Land at Tollgate Road, Colney Heath

Noise Impact Assessment

On behalf of **Vistry Homes Ltd**

Project Ref: 332510999/3001 | Rev: 0 | Date: June 2022

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.1	June 2022	Minor amendments	MH	PT	AS
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Executive Summary

Stantec UK Ltd. has been commissioned by Vistry Homes Ltd. to provide a report to support an outline planning application for a proposed development at the land at Tollgate Road, Colney Heath, Hertfordshire.

The development at this stage is an outline application for the demolition of the existing house and stables and the erection of up to 150 dwellings, including affordable and custom-build properties, together with all ancillary works (all matters reserved except access). An environmental sound survey has been undertaken by Stantec UK Ltd. to establish the existing environmental sound levels at the site.

This report presents the relevant results of the environmental sound surveys and considers the suitability of the site for residential development, having regard to planning policy, national and international standards and guidance documents in relation to environmental noise.

The calculations indicate that standard internal ambient noise levels are likely to fall below the guideline levels of BS 8233:2014. This should be confirmed by a detailed assessment once detailed information of the development is available.

Based on the measured survey data, external night-time sound levels are anticipated to be below 53 dB $L_{Aeq,8hours}$ and typically below 68 dB $L_{Amax,f}$ across the development and therefore additional overheating acoustic mitigation is unlikely to be necessary.

Calculations indicate that noise levels within external amenity area are likely to fall between 50–55 dB, and should be considered acceptable.

In respect to noise, the site should be considered suitable for residential development.

1 Introduction

1.1 Background

1.1.1 Stantec UK Ltd. has been commissioned by Vistry Homes Ltd. to provide a report to support an outline planning application for a proposed development at the land at Tollgate Road, Colney Heath, Hertfordshire.

1.1.2 Vistry Group is working with the landowner of Land at Colney Heath, to promote the Site for residential development. The site is approximately 7.82 hectares.

1.1.3 An environmental sound survey has been undertaken by Stantec UK Ltd. to establish the existing environmental baseline sound levels associated with the area.

1.1.4 The results of the environmental sound survey have been used to establish façade incident sound levels at the proposed development which form the basis of our noise impact assessment.

1.1.5 This report presents the relevant results of the environmental sound survey and considers the suitability of the site for residential development, having regard to planning policy, national and international standards and guidance documents in relation to environmental noise.

1.1.6 An explanation of the acoustic terminology used in this report is included in **Appendix A**.

1.2 Scope of Report

1.2.1 The scope of the report is as follows:

- To establish, by means of a detailed daytime and night-time environmental sound survey, the existing environmental sound levels at selected positions.
- To propose appropriate external and internal ambient sound level design criteria with respect to external sound ingress for habitable spaces and sound levels in external amenity areas based on relevant standards, guidance and the requirements of the Local Authority.
- To assess the suitability of the site for residential development with respect to internal and external sound levels.

1.3 Site Description and Location

1.3.1 The site of 7.62 hectares is located approximately 1 km south east from the village of Colney Heath, Hertfordshire. The site is bound by the wooded course of the River Colne to the south west with Coursers Road situated beyond the river, a paddock for horse grazing to the north west; Tollgate Road and residential dwellings to the north east and further paddocks for horse grazing to the south. The site falls within the jurisdiction of St Albans .

1.3.2 The location of the proposed site and the development framework plan are shown in **Figures 1 and 2 respectively.**

Figure 1: Site Location Plan

Courtesy of Maxar and Microsoft.

Figure 2: Development Framework Plan

Courtesy of Vistry Homes Drawing Number: CSA/3925/117

2 Policy, Standards, Guidance and Criteria

2.1 Local Policy

City and District of St Albans District Local Plan 1994 (Saved and deleted policies July 2020)

2.1.1 The City and District of St Albans District Local Plan 1994 (Reviewed 2020) was produced to assist the public to show which policies are still in force in the decision making process for new developments. In relation to noise the plan states:

> *"8.40 The District Council will advise on noise levels in accordance with British Standard BS.4142 in relation to proposals for noise sensitive developments. For example, dwellings, schools, hospitals, churches and hotels in locations where they are likely to be subject to excessive noise annoyance from industrial premises or other fixed installations. The Council will also advise on noise in relation to new commerce and industry in accordance with Circular 10/73 and the standards established in BS.4142.*
>
> *8.41 Noise from roads, railways, aircraft and some industrial and commercial premises has a detrimental effect on the quality of the environment, particularly in housing and other noise sensitive areas. Aircraft noise levels in the District do not at present justify refusal of planning applications (see Policy Intention 9). Circular 10/73 provides guidance on road noise and this forms the basis for Policy 83. There is no official guidance on rail noise, but proposed developments close to railways will be considered on their merits."*

2.1.2 Circular 10/73 was replaced by PPG 24 in 1999, which has since been withdrawn with the publication of The National Planning Policy Framework (NPPF).

2.2 National Policy

The National Planning Policy Framework (NPPF)

2.2.1 The revised National Planning Policy Framework (NPPF) was published in July 2021. In respect of noise, paragraph 174 states that in relation to conserving and enhancing the natural environment:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by…*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of … noise pollution..."*

2.2.2 In relation to ground conditions and pollution, paragraph 185 states that:

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

2.2.3 In relation to the integration of new development with existing premises and community facilities, paragraph 187 states that:

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

National Planning Practice Guidance (PPG)

2.2.4 The National Planning Practice Guide (PPG) was launched in March 2014 (latest update – July 2019) and provides additional guidance and interpretation to the Government's strategic policies outlined within the NPPF in a regularly updated, web-based resource.

2.2.5 The PPG provides guidance on the effects of noise exposure, relating these to people's perception of noise, and linking them to the NOEL (No Observed Effect Level) and, as exposure increases, the LOAEL (Lowest Observed Adverse Effect Level) and SOAEL (Significant Observed Adverse Effect Level).

