



DV5 Coltham (Reading) Ltd

Bennet Court, Reading

Noise Assessment



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Executive Summary

This noise assessment has been produced in support of a planning application for an industrial development at Bennet Court, Reading. The site will be developed for use as a number of light industrial or warehousing units, however the end users have not been decided yet so only general noise sources have been assessed in detail.

Sound level monitoring has been undertaken over an eight-day period at a location representative of the nearest noise sensitive receptors, and in combination with noise modelling this forms the basis of the noise assessments. The nearest noise sensitive receptors are close to a busy road and are separated from the site by over 200 meters with existing buildings in between.

The noise modelling predictions and assessment show that based on a reasonable worst-case assessment no adverse impacts are anticipated at the nearby noise sensitive receptors and the impacts are classified as NOEL

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1 Introduction

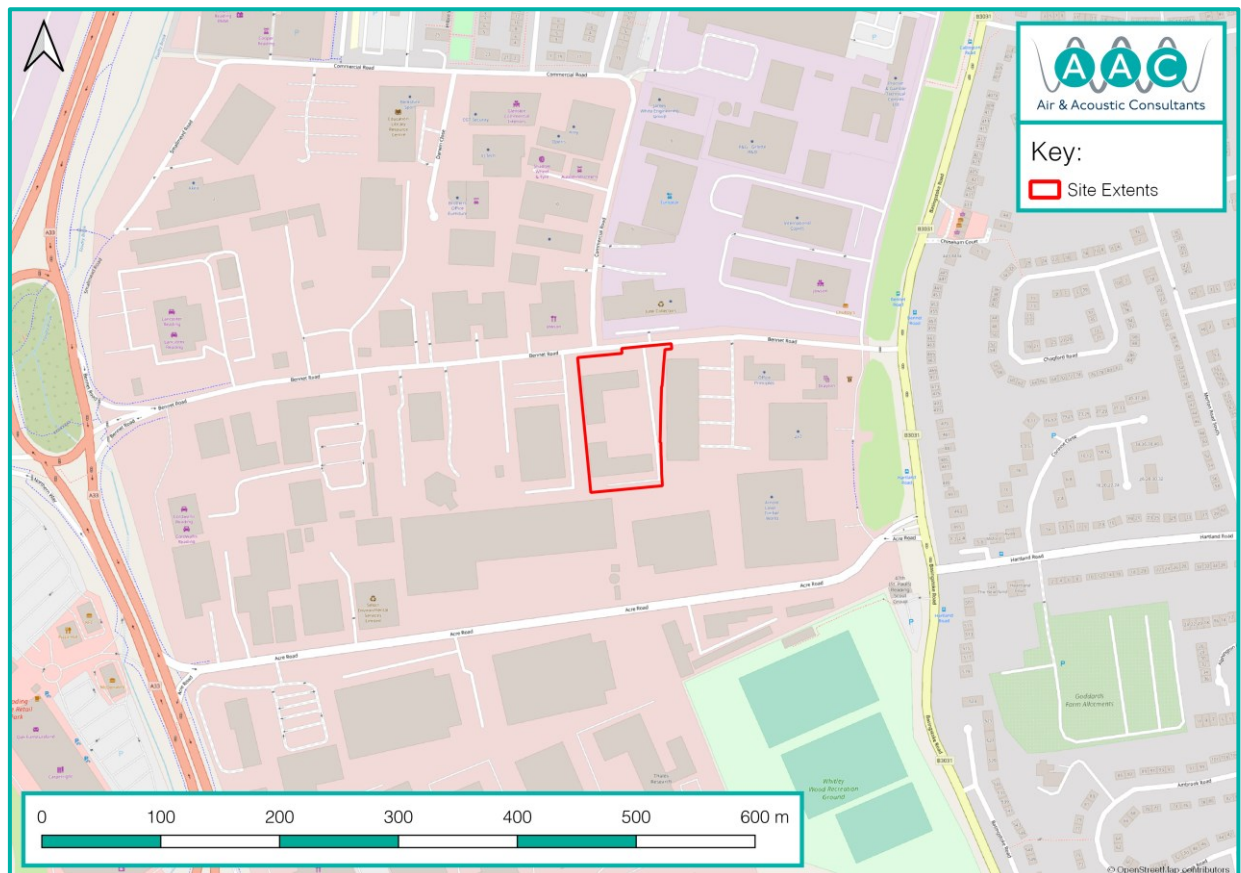
1.1 Brief

- 1.1.1 Air & Acoustic Consultants Limited have been commissioned by DV5 Coltham (Reading) Ltd to undertake a noise impact assessment in support of a planning application for a proposed commercial development, located off Bennet Road, Reading.

1.2 Application Site

- 1.2.1 The site currently consists of two office buildings at Bennet Court, located to the south of Bennet Road, Reading. The site is bound on all sides commercial units, with associated access roads and parking. The closest residential properties are approximately 220 m to the east of the site on the opposite side of the B3031.
- 1.2.2 The national grid reference for the centre of the site is, SU 71448 70140 (British National Grid Coordinates E: 471448, N: 170140). The site location and surrounding area is illustrated in [Figure 1.1](#).

Figure 1.1: Site Location



1.3 Development Proposals

- 1.3.1 The assessment supports a planning application for the demolition of the existing buildings at Bennet Court and the construction of four industrial/commercial units with associated car parking and access road. The development proposals are illustrated in [Figure 1.2](#).

Figure 1.2: Proposed Development Plans



1.4 Assessment Scope

- 1.4.1 This assessment will assess the potential noise impacts of the proposed operational development upon the closest noise sensitive receptors.
- 1.4.2 The report is structured as follows:
- [Section 2](#) considers the proposed scheme in relation to the relevant national and local planning policies;
 - [Section 3](#) sets out the proposed impact assessment methodology;
 - [Section 4](#) details the baseline noise environment at the proposed development site;
 - [Section 5](#) considers the construction phase impacts;
 - [Section 6](#) considers the operational phase impacts;
 - [Section 7](#) describes potential mitigation measures for the construction and operational phase(s) (where required); and
 - [Section 8](#) summaries and concludes the assessment.
- 1.4.3 To assist with the understanding of this report a glossary of acoustic terms is provided in [Appendix A](#).

2 Legislation and Policy Context

2.1 Introduction

- 2.1.1 The prediction and assessment of the potential noise impacts resulting from the proposed development have been considered against the relevant legislation policy and guidance regarding noise, which are discussed in turn below.

2.2 National Planning Policy Framework (NPPF)ⁱ

- 2.2.1 The NPPF sets out the Government's planning policy for England. At its heart is an intention to promote more sustainable development. The NPPF addresses noise as a planning issue primarily through the statements in paragraphs 174 and 185.

- 2.2.2 At paragraph 174:

'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 soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and'.

- 2.2.3 At paragraph 185:

'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 amenity value for this reason;'.

- 2.2.4 The NPPF refers to the Noise Policy Statement for England (NPSE) for advice on the achievement of these policy aims, and particularly in connection with the explanation of 'adverse impacts'.

2.3 Noise Policy Statement for England (NPSE)ⁱⁱ

- 2.3.1 The NPSE is the overarching government policy on noise. It seeks to clarify the underlying principles and aims in past and existing policy documents, legislation, and guidance in relation to all forms of noise including environmental noise, neighbour noise and neighbourhood noise (but not noise in the workplace).

- 2.3.2 It uses the established concepts of No Observed Effect Level (NOEL) and Lowest Observed Adverse Effect Level (LOAEL). The NPSE extends these by introducing Significant Observed Adverse Effect Level

ⁱ Ministry of Housing, Communities and Local Government. 2021. *National Planning Policy Framework*.

ⁱⁱ Department for Environment, Food and Rural Affairs. 2010. *Noise Policy Statement for England*.

(SOAEL). This is the level above which significant adverse effects on health and quality of life occur. However, the explanatory note to the NPSE states that it is not possible to identify a single objective value to define SOAEL for noise that is applicable to all sources of noise in all situations. It is likely to be different for different noise sources, for different receptors and at different times.

2.3.3 The NPSE's vision 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.

This long-term vision is supported by the following aims:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life, through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."*

2.3.4 The second aim of the NPSE refers to noise impacts that lie somewhere between LOAEL and SOAEL. The NPSE asserts that, while this means that all reasonable steps should be taken to mitigate and minimise adverse effects, this does not mean that such adverse effects cannot occur.

2.4 Planning Practice Guidance (Noise)ⁱⁱⁱ

2.4.1 The Government has published Planning Practice Guidance on a range of subjects including noise. The guidance forms part of the NPPF and provides advice on how to deliver its policies. The PPG (Noise) reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards and contains examples of acoustic environments commensurate with various effect levels.

2.4.2 Paragraph 006 of (Reference ID: 30-006-20190722) of the PPG (Noise) explains that:

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

2.4.3 Paragraph: 004 Reference ID: 30-004-20190722 of the PPG (Noise) describes the different effect levels which are defined and briefly outlined below:

- No Observable Effect Level (NOEL);
- Lowest Observable Adverse Effect Level (LOAEL); and
- Significant Observed Adverse Effect Level (SOAEL).

