Considering the existing use of the site and wider development site, it is not considered that any existing businesses wanting to develop would be restricted by the proposals.

Planning Practice Guidance: Noise

It has been predicted that on-site operational noise effects associated with the Development will be below the NOAEL, and therefore the development will have a negligible impact in relation to noise.

Appendices

Appendix A – Acoustic Terminology

Acoustic Terminology

dB Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00\ –\ 23:00}$ for example, describes the equivalent continuous noise level over the 16-hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the $L_{Aeq,\ 07:00\ –\ 23:00}$.

L_{Amin} The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_n Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say. 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10,\ 1\ hr}$ = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

Appendix B – References

British Standards Institute (BSI). (2014). BS 8233:2014. *Guidance on Sound Insulation and Noise Reduction for Buildings*. United Kingdom.

World Health Organization. (1999). *Guidelines for Community Noise.*