2.2.6 As exposure increases above the LOAEL, the noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.

2.2.7 The LOAEL is described in PPG (Paragraph: 005 Reference ID: 30-005-20190722) as the level above which *"noise starts to cause small changes in behaviour and/or attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise)."*

2.2.8 PPG identifies the SOAEL (Paragraph: 005 Reference ID: 30-005-20190722) as the level above which *"noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused."*

Noise Policy Statement for England (NPSE)

2.2.9 The Noise Policy Statement for England (NPSE) was published in March 2010 and clarifies the underlying principles and aims of existing policy documents that relate to noise. It also sets out the long-term vision of Government noise policy which is: *"to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development".*

2.2.10 The NPSE states that noise should not be considered in isolation of the wider benefits of a scheme or development, and that the intention is to minimise noise and its effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.

2.2.11 Paragraphs 2.20 and 2.21 define 'significant averse' and 'adverse' impacts as applied to noise as follows:

"There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur."

2.2.12 It is necessary to define the LOAEL and SOAEL for the potential source of noise to relate the potential impact to the aims and requirements of the NPSE.

2.3 Building Regulations

Approved Document O Overheating

2.3.1 Approved Document O of the Building Regulations 2010 *Overheating* was published in December 2021 and will took effect in England on 15 June 2022. It will apply to schemes which have not had a planning application submitted prior 15 June 2022, and to schemes which start on site after 15 June 2023.

2.3.2 Approved Document O gives guidance on how to comply with Part O of the Building Regulations and applies to residential buildings (excluding hotels) only.

2.3.3 Requirement O1(1) states that:

"Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel ("residences") to –

(a) Limit unwanted solar gains in summer;

(b) Provide an adequate means to remove heat from the indoor environment."

2.3.4 Requirement O1(2) states that:

"In meeting the obligations in paragraph (1) –

(a) Account must be taken of the safety of any occupant, and their reasonable enjoyment of the residence; and

(b) Mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it."

2.3.5 Compliance with Requirement O1(1) can be demonstrated by using the 'simplified method' or by 'dynamic thermal modelling', as described in Approved Document O.

2.3.6 In relation to noise, Paragraphs 3.2 and 3.3 of Approved Document O state:

> *"3.2 In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*
>
> *3.3 Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.*
>
> *a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).*
>
> *b. 55dB L_{AFmax}, more than 10 times a night (between 11pm and 7am)."*

2.3.7 Paragraph 3.4 of Approved Document O states that:

> *"Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use."*

2.3.8 Based on paragraph 3.4 of Approved Document O, it is considered that calculations, modelling or in-situ noise measurements could be used as evidence that these limits are not exceeded.

2.3.9 In relation to reducing internal noise levels, Approved Document O notes under paragraph 3.4 that:

> *"Guidance on reducing the passage of external noise into buildings can be found in the National Model Design Code: Part 2 – Guidance Notes (MHCLG, 2021) and the Association of Noise Consultants' Acoustics, Ventilation and Overheating: Residential Design Guide (2020)."*

2.3.10 Based on a typical level difference offered by an open window, sound levels are anticipated to be approximately 13 dB higher outside an open window compared to inside. Therefore, where external sound levels are above 53 dB $L_{Aeq,8hours}$ and 68 dB $L_{Amax,f}$ more than 10 times per night, windows are likely to be closed during sleeping hours. As such, alternative overheating strategies which do not rely on open windows may be required, subject to dynamic thermal modelling. These could include passive solutions (e.g. acoustic louvres, plenum windows) or mechanical solutions (e.g. cooling).

2.4 Standards

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

2.4.1 BS 8233, in relation to this planning application, sets out desirable guideline values in habitable rooms, such as living rooms and bedrooms.

2.4.2 The guideline values relate to steady external noise without a specific character, previously termed 'anonymous noise'. According to the standard, noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate. Examples of noise with a character may include tonal/intermittent plant noise emissions, music playback, and workshop noise. Examples of external steady noise sources may include environmental noise sources such as busy road traffic.

2.4.3 The desirable internal ambient noise levels for dwellings are presented in **Table 2.1**.

Table 2.1: BS 8233 Desirable Internal Ambient Noise Levels for Dwellings

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$
*Note 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of Sound Exposure Level (SEL) or $L_{Amax,f}$, depending on the character and number of events per night. Sporadic noise events could require separate values.			
Note 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative source of ventilation that does not compromise the façade insulation or the resulting noise levels.			
Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved.			

*A selection of the available notes

2.4.4 The standard also provides advice in relation to desirable levels for external noise. It states that:

> *"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable.*
>
> *In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*
>
> *Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate.*
>
> *Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation.*
>
> *In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."*

2.5 Guidance

Professional Practice Guidance on Planning and Noise, 2017

2.5.1 The Professional Practice Guidance on Planning and Noise (ProPG) was jointly published in 2017 by the Institute of Acoustics, the Chartered Institute of Environmental Health and the Association of Noise Consultants, and provides guidance on a recommended approach to the management of noise within the planning system in England.

2.5.2 The scope of ProPG is limited to new residential development that will be predominantly exposed to airborne noise from transport sources.

2.5.3 The guidance is mostly focused on new flats and houses, although there is some relevant content in regard to other types of residential units, such as care homes and residential institutions.

2.5.4 Noise sources other than airborne transport (i.e. industrial, commercial, entertainment, etc.) and ground-borne noise and vibration fall outside of the scope of ProPG.

2.5.5 ProPG details a two-stage approach to the consideration of noise issues including:

- Stage 1 – an initial noise risk assessment of the proposed development site.
- Stage 2 – a systematic consideration of four key elements.

2.5.6 **Table 2.2** is a reproduction of **Figure 1** within ProPG which summarises the noise risk categories for Stage 1 of the assessment process.