2.4.4 The PPG (Noise) describes noise that is not noticeable to be at levels below the NOEL. Noise exposures in this range are below the LOAEL and no mitigation is required. The PPG (Noise) suggests that noise exposures above the LOAEL cause small changes in behaviour. Examples of noise exposures above the LOAEL provided in the PPG (Noise) are having to turn up the volume on the television; needing to speak more loudly to be heard; or, where there is no alternative ventilation, closing windows for some of the time because of the noise. In line with the NPPF and NPSE, the PPG (Noise) states that consideration

ⁱⁱⁱ Department for Levelling Up, Housing and Communities and Ministry of Housing Communities and Local Government. 2019. *Planning Practice Guidance Noise*

needs to be given to mitigating and minimising effects above the LOAEL, but also to taking account of the economic and social benefits being derived from the activity causing the noise. The PPG (Noise) suggests that noise exposures above the SOAEL cause material changes in behaviour. Examples of noise exposures above the SOAEL provided in the PPG (Noise) are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. In line with the NPPF and NPSE, the PPG (Noise) states that effects above the SOAEL should be avoided and that whilst the economic and social benefits derived from the activity causing the noise must be taken into account, such exposures are undesirable.

2.4.5 The non-numeric guidance contained within the PPG (Noise), based upon the starting point in the NPSE, is summarised in [Table 2.1](#) below.

Table 2.1: Summary of Guidance from NPSE and PPG (Noise)

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Adverse Effect Level			
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and / or attitude, 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and / or attitude, 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
Noticeable and very disruptive	Extensive and regular changes in behaviour and / or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation / awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.4.6 In line with the NPPF and the NPSE, the guidance confirms that significant adverse effects should be avoided. At the next level down in the hierarchy, where there is an observed adverse effect, the PPG (Noise) confirms that effects should be mitigated and reduced to a minimum, (as far as reasonably practicable). No mitigation measures are required for effects that are considered to be below the lowest observed adverse effect level (LOAEL).

- 2.4.7 However, along with the NPSE it does not provide any numerical of definition of the NOEL, LOAEL and SOAEL.
- 2.4.8 The NPSE also refers to the World Health Organisation, (WHO) when discussing noise impacts. The WHO Guidelines for Community Noise (1999) suggest guideline values for internal noise exposure which take into consideration the identified health effects and are set, based on the lowest effect levels for general population. Guideline values for amenity which relate to external noise exposure are set at 50 or 55 dB(A), representing daytime levels below which most of the adult population will be protected from becoming moderately or seriously annoyed, respectively.

2.5 The Control of Pollution Act^{iv}

- 2.5.1 The Control of Pollution Act (1974) gives local authorities powers in relation to noise from construction sites including to serve a notice, (under Section 60) specifying exactly how works should be carried out.
- 2.5.2 An application for prior consent for the work can be completed under Section 61 of the Act providing a collaborative approach to the development.
- 2.5.3 A Section 61 application demonstrates to the local authority a pro-active approach to reducing environmental impacts, outlining what methods are in place to minimise disruption to the neighbourhood, thus reducing the number of potential complaints. By having Section 61 consent, a local authority may not issue a Section 60 notice if the terms of the S61 agreement are not breached. Having a Section 61 consent in place minimises the likelihood of the contractor's work being stopped, as a mitigation plan is already in place.

2.6 Local Planning Policy

[Reading Borough Local Plan^v](#)

- 2.6.1 The Local Plan for Reading is the document that contains the policies for how Reading will develop up to 2036, which is the end date of the plan. It identifies the amount of development that will take place, the areas and sites where development is expected to be accommodated, and where it will be restricted, and sets out policies for how planning applications will be decided.
- 2.6.2 The document contains the following policies related to noise and this type of development:

"CC8: SAFEGUARDING AMENITY

Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of:

- *Privacy and overlooking;*
- *Access to sunlight and daylight;*
- *Visual dominance and overbearing effects of a development;*
- *Harm to outlook;*
- *Noise and disturbance;*
- *Artificial lighting;*

^{iv} UK Public General Acts. 1974. *Control of Pollution Act*.

^v Reading Borough Council. 2019.

- *Vibration;*
- *Dust and fumes;*
- *Smell;*
- *Crime and safety; or*
- *Wind, where the proposals involve new development of more than 8 storeys.*

The position of habitable rooms, windows and outdoor living spaces will be particularly important. A back-to-back distance of 20 metres between dwellings is usually appropriate, although the circumstances on individual sites may enable dwellings to be closer without a detrimental effect on privacy.

As well as immediate impacts, other aspects to which this policy applies will include matters such as hours of operation of businesses, and effects of traffic movements, particularly of heavy goods vehicles (HGVs). Proposals which would generate regular movements of HGVs on residential roads will not be acceptable.

Where an otherwise acceptable development could change its character to a use that would have a greater impact on amenity without needing planning permission, conditions will be applied to restrict such changes."

"EN16: POLLUTION AND WATER RESOURCES

Development will only be permitted where it would not be damaging to the environment and sensitive receptors through land, noise or light pollution; where it would result in no deterioration in, or ideally enhance, ground and surface water quality; and where adequate water resources, sewerage and wastewater treatment infrastructure will be in place to support the proposed development prior to occupation.

Proposals for development that are sensitive to the effects of noise or light pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution.

Development will only be permitted on land affected by contamination where it is demonstrated that the contamination and land gas can be satisfactorily managed or remediated so that it is suitable for the proposed end use and will not impact on the groundwater environment, human health, buildings and the wider environment, during demolition and construction phases as well as during the future use of the site."

"EN17: NOISE GENERATING EQUIPMENT

Where noise generating equipment is proposed, the noise source specific level (plant noise level) should be at least 10dBA below the existing background level as measured at the nearest noise sensitive receptor."

3 Assessment Approach

3.1 Consultation

- 3.1.1 A consultation has been attempted with the Environmental Health department at Reading Borough Council, however no reply had been received at the time of writing this document.

3.2 Construction Impacts

BS5228-1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites

- 3.2.1 The activities associated with the construction phase of the proposed development have the potential to generate noise which may have an adverse impact on the surrounding area.
- 3.2.2 Guidance on the prediction and assessment of noise from development sites is given in British Standard BS 5228 -1:2009 + A1:2014.^{vi} (BS 5228-1).
- 3.2.3 Construction noise can have disturbing effects on the surrounding neighbourhood. The effects are varied and are complicated further by the nature of the site works, which will be characterised by varied noise sources which will change location throughout the construction works. The duration of site operations is also an important consideration. Higher noise levels may be acceptable if it is known that the levels will only occur for a limited period.
- 3.2.4 BS:5228-1 provides guidance on significance criteria for assessing the potential noise impacts associated with the construction phase of projects. There are two methods specified; the ABC method and the 5 dB(A) change method.
- 3.2.5 The ABC method involves categorising receptors using the ambient sound level they experience, using the method and categories outlined in [Table 3.1](#).

Table 3.1: BS 5228-1 ABC Method

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
	Category A ^A	Category B ^B	Category C ^C
Night-time (23:00-07:00)	45	50	55
Evenings and weekends	55	60	65
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75
NOTE 1 A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.			
NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.			
NOTE 3 Applied to residential receptors only.			
^A Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.			
^B Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.			
^C Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.			
^D 19:00-23:00 weekdays, 12:00-23:00 Saturdays and 07:00-23:00 Sundays			

^{vi} BSI. BS 5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites. Part 1: Noise.

3.2.6 The 5 dB(A) change method assesses the change in noise levels as a result of the construction works. It states;

"Noise levels generated by site activities are deemed to be potentially significant if the total noise (pre-construction ambient plus site noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq, T}$ from site noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant effect.

These evaluative criteria are generally applicable to the following resources:

- *residential buildings;*
- *hotels and hostels;*
- *buildings in religious use;*
- *buildings in educational use;*
- *buildings in health and/or community use.*

For public open space, the impact might be deemed to cause significant effects if the total noise exceeds the ambient noise ($L_{Aeq, T}$) by 5 dB or more for a period of one month or more. However, the extent of the area impacted relative to the total available area also needs to be taken into account in determining whether the impact causes a significant effect."

3.3 Operational Impacts

[World Health Organisation Guidelines for Community Noise](#)^{vii}

3.3.1 The World Health Organisation's Guidelines for Community Noise has been considered regarding the potential impact from any maximum short-term noise levels.

3.3.2 The WHO Guidelines indicate that sound pressure levels at the outside façades of living spaces should not exceed 60 dB L_{AFmax} so that people may sleep within bedrooms with windows open. These values assume the noise reduction with a window partially open is 15 dB, resulting in an internal noise level of 45 dB L_{AFmax} . The guidelines state that for good sleep, indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10 – 15 times per night. It is generally accepted that 60 dB L_{AFmax} at the façade represents a LOAEL.

[BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound](#)^{viii}

3.3.3 BS 4142:2014+A1:2019 is used to rate and assess sound of an industrial and/or commercial nature including:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and;

^{vii} World Health Organisation. 1999. *Guidelines for Community Noise*

^{viii} BSI. *BS 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound.*

- 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, or that from train or ship movements on or around an industrial and/or commercial site.

3.3.4 The purpose of the BS 4142:2014+A1:2019 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.

3.3.5 BS 4142:2014+A1:2019 refers to noise from the industrial source as the 'specific noise' and this is the term used in this report to refer to noise which is predicted to occur due to activities associated with the proposed commercial/industrial uses.

3.3.6 BS 4142:2014+A1:2019 assesses the significance of impacts by comparing the specific noise level to the background noise level (L_{A90}).

3.3.7 Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. BS 4142:2014+A1:2019 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS 4142:2014+A1:2019 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristics. The specific noise level along with any applicable correction is referred to as the 'rating level'.

3.3.8 The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS 4142:2014+A1:2019 are as follows:

- 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; and
- The lower the rating level is, relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

3.3.9 During the daytime, BS 4142:2014+A1:2019 requires that noise levels be assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.

3.3.10 Where the initial estimate of the impact needs to be modified due to context, BS 4142:2014+A1:2019 states that all pertinent factors should be taken into consideration, including:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or external acoustic conditions.

3.4 Noise Modelling

3.4.1 The potential levels of sound from the operational development have been predicted across the site using the environmental noise modelling software CadnaA, for the relevant receptor locations.

3.4.2 Noise modelling details and inputs that have been used in the assessment are provided in [Table 3.2](#).

Table 3.2: Noise Modelling Inputs and Details

Noise Modelling Input	Details
Software Version	CadnaA 2022 Version
Calculation Algorithm	ISO9613
Ground Levels	OS terrain 50 data
Noise Sources	AAC Database and manufacturer data
Time Periods	Daytime 07:00 – 23:00 & Night-time 23:00 – 07:00
Height of Receptors	First Floor – 4.0 m
Proposed Site Layout	Site Layout Plan by BHP Design
Existing Building and Receptor Locations	Digitised from Google aerial imagery
Existing feature locations and base map	Google aerial imagery
Ground absorption	0 for hard ground, 1.0 for soft ground
Project co-ordinate system	OSGB 36 EPSG:27700

3.5 Assessment Receptors

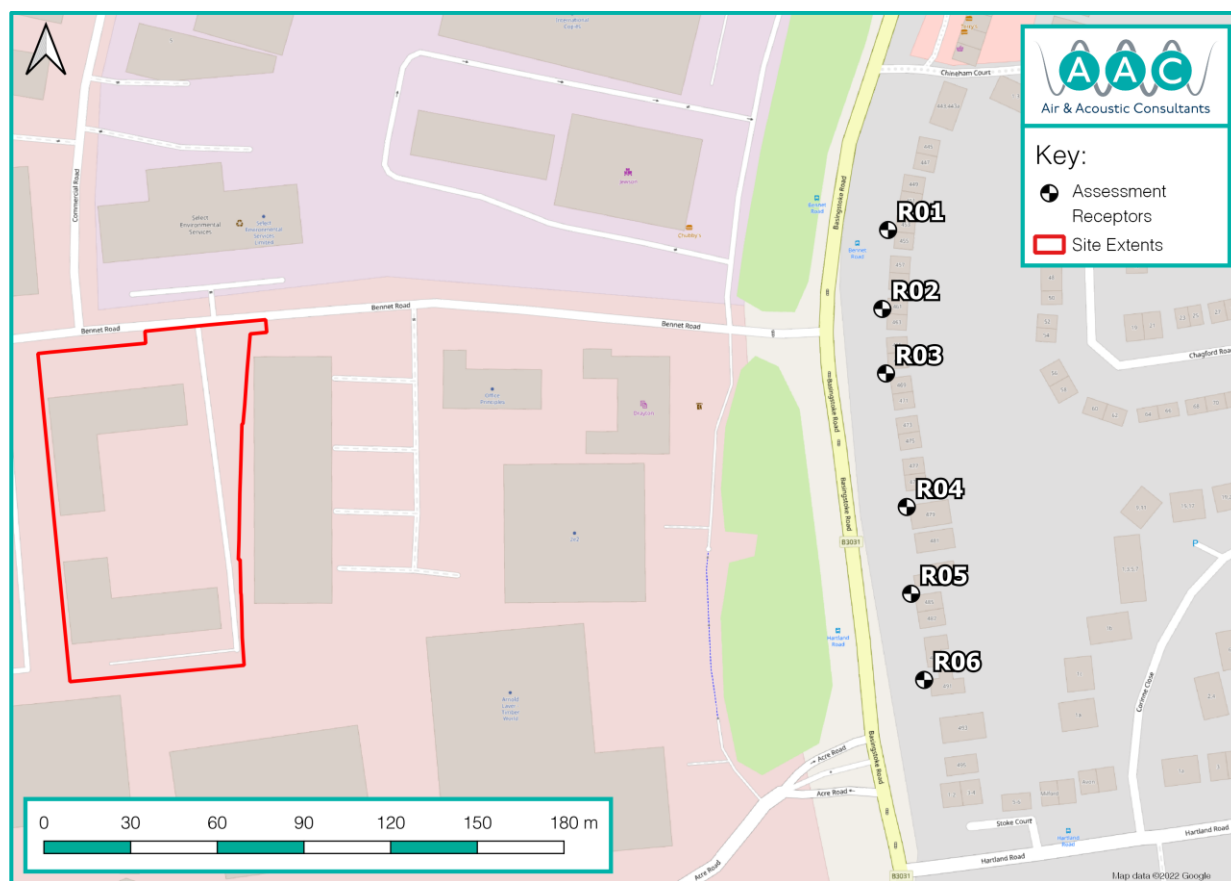
3.5.1 The receptors have been selected to represent the noise sensitive properties most exposed to the potential noise sources, as a result of the proposed development. The receptor height is set at 4m to represent a receptor in a first-floor bedroom.

3.5.2 The selected noise sensitive receptor locations are detailed in [Table 3.3](#) and illustrated in [Figure 3.1](#).

Table 3.3: Noise Sensitive Receptors

Receptor	Height (m)	Description	Receptor Location Description
R01	4.0	455 Basingstoke Road	West façade
R02	4.0	463 Basingstoke Road	West façade
R03	4.0	469 Basingstoke Road	West façade
R04	4.0	479 Basingstoke Road	West façade
R05	4.0	485 Basingstoke Road	West façade
R06	4.0	491 Basingstoke Road	West façade

Figure 3.1: Modelled Noise Sensitive Receptor Locations



3.6 Uncertainty and Limitations

- 3.6.1 The baseline survey (discussed in [Section 4](#)) was conducted over an eight-day period to obtain a representative sample of the existing environmental noise levels. Baseline surveys conducted over a number of days reduce the uncertainty of the resulting measured noise levels. Due to access restrictions the monitoring location was not at the closest sensitive receptor but was located on the opposite side of the B3031. The noise monitor was slightly further away from the B3031 than the receptors, so the measured background sound levels are likely to be slightly lower than those experienced at the receptors. The background sound levels therefore represent a reasonable worst-case scenario for the assessment.
- 3.6.2 The background sound level was measured in November and December which may mean that activities that happen more at warmer times of the year are excluded and may include noise from boilers and/or heating equipment that would not be present in warmer months.
- 3.6.3 The calibration drift on the meters was very small; less than 0.1 dB for all measurements. All equipment was within laboratory calibration in accordance with the relevant standards (calibrators every year and sound level meters every 2 years).
- 3.6.4 Predictions have been made using the sound propagation software CadnaA, which is an industry standard and incorporates the required national standards for sound propagation. The propagation predictions have been made using the ISO 9613 algorithm as implemented by CadnaA. ISO 9613 states a variation of ± 3 dB for sources and receptors with height above ground of between 0 m and 5 m for separation distances of up to 1000 m, which is relevant to this assessment because all sources and

receptors are less than 5 m above the ground. The estimated error is for propagation with no reflections and no screening, the noise model contains buildings which reflect and screen the noise sources so the calculation error could be greater than ± 3 dB.