Table 2.2: Stage 1 ProPG Risk Categories

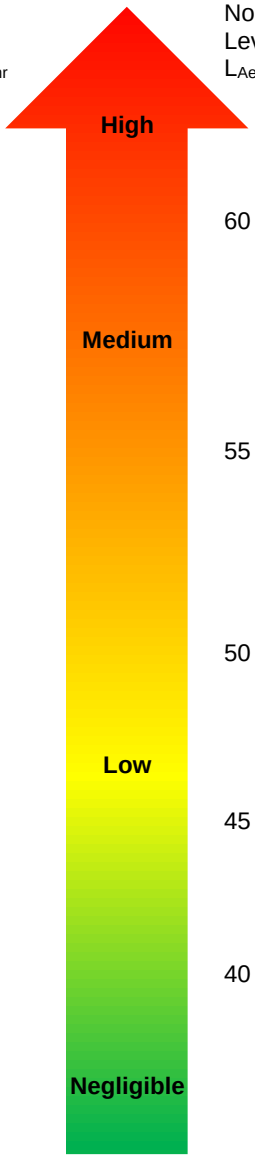
Noise Risk Assessment	**Potential Effect Without Noise Mitigation**	**Pre-Planning Application Advice**
Indicative Daytime Noise Levels $L_{Aeq,16hr}$ / Indicative Night-time Noise Levels $L_{Aeq,8hr}$  	Increasing risk of adverse effect	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed Acoustics Design Statement (ADS). Applicants are strongly advised to seek expert advice. As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development. At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
	No adverse effect	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.

Figure Notes:

a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".
c. $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.
d. An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F}$ > 60 dB means the site should not be regarded as negligible risk.

2.5.7 Stage 2 comprises four key elements which are undertaken in parallel:

- Element 1 – demonstrating a 'Good Acoustic Design Process';
- Element 2 – observing internal 'Noise Level Guidelines';
- Element 3 – undertaking an 'External Amenity Area Noise Assessment'; and
- Element 4 – consideration of 'Other Relevant Issues'.

2.5.8 Following a good acoustic design process involves considering acoustics at an early stage in the design process; avoid 'unreasonable' acoustic conditions and prevent 'unacceptable' acoustic conditions; and achieve an integrated, optimum solution without overdesign.

2.5.9 Demonstration of good acoustic design should include:

- Checking the feasibility of relocating or reducing noise levels from relevant sources.
- Consider options for planning the site or building layout.
- Consider the orientation of proposed building(s).
- Select construction types and methods for meeting building performance requirements.
- Consider the effects of noise control measures on ventilation, fire regulation, health and safety, Construction Design & Management, CDM etc.
- Assess the viability of alternative solutions.
- Assess external amenity areas noise.

2.5.10 With respect to internal noise levels, ProPG recommends that noise levels set out in BS 8233 are used for residential development. However, an additional criterion is proposed by ProPG for night-time L_{Amax} levels as follows:

> *"[…] In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax, F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events."*

2.5.11 With respect to external noise levels, ProPG again makes reference to the guideline levels detailed in BS8233 stating that:

> *"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."*

2.5.12 The final element indicates that the assessment should consider 'Other Relevant Issues' which may include:

- Compliance with relevant national and local policy.
- Magnitude and extent of compliance with ProPG.
- Likely occupants of the development.

- Acoustic design verses unintended adverse consequences.
- Acoustic design verse wider planning objectives.

3 Environmental Sound Survey

3.1 Procedure

3.1.1 An unattended environmental sound survey was undertaken over approximately 24 hours between Tuesday 19 April 2022 to Wednesday 20 April 2022 to determine the existing sound climate at locations considered representative of sound levels incident on the proposed development.

3.1.2 Measurements were logged in 15-minute periods of the L_{Aeq}, L_{A90} and L_{AFMax} sound levels.

3.1.3 The sound level meters were located in environmental cases. The microphones were connected to the meters via an extension cable and fitted with the manufacturer's windshield.

3.1.4 The instrumentation used in the survey (including calibration information) is listed in **Appendix B**. Field calibrations were performed before and after the measurements with no significant fluctuations recorded (< 0.5 dB). Calibration certificates are available upon request.