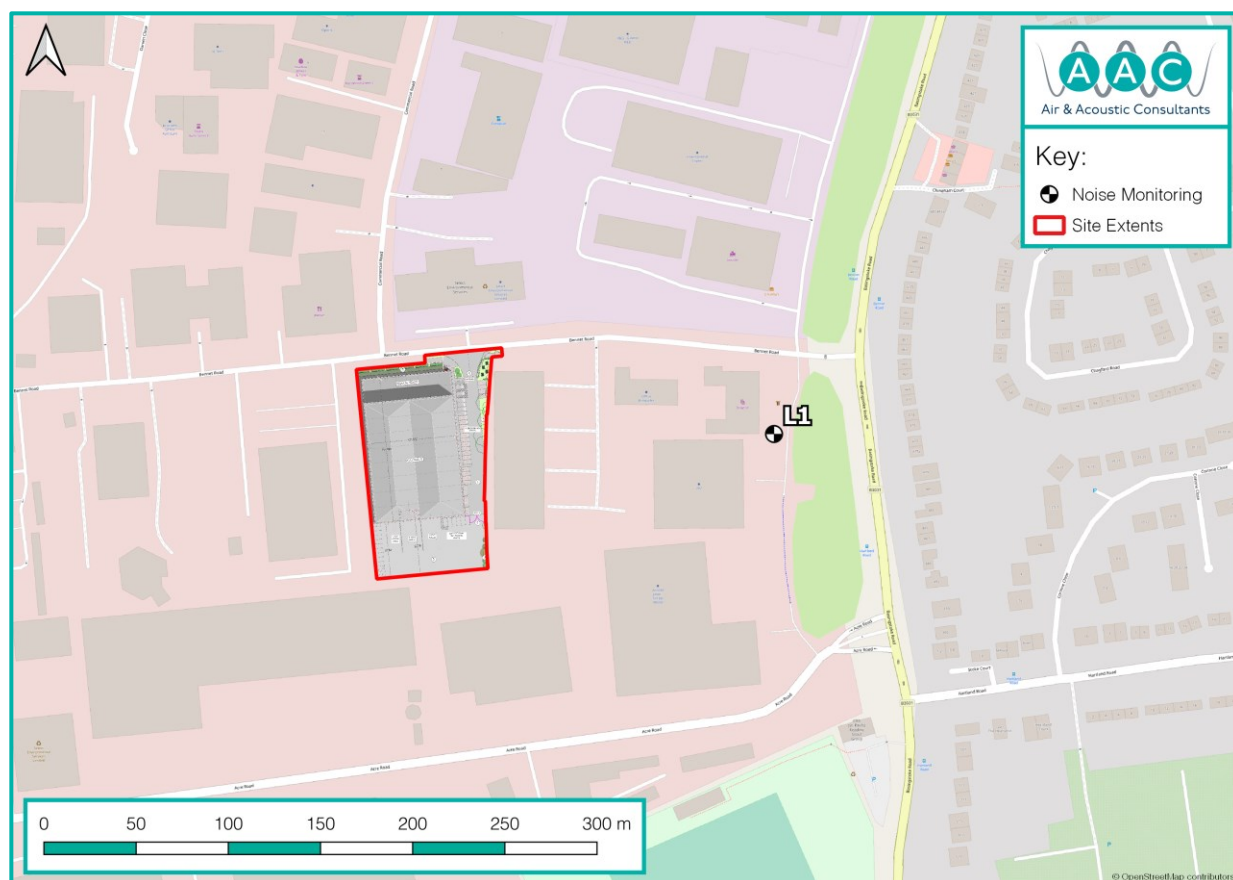
- 3.6.5 The propagation of noise from source to receptors is downwind which may increase noise levels at receptors higher than may occur naturally. The prevailing wind direction in Reading is westerly which in this case is from the source to receptor so the predictions will not be higher than reality because of this assumption by the algorithm.
- 3.6.6 The locations of existing buildings and features have been digitised from aerial imagery which is georeferenced to the WGS 84 system so all features are the correct distance from each other. When adding proposed buildings the proposed site plan has been georeferenced to the aerial imagery by setting common features to the same co-ordinates. The proposed site plan had many existing features which correlated with the aerial imagery, so the location of the proposed building is considered accurate.
- 3.6.7 The source noise data has been measured by Air and Acoustic Consultants for equipment and activities at similar types of commercial sites. Operations and equipment at different sites are likely to be different because of general differences in equipment and methods of operation.
- 3.6.8 Penalties applied to the specific levels experienced by the noise sensitive receptors cannot be experienced prior to the site being occupied so penalties must be applied qualitatively based on the experience of the assessor. The penalties are unlikely to include much error in this case because specific sound from the development is unlikely to be audible at the receptors as demonstrated by the difference between the specific levels and the background sound level.
- 3.6.9 The topography data is ordnance survey Terrain 5 which is a grid of height points with 10 m spacing this means that small topography features such as bunds and embankments are not represented well, however the topography between the application site and the receptors has very little variation and the data is considered suitable.
- 3.6.10 In summary, it is considered that whilst there will always be a level of inherent uncertainty in any assessment, where possible, potential sources of uncertainty have been minimised and it is considered to be a representative and robust assessment of the likely impacts.

4 Baseline Conditions

4.1 Noise Monitoring

- 4.1.1 A baseline noise survey was undertaken between Tuesday 29th November and Tuesday 6th December 2022. The survey consisted of one long-term monitoring position at the location illustrated in [Figure 4.1](#).
- 4.1.2 The location was chosen to be representative of the residential properties on The B3031 Basingstoke Road. The monitor was located slightly further from the road and would have experienced slightly lower traffic noise levels than the residential noise sensitive receptors, but this will ensure a worst-case assessment.

Figure 4.1: Noise Monitoring Location



- 4.1.3 The measurements were taken using a class 1 sound level meter. The microphone measurement position was in the acoustic free field and was mounted on a fence 1.5 m above the ground. Calibration checks were performed at the start and end of the survey and no significant drift in calibration was observed. The details of the monitoring equipment used is set out in [Table 4.1](#).

Table 4.1: Noise Monitoring Equipment

Equipment Type	Manufacturer	Model	Serial Number	Calibration Due
Sound Level Meter		Model Lxt1	4473	
Pre-Amplifier	Larson Davis	PRMLxT1	36007	01/2023
Microphone		377BO2	153565	

Equipment Type	Manufacturer	Model	Serial Number	Calibration Due
Calibrator	Larson Davis	Cal 200	17575	03/2023

4.1.4 The weather conditions during the survey were generally influenced by low-speed winds with a predominantly westerly direction. The average daily temperature stayed between 2 °C and 6 °C for the whole survey period, there was a small amount of precipitation recorded on two days during the monitoring period. Average wind speeds for the monitoring period were below 5 m/s.

4.1.5 The information provided in [Table 4.2](#), uses data from Weather Underground. The weather station is located on Hollydale Close (Station ID: IREADI11).

Table 4.2: Summary of Weather Conditions

Date	Temp (°C)	Wind Speed (m/s)		Wind Direction	Total Precipitation (mm)
		Average	Peak		
29/11/2022	5.2	0.8	2.2	WNW	0.00
30/11/2022	5.6	0.6	2.2	NW	0.00
01/12/2022	2.0	1.3	2.7	West	0.00
02/12/2022	4.3	1.3	2.7	WSW	0.20
03/12/2022	5.4	1.6	3.1	ENE	0.00
04/12/2022	3.9	1.4	3.1	NE	0.30
05/12/2022	5.2	1.4	2.2	NNW	0.00
06/12/2022	4.8	1.5	2.7	NW	0.00

4.2 Unattended Noise Survey Results

4.2.1 A summary of the long-term monitored noise levels is presented in [Table 4.3](#), for L1, east of the site close to the B3031, illustrated in [Figure 4.1](#). The data is presented as average levels for the daytime and night-time periods calculated from 15-minute sound indices.

Table 4.3: Noise Monitoring Results – L1, East, Unattended Long-Term

Date	Period	Average Measured Sound Levels (dBA)		
		L _{Aeq}	L _{AFmax} **	L _{A90} **
29/11/2022	Day 07:00 - 23:00	54.5	71.7	49.8
	Night 23:00 - 07:00	48.3	65.8	41.1
30/11/2022	Day 07:00 - 23:00	56.6	78.0	51.4
	Night 23:00 - 07:00	49.1	68.0	43.6
01/12/2022	Day 07:00 - 23:00	56.0	76.0	51.1
	Night 23:00 - 07:00	49.5	66.6	42.1
02/12/2022	Day 07:00 - 23:00	57.1	76.1	52.4
	Night 23:00 - 07:00	50.8	69.8	43.3
03/12/2022	Day 07:00 - 23:00	63.0	78.5	51.6
	Night 23:00 - 07:00	48.4	67.2	40.8

Date	Period	Average Measured Sound Levels (dBA)		
		L _{Aeq}	L _{AFmax} **	L _{A90} **
04/12/2022	Day 07:00 - 23:00	55.6	76.8	50.3
	Night 23:00 - 07:00	50.3	68.2	43.8
05/12/2022	Day 07:00 - 23:00	56.5	73.7	52.4
	Night 23:00 - 07:00	50.3	68.9	43.1
06/12/2022	Day 07:00 - 23:00	57.3	74.2	52.9
	Night 23:00 - 07:00	-	-	-
Overall	Day 07:00 - 23:00	58.2	76.4	51.5
	Night 23:00 - 07:00	49.6	68.0	42.7

*Based on Partial Data.

**Logarithmic averages not used in any assessment that requires maximum sound levels or background sound levels.

- 4.2.2 During the site visits to install and collect the monitoring equipment the dominant sound sources were noted to be road traffic noise on the B3031.
- 4.2.3 Time history graphs for the entire monitoring period are given in [Appendix B](#) and include the L_{Aeq}, L_{A90} and L_{AFmax} for each 15-minute period.

4.3 Background Sound Levels

- 4.3.1 As part of an assessment of commercial or industrial sound and following the methodology within BS 4142:2014+A1:2019, a representative background sound level must be determined. Typically, the modal L_{A90,15min} value from the relevant time period is used.
- 4.3.2 The background sound levels have been identified during the daytime period 07:00 – 23:00 and night-time period 23:00 – 07:00 using statistical analysis (see [Appendix C](#)). These levels are considered to be representative of the background sound levels for the relevant periods.
- 4.3.3 The representative background sound level for each day of monitoring as well as the overall representative level is given in [Table 4.4](#). The background sound level at L1 has been used for all noise sensitive receptors within this assessment.

Table 4.4: Background Sound Levels Used for the Assessment of Operational Sound

Date	Modal L _{A90,15min} Values at L1 (dBA)	
	Daytime (07:00-23:00)	Night-Time (23:00-07:00)
29/11/2022	51*	35
30/11/2022	53	40
01/12/2022	52	37
02/12/2022	53	41
03/12/2022	53	39
04/12/2022	51	39
05/12/2022	53	38
06/12/2022	54*	-
Overall	53	39

*Based on partial data.

- 4.3.4 [Appendix C](#) presents the graphs used in the determination of the representative background sound levels that have been used in this assessment.
- 4.3.5 The overall representative background sound level chosen for L1 during the daytime period is the modal value, there is a single peak in the distribution of the values and 53 dB is the most common level in that peak. During the night-time at L1 there is a single peak in the distribution of the values and 39 dB is the most common level in that peak. These daytime and night-time values have been chosen as the representative background sound levels.

5 Construction Impact Assessment

5.1 Demolition & Construction

- 5.1.1 At this stage of the scheme, details regarding the construction traffic movements and the type, number and size of construction equipment are not available. Therefore, it is not possible to predict, with any great degree of accuracy, the possible effects arising from construction activities associated with the proposed development.
- 5.1.2 For the purposes of a generic construction noise assessment, the associated works can be divided into four main phases:
- Demolition;
 - Earthworks;
 - Concreting; and
 - Main build.
- 5.1.3 On weekdays, typical construction working hours are anticipated to be 07:30 – 17:30, and potentially 07:00 – 18:30 in the summer months. On Saturdays, working hours are expected to be between 07:30 and 13:00 hours. Work on Sundays/Bank Holidays will only take place in exceptional circumstances. The construction work will be carried out under the Considerate Constructors Scheme, which, as one of its objectives, aims to reduce adverse noise impacts on nearby residents.
- 5.1.4 During the construction phase, there would be a slight increase in HGV movements on the surrounding highway network. However, this will be a temporary impact and will decrease as the proposed development progresses towards completion.
- 5.1.5 Overall, based on the experienced gained from similar sites, and on the existing ambient noise levels at the closest residential receptors, it is anticipated that although the main construction phases may be audible at times, they will result in no more than a minor adverse impact, only during the daytime. It should also be noted that this effect will only be temporary, whilst the construction phase(s) are moving forward and focusing on different areas of the site.
- 5.1.6 Following the BS 5228-1:2009+A1:2014 ABC classification method, during the daytime working hours mentioned above, the nearby sensitive receptors would fall into Category A, with a threshold noise level criteria of 65 dB(A) during the daytime.

6 Operational Impact Assessment

6.1 Operational Commercial Sound Levels

- 6.1.1 As described in [Section 3](#), the potential adverse effects of commercial and/or industrial sound experienced at the existing noise sensitive receptors has been assessed using the methodology described in BS 4142:2014+A1:2019. The typical background sound level for the daytime and night-time periods used in the assessment are given in [Table 4.4](#).
- 6.1.2 The proposed development layout, shown in [Figure 1.2](#) shows a single building housing one unit that has associated parking and loading areas that are all accessed via a short section of road. The parking areas are located adjacent to the eastern façade. The plans show space for four HGV's parked in front of the unit.
- 6.1.3 The end user and specific uses for the unit are not known at this point so only typical sources that are likely to be required as part of their operations have been included in the assessment.
- 6.1.4 The development proposals include 24-hour operations seven days per week and have been assessed during the daytime and night-time.
- 6.1.5 The source levels used for the assessment of the proposed industrial sound on the existing residential properties have been taken from the Air and Acoustic Consultants library of sound measurements. The sources chosen are representative of the types of activities likely to occur on site for example vehicles manoeuvring that are likely to include reversing include reversing alarms and forklifts include lifting and moving pallets. Details of the sources used in the assessment are provided in [Table 6.1](#).

Table 6.1: Sound Sources Used in the Noise Assessment

Source ID	Sound Power Level (dB) at Octave Band Centre Frequencies (Hz)								Overall dB(A)
	63	125	250	500	1 k	2 k	4 k	8 k	
HGV Movement	65.9	64.2	63.5	66.4	79.6	69.8	63.1	56.6	80.4
HGV Manoeuvring	96.9	93.0	86.3	87.4	88.5	87.7	89.9	75.6	95.4
HGV Unloading	78.1	71.3	66.1	64.9	62.9	61.5	58	58.8	68.9
Van Reversing	89.4	78.6	77	76.6	83.6	78.6	75.9	70.3	86.3
Forklift Unloading	95.0	87.4	84.2	81.9	81.3	79.6	75.5	77.5	86.8

- 6.1.6 Each sound source has had corrections added to account for the assessment period and operational duration. The on-time corrections for the operations have been determined from observations of similar types of developments by Air and Acoustic Consultants and from the traffic generation data provided by the transport consultants for the project.
- 6.1.7 The on-time corrections are made using the following equation:

$$10 \times \log \left(\frac{d \times 10^{\frac{L}{10}}}{D} \right)$$

- 6.1.8 Where d is the duration of the activity in minutes, L is the sound power level of the activity and D is the assessment duration in minutes, 1 hour during the daytime and 15 minutes during the night-time.

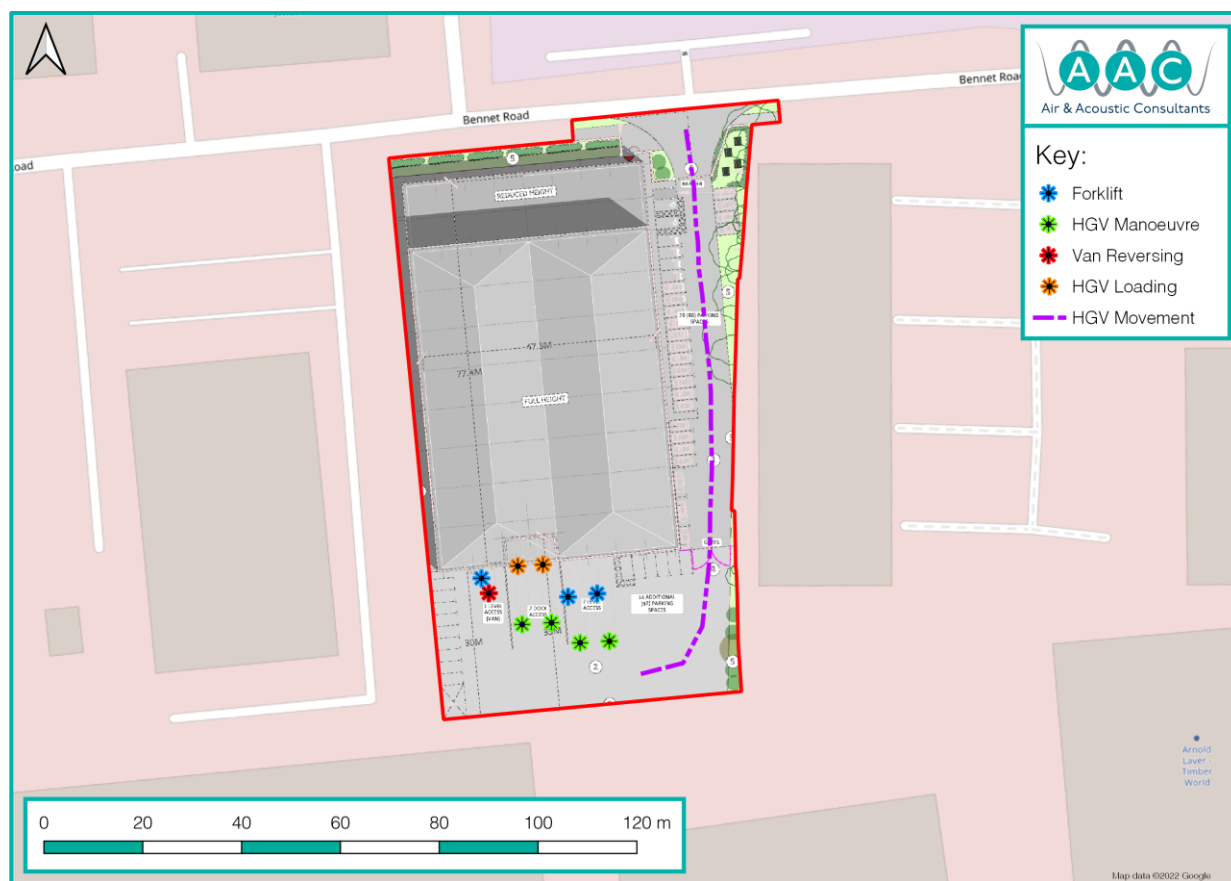
- 6.1.9 The traffic data for a B2 use class shows a total of 178 vehicle movements in a typical day, of which 42 are HGVs, this is higher than the B8 use class so the B2 traffic data will be used in this assessment to represent a reasonable worst-case. No information has been provided to indicate which hours will have the most HGV visits during the day, however, due to the limited on-site space it is unlikely that more than four HGVs could be on-site at any one time so as a worst-case assumption the assessment includes six two-way HGV movements during the one-hour daytime assessment period and one during the 15-minute night-time assessment period.
- 6.1.10 A reasonable assumption based on previous experience from similar sites with similar use, is that there will be four van movements during the one-hour daytime assessment period and one van movement during the 15-minute night-time assessment period.
- 6.1.11 The unit will have forklifts for unloading of deliveries and other on-site uses, given the proposed layout three have been included. One of these will be used for unloading vans at the 1 level access entry point, and two will be used at the 2-level access entry point for unloading HGVs. If used for deliveries it would be expected that the forklifts would operate both outside and inside in equal proportions. The duration of time it will take to unload the HGVs is longer than the duration of time it will take to unload the Van, therefore the duration of time for the sound source on-time calculations reflects this difference.
- 6.1.12 The on-time corrected noise sources are provided in [Table 6.2](#).