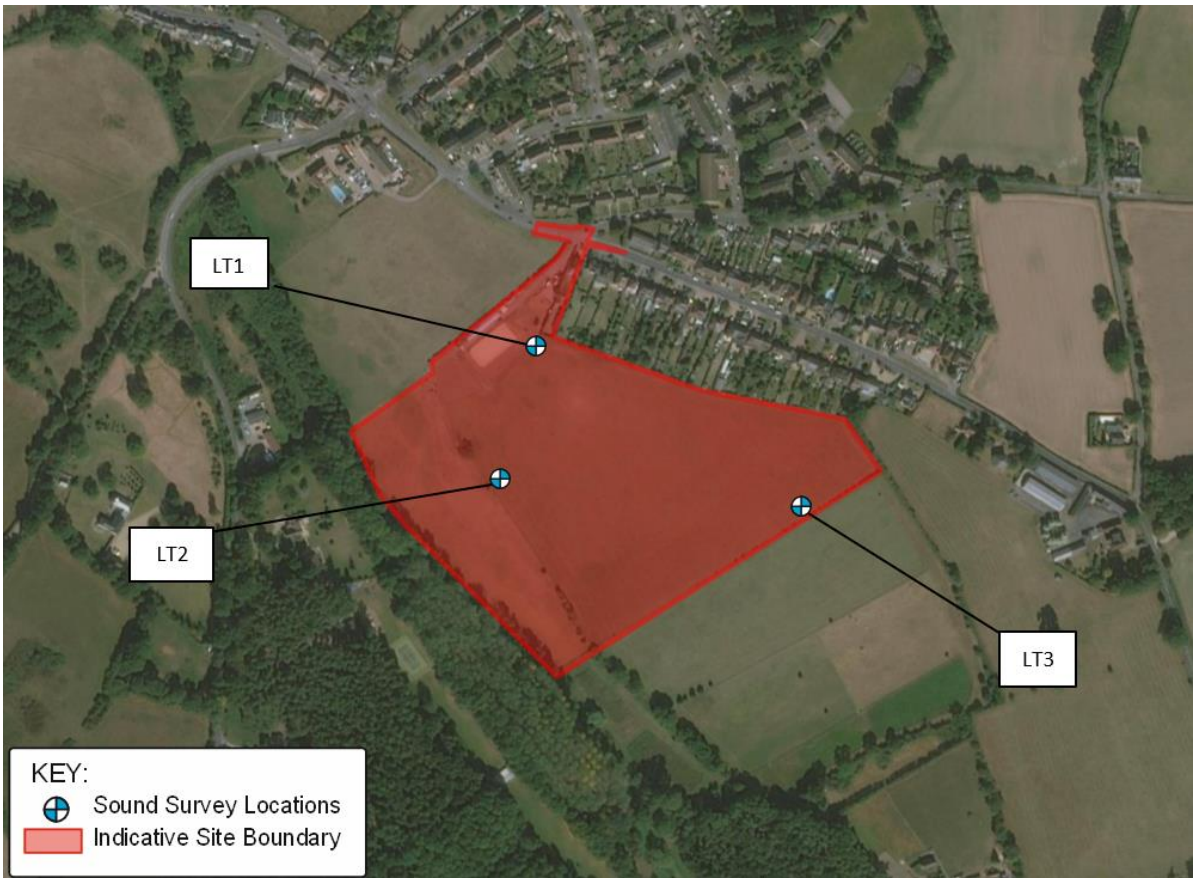
3.2 Measurement Locations

3.2.1 Sound measurements were undertaken at three positions at the site. These positions were chosen as they are on the boundary of the residential area, in the proposed outline plans.

3.2.2 These are deemed representative of future dwelling façades exposed to the highest sound levels at the proposed development outline plan.

3.2.3 The measurement positions are detailed in **Figure 2** and are described in **Table 3.1**.

Figure 2: Environmental Sound Measurement Locations



Courtesy of Maxar, Microsoft.

Table 3.1: Description of Measurement Locations

Position	Description
LT1	The microphone was located 1.5 m above ground level, in a free field position on the north western boundary of the proposed site, approximately 85 m from Tollgate Road.
LT2	The microphone was located 1.5 m above ground level, in a free field position on the eastern boundary of the proposed site, approximately 125 m from Tollgate Road.
LT3	The microphone was located 1.5 m above ground level, in a free field position on the south western boundary of the proposed site, approximately 210 m from the Tollgate Road.

3.3 Meteorological Conditions

3.3.1 Due to the nature of the survey (i.e., unattended) it is not possible to comment on the weather conditions for the entire duration of the survey. However, meteorological conditions were noted at the beginning and end of the survey and deemed to be acceptable for an environmental sound survey.

3.3.2 **Table 3.2** shows the meteorological data for the start and end of the survey period.

Table 3.2: Meteorological conditions

Date/Day	Temperature (°c)	Cloud Cover (Oktas)	Precipitation (mm)	Wind Speed (m/s)	Wind Direction
Tuesday 19/04/2022	15	6/8	1-2	4	NE
Wednesday 20/04/2022	16	3/8	0	4	ENE

3.4 Assumptions/Limitations

3.4.1 The engineer noticed nothing unusual in terms of the sound climate at the time of the survey. This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary but the conditions of the sound survey were deemed representative of typical sound conditions at the Site.

3.5 Environmental Sound Climate

3.5.1 Due to the nature of the survey (i.e. unattended), it is not possible to accurately comment on the dominant noise sources or specific noise events during the entire survey period. However, at the beginning and end of the survey period, it was noted that on-site sound levels were dominated by vehicular movements on the Tollgate Road to the north of the proposed development.

3.5.2 Secondary noise sources included distant traffic, birdsong and farm animals.

3.6 Environmental Sound Survey Results

3.6.1 A summary of the survey results is provided in **Table 3.3**. Results of the survey at locations are presented in the time history graphs in **Appendix C**.

Table 3.3 Summary of Measured Environmental Sound Survey Results

Location	Period, T	Measured Sound Level (dB)	
		$L_{Aeq,T}$	Typical** $L_{A90,T}$
LT1	Daytime (07:00 – 23:00 hours)	50	47
	Night-time (23:00 – 07:00 hours)	47	39
LT2	Daytime (07:00 – 23:00 hours)	52	48
	Night-time (23:00 – 07:00 hours)	48	39
LT3	Daytime (07:00 – 23:00 hours)	54	49
	Night-time (23:00 – 07:00 hours)	50	44

* Based on the 10th highest measured L_{AFmax} level.
** Calculated based on the statistical distribution of background sound levels during the measurement period in general accordance with guidance in BS 4142:2014+A1:2019

4 Suitability of Site for Residential Development

4.1 Overview

4.1.1 An analysis of the results of the environmental sound survey results has been undertaken to determine the suitability of the site for residential development with regards to internal sound levels within residential dwellings and external sound levels within external amenity areas.

4.1.2 The assessment has been informed by the concept illustrative masterplan. It should be noted that the exact layout of the proposed development has not yet been developed and would be confirmed at the detailed design stage.

4.2 Calculated Incident Sound Levels

4.2.1 Based on the results of the environmental sound survey and the concept illustrative masterplan, **Table 4.1** details the calculated incident sound levels.

Table 4.1: Calculated Incident Sound Levels

Facade	Sound Level (dB)		
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)	
	$L_{Aeq,16\ hrs}$	$L_{Aeq,8\ hrs}$	Typical L_{AFMax}
North-western site boundary of the proposal	50	47	62
Eastern site boundary of the proposal.	52	48	64
South western site boundary overlooking the river Colne.	54	50	57

4.2.2 It should be noted that vehicle movements on Tollgate Road were considered to be the dominant noise source at all locations within the proposed site boundaries. Therefore, the incident sound levels outlined above should be considered to represent a worst-case scenario.

4.2.3 The majority of Tollgate Road is screened by the existing residential dwellings to the north. Given this, night-time sound levels as measured at 1.5 m above ground level are deemed to be representative of sound levels at a height of 4 m above ground throughout the proposed development.