Table 6.2: Sound Source On-Time Calculations

Source ID	Source Sound Power Level L_{WA} (dBA)	Duration (min)		Corrected Sound Power Level L_{WA} (dBA)	
		Daytime	Night-time	Daytime	Night-time
HGV Movement	80.4	3	0.5	67.4	65.6
HGV Manoeuvring	95.4	1.5	1	79.4	83.6
Van Reversing	86.3	2	0.5	71.5	71.5
Forklift Unloading (HGV)	86.8	15	7.5	80.8	83.8
Forklift Unloading (Van)	86.8	10	5	79.0	82.0
HGV Unloading	68.9	30	15	61.1	64.1

- 6.1.13 The sound sources and their respective locations within the noise propagation model for the operational noise assessment are shown in [Figure 6.1](#).

Figure 6.1: Modelled Sound Source Locations, BS 4142 Noise Assessment



6.1.14 The predicted specific sound levels at the noise sensitive receptors require a penalty to account for distinctive characteristics in line with the BS 4142:2014+A1:2019 method. Penalties account for distinctive characteristics that may make a sound more prominent than the existing noise environment, penalties can be added for tonality, impulsivity, intermittency or other characteristics not captured in the three defined classes. The penalties are summarised in [Table 6.3](#).

Table 6.3: Rating Level Penalties

Receptor	Separation distance (m)	Direction	Rating Penalty Description
R01	224	East	0 dB Due to the distance and existing building between the site and the receptors no distinctive characteristics expected to be distinguishable at receptors
R02	219	East	0 dB Due to the distance and existing building between the site and the receptors no distinctive characteristics expected to be distinguishable at receptors
R03	221	East	0 dB Due to the distance and existing building between the site and the receptors no distinctive characteristics expected to be distinguishable at receptors
R04	231	East	0 dB Due to the distance and existing building between the site and the receptors no distinctive characteristics expected to be distinguishable at receptors
R05	224	East	0 dB Due to the distance and existing building between the site and the receptors no distinctive characteristics expected to be distinguishable at receptors

distinguishable at receptors			
R06	236	East	0 dB Due to the distance and existing building between the site and the receptors no distinctive characteristics expected to be distinguishable at receptors

6.1.15 Table 6.4 shows the application of the specific noise penalties to the Specific Level to calculate the Rating Level which is used within the BS 4142:2014+A1:2019 assessment.

Table 6.4: Predicted Specific Noise Levels at Sensitive Receptors

Receptor	Height (m)	Daytime (07.00 – 23.00) (dBA)			Night-time (23:00 – 07:00) (dBA)		
		Specific Level $L_{S, Tr}$	Penalty	Rating Level $L_{Ar, Tr}$	Specific Level $L_{S, Tr}$	Penalty	Rating Level $L_{Ar, Tr}$
R01	4.0	11.6	0	11.6	12.6	0	12.6
R02	4.0	13.0	0	13.0	10.0	0	10.0
R03	4.0	12.5	0	12.5	12.2	0	12.2
R04	4.0	16.3	0	16.3	16.0	0	16.0
R05	4.0	30.8	0	30.8	30.4	0	30.4
R06	4.0	22.0	0	22.0	21.8	0	21.8

6.1.16 The predicted noise rating levels at the noise sensitive receptors are presented in Table 6.5 along with a comparison with the representative background sound levels as defined in BS 4142:2014+A1:2019.

Table 6.5: Predicted Commercial Noise Impacts at Sensitive Receptors

Receptor	Height (m)	Daytime (07.00 – 23.00) (dBA)			Night-time (23:00 – 07:00) (dBA)		
		Rating Level $L_{Ar, Tr}$	Background Level	Diff	Rating Level $L_{Ar, Tr}$	Background Level	Diff
R01	4.0	11.6	53	-41.4	12.6	39	-26.4
R02	4.0	13.0	53	-40.0	10.0	39	-29.0
R03	4.0	12.5	53	-40.5	12.2	39	-26.8
R04	4.0	16.3	53	-36.7	16.0	39	-23.0
R05	4.0	30.8	53	-22.2	30.4	39	-8.6
R06	4.0	22.0	53	-31.0	21.8	39	-17.2

6.1.17 It can be seen in Table 6.5 that, based upon a reasonable worst-case scenario, during the daytime and night-time all of the noise sensitive receptors will experience noise rating levels that are within the BS 4142:2014+A1:2019 criterion of no more than 5 dB above the background sound level.

6.1.18 The local criteria EN17 Noise Generating Equipment suggests that for this kind of development that the level of noise at the receptor should be 10 dB below background. This local criterion was achieved at all receptors except for receptor R05 where the Rating level is 8.6 dB below the existing background. The specific monitoring location L1 was located 50 meters away from the centre line of Basingstoke Road, while the receptor R05 is located 21 meters away from the centre of the road. The background noise at the specific monitoring locations L1 will be lower than that at R05 and with the higher background noise at R05 it is likely that the Rating Level will be more than 10 dB under the existing background noise.

- 6.1.19 BS 4142:2014+A1:2019 requires that the noise assessment considers the context of the environment and the new noise sources. In this situation the surrounding area contains industrial premises only and the nearest noise sensitive receptors are separated from the site by considerable distance (over 200 meters) which includes a number of buildings and the B3031. Any noise produced on site is likely to be of similar nature to the existing surrounding industrial premises and is highly unlikely to be audible or distinctive especially because all noise sensitive premises are close to the busy B3031. Therefore no adverse noise impacts are likely and in accordance with national policy would be classified as NOEL.
- 6.1.20 Predicted noise rating level contours are presented in [Appendix D](#), showing how sound is likely to propagate from the sources to the sensitive receptors.

6.2 Fixed Plant and Equipment Limits

- 6.2.1 No specific fixed plant items or equipment is proposed as part of the development, but it is possible that future tenants will install items, so limits have been specified using the measured background sound levels and the criterion specified by Reading Borough Council in Policy EN17 of the Reading Local Plan. The local plan requires that the specific level from all fixed plant and equipment is more than 10 dB(A) less than the background sound level with no consideration of context as required by a BS4142:2014+A1:2019 noise assessment.
- 6.2.2 Due to the distance and existing context of the site it is unlikely that any distinctive characteristics will be noticeable from any fixed plant, and it is recommended that no rating penalties be added to convert from the specific noise level to the rating noise level. The limits (at the receptors) are presented in [Table 6.6](#) the daytime assessment period of one-hour and the night-time assessment period of 15-minutes.