4.3 External Sound Levels

4.3.1 Daytime sound levels around the proposed development are approximately 50-54 dB $L_{Aeq,16hours}$, which fall into the 'low noise risk' category according to ProPG.

4.3.2 Night-time sound levels around the proposed development are approximately 47-50 dB $L_{Aeq,8hours}$, which fall into the 'low noise risk' category according to ProPG.

4.3.3 When sites are deemed to be in the 'low noise risk' category, ProPG advises that:

> *"At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which*

confirms how the adverse impacts of noise will be mitigated and minimised in the finished development."

4.3.4 Based on guidance provided in ProPG, the site is likely to be acceptable from a noise perspective and suitable internal and externals sound levels around the proposed development should be achievable, provided good acoustic design is followed during the design process.

4.3.5 To promote the inclusion of good acoustic design within the development and based on guidance within ProPG, we would recommend that planning consent should be granted on noise grounds, and that the planning consent should include a suitable noise condition. The condition should request that a noise assessment be undertaken during the detailed planning stage of the development, and that elements outlined within the noise assessment are included within the finished development. Below is an example condition based on the above:

"The dwellings shall be designed and/or insulated as to provide attenuation against externally generated noise in accordance with a mitigation scheme to be submitted to and approved in writing by the Local Planning Authority before commencement of development. The approved mitigation measures to serve each dwelling shall be implemented prior to occupation."

4.4 Internal Noise Levels – Windows Closed

4.4.1 The calculated incident sound levels have been used to determine the likely internal sound levels within dwellings at the proposed development.

4.4.2 Exact construction proposals are yet to be determined. However, a preliminary assessment has been undertaken based on typical construction details.

4.4.3 **Table D.1 in Appendix D** details the assumed details used within the calculation procedure.

4.4.4 Based on the calculated incident sound levels and the typical sound reductions of standard construction details, **Table 4.2** details the results of the noise impact assessment.

Table 4.2 Calculated Worst Case Internal Noise Levels

Façade	Calculated Worst Case Internal Noise Levels		
	Daytime (07:00 – 23:00 hours)	Night-Time (23:00 – 07:00 hours)	
North-western boundary of the proposed Site.	27 dB $L_{Aeq,16hours}$	22 dB $L_{Aeq,8hours}$	38 dB L_{AFMax}
Eastern boundary of the proposed Site.	27 dB $L_{Aeq,16hours}$	23 dB $L_{Aeq,8hours}$	37 dB L_{AFMax}
South western boundary of the proposed Site overlooking the river Colne.	29 dB $L_{Aeq,16hours}$	25 dB $L_{Aeq,8hours}$	32 dB L_{AFMax}

4.4.5 Based on the results of **Table 4.2**, our calculations indicate that standard external constructions should be capable of providing sufficient sound insulation to achieve suitable internal ambient noise levels, below the guideline levels of BS 8233:2014. This should be confirmed by a detailed assessment once detailed information of the development is available.

4.5 Internal Noise Levels – Overheating

4.5.1 Based on the measured survey data, external night-time sound levels are anticipated to be below 53 dB $L_{Aeq,8hours}$ and typically below 68 dB $L_{Amax,f}$ across the development. With the inclusion of good acoustic design, it is considered likely that night-time sound levels would be below the internal noise criteria outlined in Approved Document O, and therefore additional

overheating acoustic mitigation is unlikely to be necessary as openable windows could form part of the overheating mitigation strategy.

4.5.2 Internal sound levels within dwellings should be considered during the detailed planning and design stage of the development, to ensure the target criteria are complied with.

4.6 Noise Levels in External Amenity Areas

4.6.1 The exact layout and orientation of dwellings is at this stage unknown. However, it is likely that dwellings are to feature private external amenity areas in the form of gardens.

4.6.2 An indicative assessment has been undertaken, based on the calculated incident levels. As the plans at this stage are outline, external amenity areas have been calculated at the proposed site boundary.

4.6.3 The results of the environmental sound survey indicate that sound levels within the external amenity areas are likely be between 50 - 54 dB at the site boundary.

4.6.4 BS 8233:2014 advises the following in relation to sound levels in external amenity areas:

> *"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable.*
>
> *…*
>
> *In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."*

4.6.5 Therefore, based on the results of the assessment, sound levels in external amenity areas should be considered acceptable.

5 Conclusions

5.1.1 Stantec UK Ltd. has been commissioned by Vistry Homes Ltd. to provide a report to support an outline planning application for a proposed residential development at the Land at Tollgate Road, Colney Heath.

5.1.2 An environmental sound survey has been undertaken by Stantec UK Ltd. to establish the existing environmental sound levels at the site.

5.1.3 This report presents the relevant results of the environmental sound surveys and considers the suitability of the site for residential development, having regard to planning policy, national and international standards and guidance documents in relation to environmental noise.

5.1.4 The calculations indicate that standard internal ambient noise levels are likely to fall below the guideline levels of BS 8233:2014. This should be confirmed by a detailed assessment once detailed information of the development is available.

5.1.5 Based on the measured survey data, external night-time sound levels are anticipated to be below 53 dB $L_{Aeq,8hours}$ and typically below 68 dB $L_{Amax,f}$ across the development and therefore additional overheating acoustic mitigation is unlikely to be necessary.

5.1.6 Calculations indicate that noise levels within external amenity area are likely to fall between 50–55 dB, and should be considered acceptable.