Table 6.5 Specific Noise Level Limits

Daytime (07:00-23:00) Specific Noise Level Limit (dBA)	Night-Time (07:00-23:00) Specific Noise Level Limit (dBA)
43	29

6.3 Operational Commercial Maximum Sound Levels

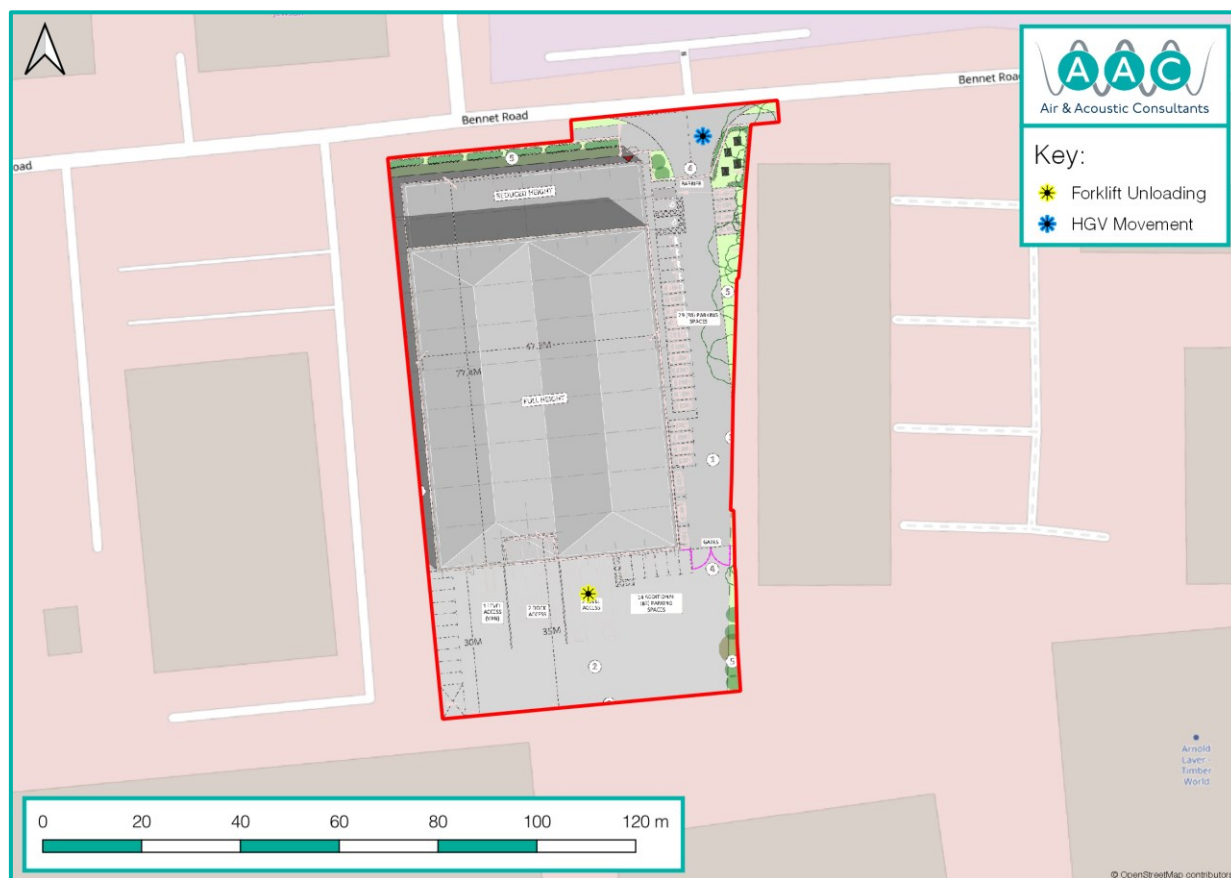
- 6.3.1 The WHO Guidelines state that to avoid night-time sleep disturbance indoor sound pressure levels should not exceed approximately 45 dB(A) L_{AFmax} more than 10 – 15 times per night. It is generally accepted that 60 dB(A) L_{AFmax} at the external façades of living spaces corresponds to the LOAEL. These values assume the sound reduction provided by a partially open window is 15 dB, resulting in an internal noise level of 45 dB(A) L_{AFmax} .
- 6.3.2 All maximum events have been modelled as point sources at worst-case locations, the number of sources is fewer than in the BS 4142:2014+A1:2019 industrial noise assessment because maximum noise events are extremely unlikely to be simultaneous.
- 6.3.3 The source levels used in the assessment, have been taken from the Air and Acoustic Consultants library of sound measurements, details of the sources used in the assessment are provided in [Table 6.7](#).

Table 6.6: Sound Sources Used in the Maximum Noise Assessment

Activity	Sound Power Level (dB) at Octave Band Centre Frequencies (Hz)								Overall dB(A)
	63	125	250	500	1 k	2 k	4 k	8 k	
HGV Movement	84.5	83.9	83.7	87.0	101.2	94.2	87.5	80.6	101.6
Forklift Unloading	102.4	98.1	96.2	97.2	98.8	94.8	93.6	103.2	103.0

6.3.4 The sound sources included in the noise propagation model for the maximum operational noise assessment are shown in [Figure 6.2](#).

Figure 6.2: Modelled Sound Source Locations, Maximum Noise Assessment



6.3.5 The predicted levels at receptors from maximum noise events are provided in [Table 6.8](#).

Table 6.7: Predicted Maximum Commercial Noise Impacts at Sensitive Receptors

Receptor	Height (m)	Night-time (23:00 – 07:00) (dBA)		
		Predicted Level	Criterion Level	Difference
R01	4.0	49.2	60.0	-10.8
R02	4.0	49.1	60.0	-10.9
R03	4.0	38.5	60.0	-21.5
R04	4.0	33.1	60.0	-26.9
R05	4.0	46.8	60.0	-13.2
R06	4.0	39.4	60.0	-20.6

6.3.6 The predicted maximum noise event levels from the commercial operations are all lower than the 60 dB(A) WHO criterion at all noise sensitive receptors.

6.3.7 Predicted night-time maximum noise contours are presented in [Appendix D](#), showing how sound is likely to propagate from the sources to the sensitive receptors.

6.3.8 In accordance with international policy the impacts would be categorised as less than LOAEL and mitigation will not be required.

7 Mitigation Measures

7.1 Construction

- 7.1.1 Operators should be properly trained in the use of equipment, made aware of any noise mitigation requirements, and where necessary, be supervised so that reasonable care is taken to minimise their noise impact. BS 5228-1:2009+A1:2014 provides advice on minimising noise from construction activities with the implementation of Best Practicable Means (BPM).
- 7.1.2 The contractor would regularly brief the construction staff so that they are considerate of the surrounding residents and operate construction plant in a manner which controls noise (where practicable). Once the exact construction methods and plant to be employed are confirmed, any required mitigation measures will be identified. Such measures could include:
- Avoidance of the use of horns and excessive revving of engines;
 - Vehicles, generators, concrete pumps, air compressors and other constant noise sources being turned off when not required, or at least throttled back to a minimum;
 - Plant to operate at low speeds, where possible, and incorporate automatic low speed idling;
 - Selection of 'silenced' plant and equipment where practicable;
 - Locating noisy plant and equipment as far away from sensitive receptors as reasonably possible;
 - Reducing impulsive noise generating activities such as slamming doors, noisy brakes, impacts etc.;
 - Screening either in the form of localised temporary acoustic fencing where the distances between source and receptor cannot be managed, or on the site boundary; and
 - All plant being properly maintained (greased, blown silencers replaced, saws kept sharpened, teeth set and blades flat, worn bearings replaced, etc.).

7.2 Operational Commercial Noise Levels

- 7.2.1 No adverse impacts are predicted and so no mitigation measures will be required.

8 Summary & Conclusions

8.1 Baseline

- 8.1.1 Air and Acoustic Consultants Ltd have been instructed by DV5 Coltham (Reading) Ltd to undertake a noise impact assessment in support of the planning application for the proposed commercial development at Bennet Court, Reading.
- 8.1.2 A long-term unattended baseline noise survey was undertaken at the site during November and December 2022 to characterise the existing noise environment and inform the assessment of the potential impacts and effects of the proposed development upon the nearby noise-sensitive receptors.

8.2 Construction Phase

- 8.2.1 The specific details of the construction methodology are not known at this stage; however, the potential construction impacts have been considered, based upon the nature and scale of the proposed development, and appropriate mitigation measures have been provided.
- 8.2.2 Assuming the appropriate mitigation measure are employed, the potential construction impacts can be minimised to the point that any adverse impacts will be temporary in nature and result in the LOAEL in terms of potential impacts.

8.3 Operational Phase

- 8.3.1 The operational noise levels associated with the proposed development have been assessed using a combination of long-term noise monitoring data and modelling predictions using a CadnaA sound propagation model. Both the monitoring and assessment have been undertaken in line with the relevant British Standards, Guidance documents and Policy.
- 8.3.2 The development is also consistent with the local Policy CC8: Safeguarding Amenity within the Reading Borough Local Plan as the development does not impact the context of the existing local noise environment.
- 8.3.3 While the assessment shows that all but one of the receptors also meets the EN17 Noise Generating Equipment policy, when the context of the site and receptors is included within the considered no adverse impacts are likely.
- 8.3.4 The predictions have shown that maximum unmitigated noise levels from the development will not exceed either WHO or the BS 4142:2014+A1:2019 assessment criterion. The existing noise environment, the context of the site and receptors suggest that adverse industrial noise impacts are unlikely and should be classified as NOEL.
- 8.3.5 Additionally, fixed plant noise limits have been specified based on the Reading Borough Council requirements which specify a noise rating level relative to the background sound level with no consideration of the context.