5.1.7 In respect to noise, the site should be considered suitable for residential development.

Appendix A Glossary of Acoustic Terminology

Table A.1: Glossary of Acoustic Terminology

Parameter	Description
Acoustic Environment	Sound at the receiver from all sound sources as modified by the environment.
Ambient Sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Comprises of the residual sound and the specific sound when present.
Ambient Sound Level ($La = L_{Aeq,T}$)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
A-Weighted Decibel (dBA)	A decibel level that has been corrected for the A-Weighting curve.
A-Weighting	Octave band and 1/3 octave band filters that correlate to the response of the human hearing system to sound pressure levels at different frequencies.
Background Sound	The level of sound measured in the absence of extraneous noise sources.
Background Sound Level ($L_{A90,T}$)	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using a fast time-weighting and quoted to the nearest whole number of decibels.
Decibel (dB)	A logarithmic unit used to describe the ratio between the measured level and a reference level of 0 dB. The ratio can be sound pressure, intensity or power.
Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$)	Value of the time-averaged A-weighted sound pressure level, in decibels (dB), of a continuous steady sound for the duration of the specified time interval, T.
Façade Level	The sound pressure level at a distance of 1 metre from the façade
Fast Time Weighted	The speed at which the instrument responds to changes in amplitude of the measured signal. The response time of a fats time-weighted instrument is 0.125 seconds.
Free-Field Level	The sound pressure level measured away from any reflective surfaces.
Frequency (f)	The number of cycles of pressure fluctuations within a given period of time. Measured in Hertz.
Hertz (Hz)	The unit of frequency or pitch of a sound.
$L_{10,T}$	The noise level exceeded for 10 % for a given time interval, T. Generally used to describe traffic noise.
L_{Amax}	The maximum A-weighted level measured during a given time period.
Octave Band	Band of frequencies where the upper limit of the band is twice the frequency of the lower limit. E.g., the 1000 Hz band contains noise energy at all frequencies from 707 to 1414 Hz.
Percentile Level ($L_{AN,T}$)	The A-Weighted Sound Pressure Level which is exceeded for N% of the specified time interval. E.g., the LA90,1hour is the A-weighted sound level exceeded for 90% of 1 hour/
Reference Time Interval (T)	Specified interval over which the specific sound level is determined.
Sound Pressure	The difference between the pressure caused by a sound wave and the ambient pressure of the medium the sound wave is passing through. Measured in Pascals.
Sound Pressure Level (Lp)	The logarithm of the ratio of a given sound pressure (p) to the reference sound pressure (p0). The reference value for sound pressure is 20 µPa.
Sound Sources	Sounds generated by nature or human activity.

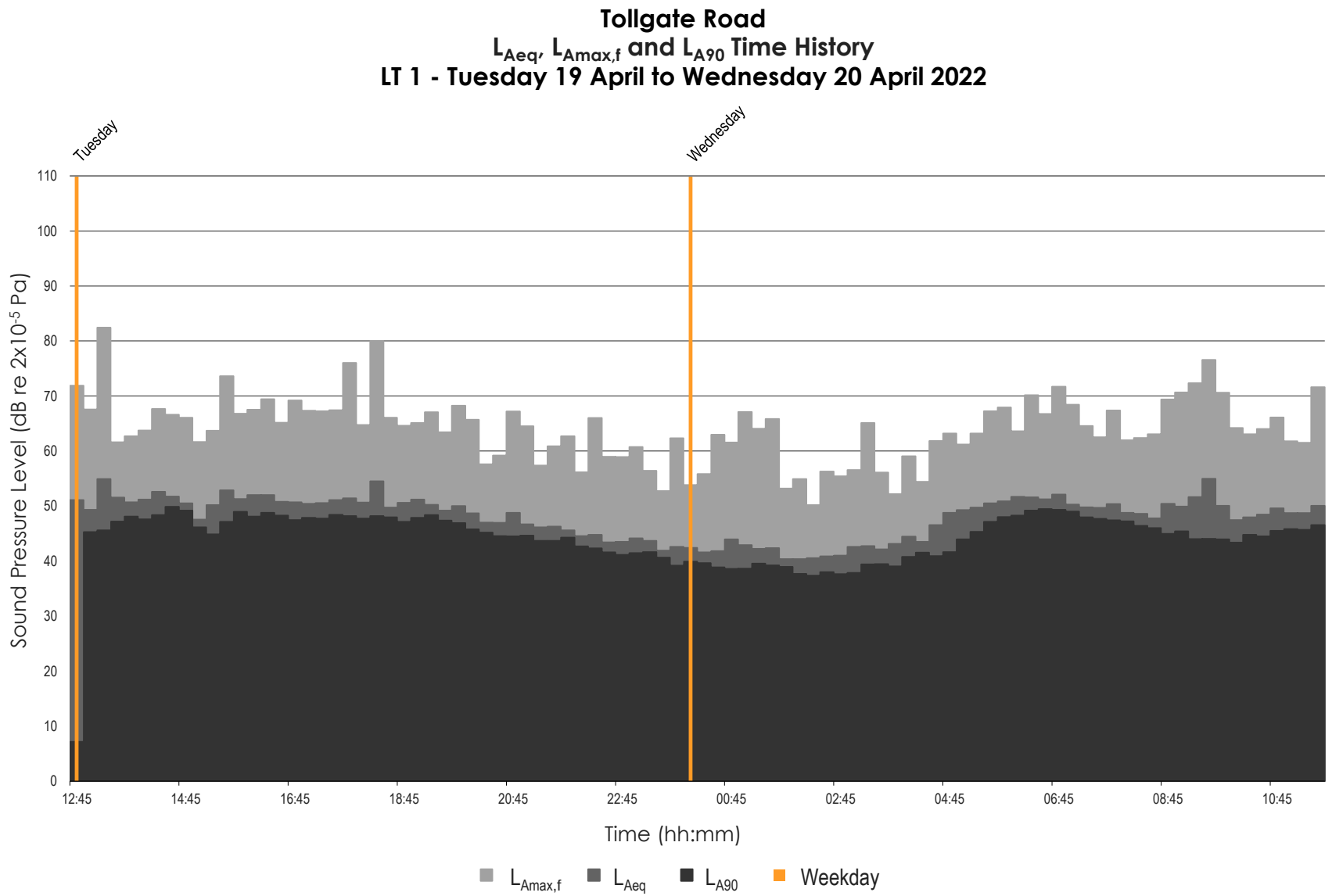
Appendix B Instrumentation

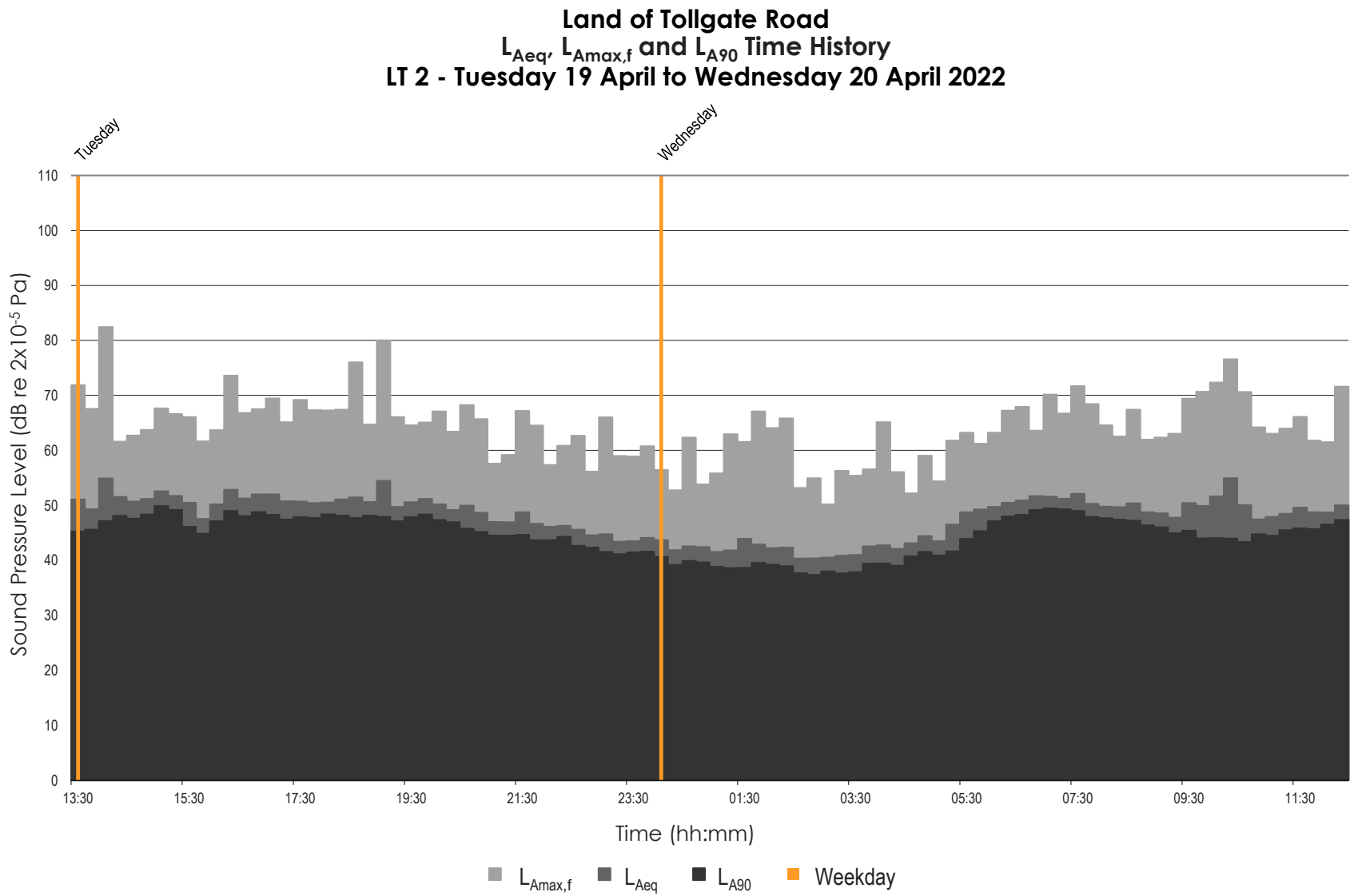
B.1.1 The instrumentation used in the survey is listed in **Table B.1**.

Table B.1: Instrumentation

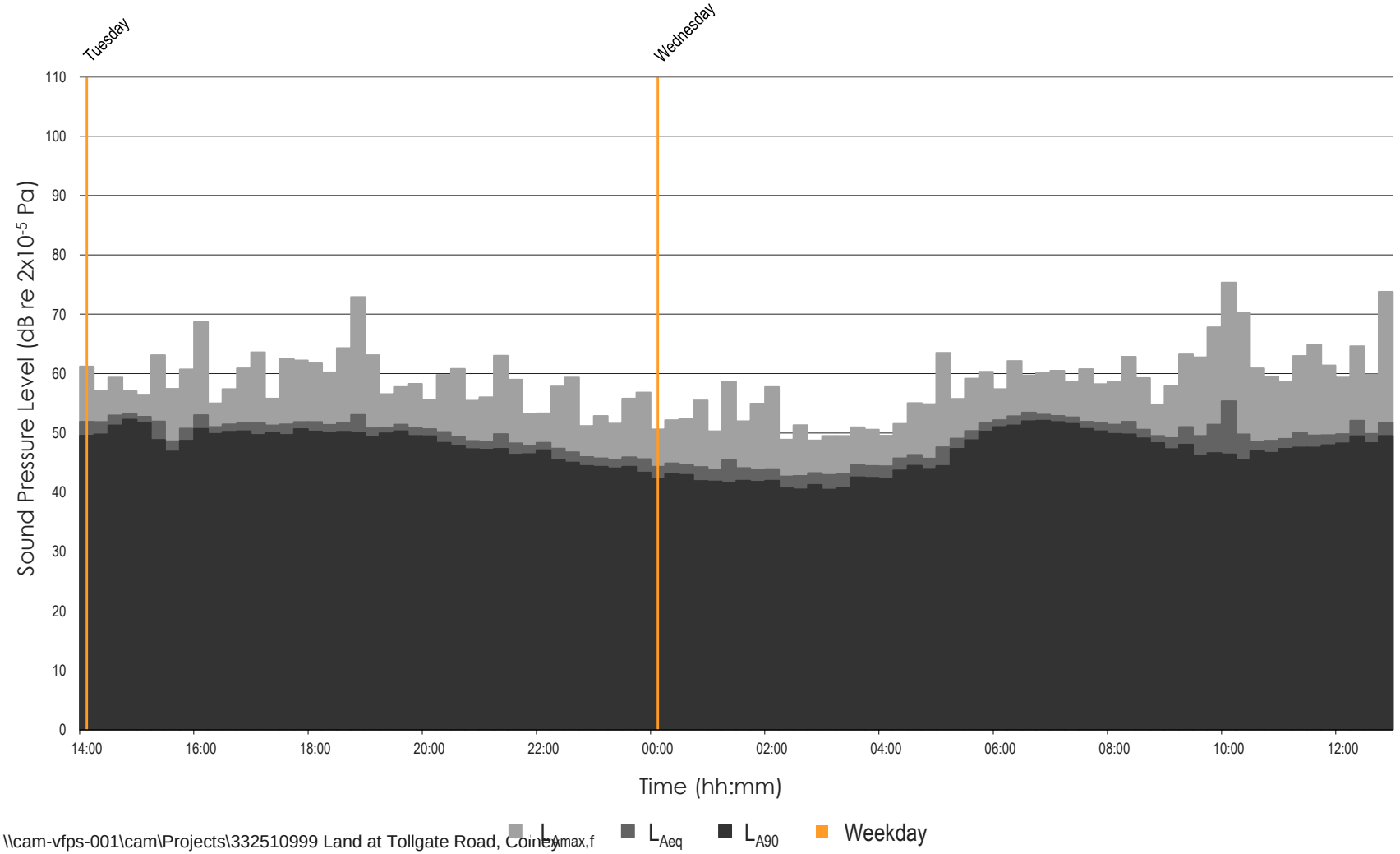
Description	Manufacturer	Type	Serial Number	Laboratory Calibration Date
Sound Level Meter	RION	NL-52	1010734	23/03/2022
½" Pre-polarised microphone		UC-59	20357	23/03/2022
Pre-amplifier		NH-25	11381	23/03/2022
Sound Level Meter	RION	NL-52	810643	23/03/2022
½" Pre-polarised microphone		UC-59	20051	23/03/2022
Pre-amplifier		NH-25	11186	23/03/2022
Sound Level Meter	Brüel & Kjær	2250	2626232	25/03/2022
½" Pre-polarised microphone		4189	3148083	25/03/2022
Pre-amplifier		ZC0032	31157	25/03/2022
Sound Calibrator	Brüel & Kjær	4231	2619375	17/01/2022

Appendix C Time History Graphs


Tollgate Road
LAeq, LAmax,f and LA90 Time History
LT 1 - Tuesday 19 April to Wednesday 20 April 2022
Tuesday
Wednesday
Sound Pressure Level (dB re 2x10-5 Pa)
110
100
90
80
70
60
50
40
30
20
10
0
12:45
14:45
16:45
18:45
20:45
22:45
00:45
02:45
04:45
06:45
08:45
10:45
Time (hh:mm)
LAmax,f
LAeq
LA90
Weekday


Land of Tollgate Road
LAeq, LAmax,f and LA90 Time History
LT 2 - Tuesday 19 April to Wednesday 20 April 2022
Tuesday
Wednesday
110
100
90
80
70
60
50
40
30
20
10
0
Sound Pressure Level (dB re 2x10-5 Pa)
13:30
15:30
17:30
19:30
21:30
23:30
01:30
03:30
05:30
07:30
09:30
11:30
Time (hh:mm)
LAmax,f
LAeq
LA90
Weekday

Land on Tollgate Road, Colney Heath
L_{Aeq}, $L_{Amax,f}$ and L_{A90} Time History
LT 3 - Tuesday 19 April to Wednesday 20 April 2022



Appendix D External Noise Ingress Calculation Assumptions

D.1.1 The following assumptions have been used to calculate the internal sound level within dwellings of the proposed development.

D.1.2 The assumptions used should not be used to form an acoustic performance specification, and are for indicative purposes only. The acoustic performance specification of these elements should be considered at the detailed design stage.

Table D.1: Assumed External Noise Ingress Calculation Details

Living Rooms	Dimensions (m)					
	Width				4	
	Length				5	
	Height				2.5	
	External Element Areas (m^2)					
	Windows				2	
	Walls				10	
	Roof				0	
	Average Acoustic Absorption Coefficients ($\overline{\alpha}$) at Octave-band Centre Frequency (Hz)					
	125	250	500	1 k	2 k	4 k
	0.18	0.25	0.27	0.31	0.32	0.32
Bedrooms	Dimensions (m)					
	Width				3	
	Length				3	
	Height				2.5	
	External Element Areas (m^2)					
	Windows				2	
	Walls				5	
	Roof				6	
	Average Acoustic Absorption Coefficients ($\overline{\alpha}$) at Octave-band Centre Frequency (Hz)					
	125	250	500	1 k	2 k	4 k
	0.18	0.25	0.27	0.31	0.32	0.32
External Constructions	Glazing Sound Reduction Indices (R dB) at Octave-band Centre Frequency (Hz) (Based on typical thermal double glazing)					
	125	250	500	1 k	2 k	4 k
	19	22	25	33	33	28
	Trickle Ventilator Element Normalised Level Difference ($D_{n,e}$ dB) at Octave-band Centre Frequency (Hz) (Based on typical non-acoustically rated trickle ventilator)					
	125	250	500	1 k	2 k	4 k
	32	32	31	33	31	31
	External Wall Sound Reduction Indices (R dB) at Octave-band Centre Frequency (Hz) (Based on typical brick/blockwork construction)					
	125	250	500	1 k	2 k	4 k
	41	45	45	54	58	58
	Roof Sound Reduction Indices (R dB) at Octave-band Centre Frequency (Hz) (Based on tiled/slated roof with 12 mm plasterboard ceiling)					
	125	250	500	1 k	2 k	4 k
	21	26	33	33	35	35