Appendices

APPENDIX A – DEFINITION OF TERMS

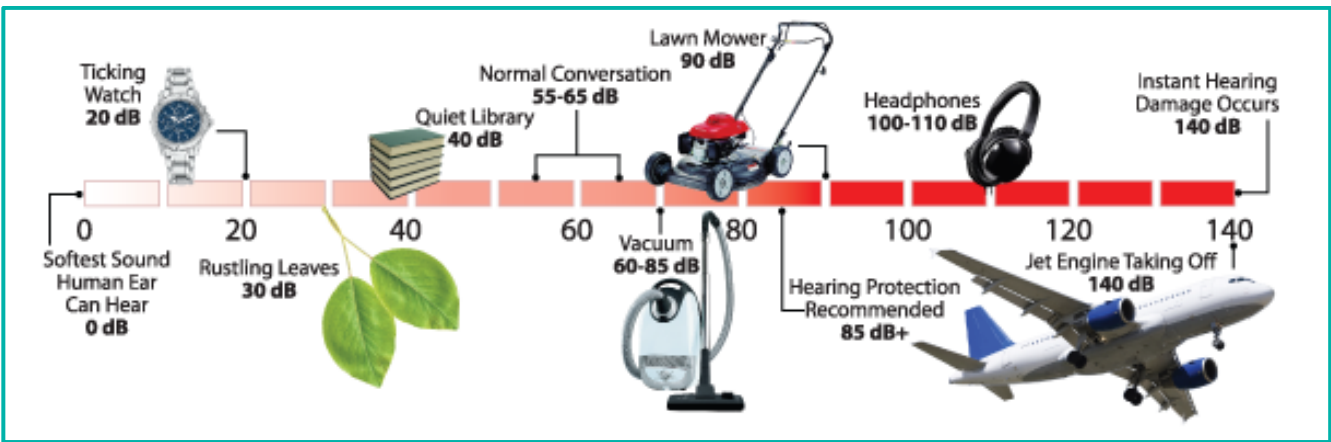
Sound Pressure - Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.

Sound Pressure Level - The sound level is the sound pressure relative to a standard reference pressure of 20 μPa (2×10^{-5} Pascals) on a decibel scale.

Decibels dB - Noise is commonly defined as unwanted sound. The range of audible sound is from 0 dB to 140 dB, which is taken to be the threshold of pain. The sound pressure detected by the human ear covers an extremely wide range. The decibel (dB) is used to condense this range into a manageable scale by taking the logarithm of the ratio of the sound pressure and a reference sound pressure.

The decibel scale is logarithmic and therefore when two noise sources are present together, they must be combined logarithmically, therefore, when two sound sources of the same sound pressure level are combined the resultant level is 3dB(A) higher than the single source. However, in subjective terms the ear can distinguish a difference in 'loudness' between two simple noises sources when there is a 3dB(A) difference between them. I emphasis, loudness, not a measure of annoyance. Again, for simple sources, when two sounds differ by 10dB(A) one is said to be twice as loud as the other.

Figure A.1: Examples of Typical Noise Levels



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.

'A' Weighted Decibels dB(A) - The frequency response of the ear is usually taken to be about 18Hz (number of oscillations per second) to 18,000Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than at the lower and higher frequencies, and because of this, the low and high frequency component of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most used, and which correlates best with the subjective response to noise, including that of music, is the dB(A) weighting. This electronic filter matches the variation in the frequency sensitivity of the meter to that of the human ear. This is an internationally accepted standard for noise measurements.

Table A.1: Other Standard Noise Units:

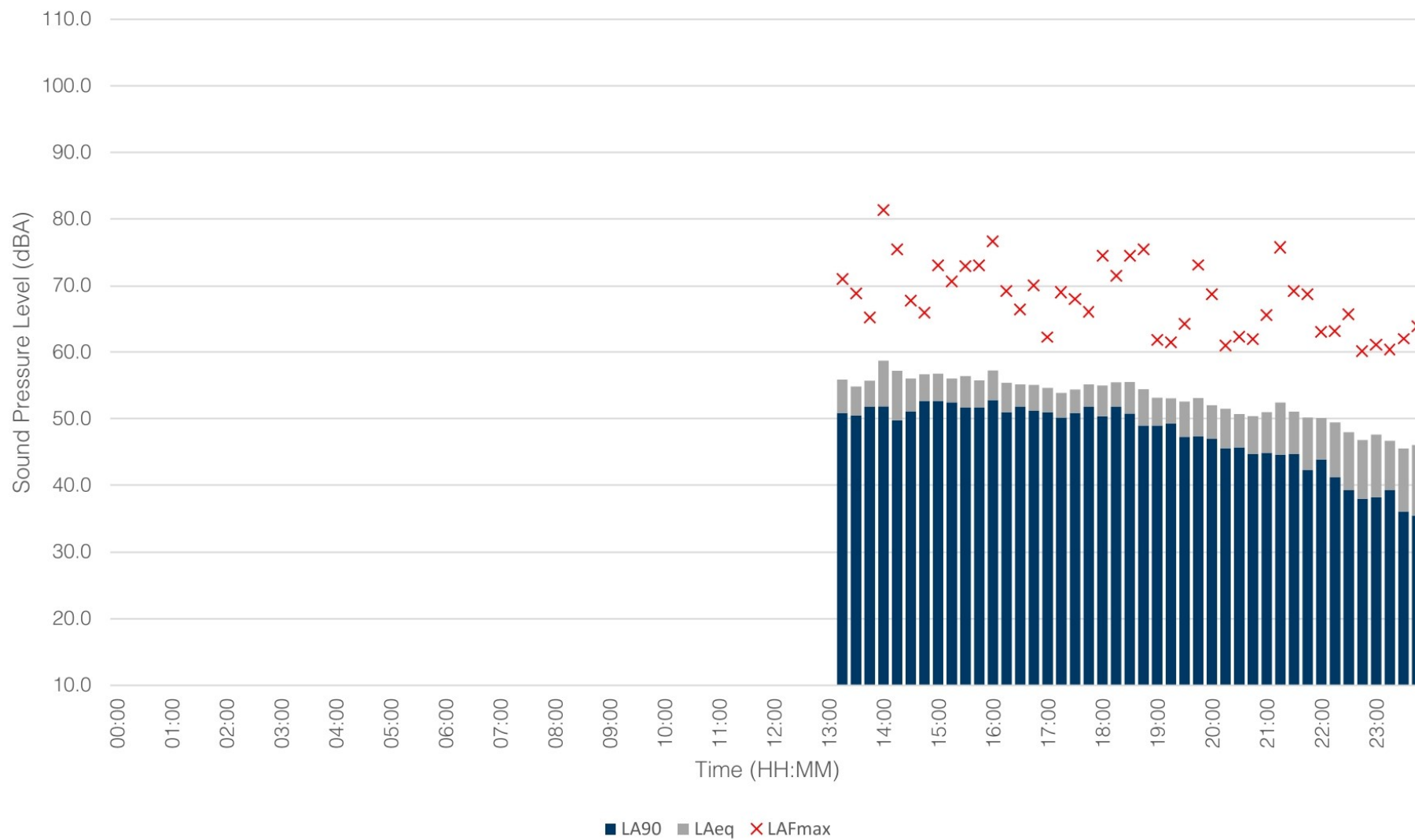
Symbol	Name	Definition
$L_{Aeq,T}$	Equivalent Continuous Sound Level	The A-weighted sound pressure level of a steady sound that has, over a given period, the same energy as the fluctuating sound under investigation. The LAeq provides a single value to express the average sound energy over the measurement period and is the most widely used indicator for environmental noise.
$L_{Amax,T}$	maximum 'A' weighted noise level	This is the maximum 'A' weighted noise level recorded during the measurement period, (T).

Symbol	Name	Definition
$L_{A90,T}$	the 'A' weighted noise level	This is the 'A' weighted noise level exceeded for 90% of the measurement period (T). This is normally used to describe the background noise.
$L_{A10,T}$	the 'A' weighted noise level exceeded for just 10 % of time	This is the 'A' weighted noise level exceeded for just 10 % of the measurement period, (T). This is normally used to describe traffic noise.
$L_{A90,T}$	the 'A' weighted noise level exceeded for just 90 % of time	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_S	Specific noise level.	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval.
$L_{Ar,Tr}$	Rating noise level	The specific noise level plus any adjustments for characteristic features of the noise.
$D_{n,c,w}$	Laboratory Insulation Rating	A single-number rating of the laboratory measurement of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it.
$D_{nf,w}$	Weighted normalised flanking level difference	A single-number that quantifies the in-situ airborne sound insulation between rooms, when the transmission only occurs through a specified flanking path.
$D_{nT,w}$	Weighted standardized level difference	Single-number quantity that characterizes the in-situ airborne sound insulation between rooms.
R_w	Weighted sound reduction index.	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies in a laboratory.
C_{tr}	Low frequency correction	Correction term applied against the sound insulation single-number values (R_w , D_w and $D_{nT,w}$) to provide a weighting against low frequency performance.
NOEL	No Observed Effect Level	Noise Policy Statement for England (2010) - The noise 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	Noise Policy Statement for England (2010) - The noise level above which adverse effects on health and quality of life can be detected.
SOAEL	Significant Observed Adverse Effect	Noise Policy Statement for England (2010) - The noise level above which significant adverse effects on health and quality of life occur.

APPENDIX B – NOISE MONITORING TIME HISTORIES

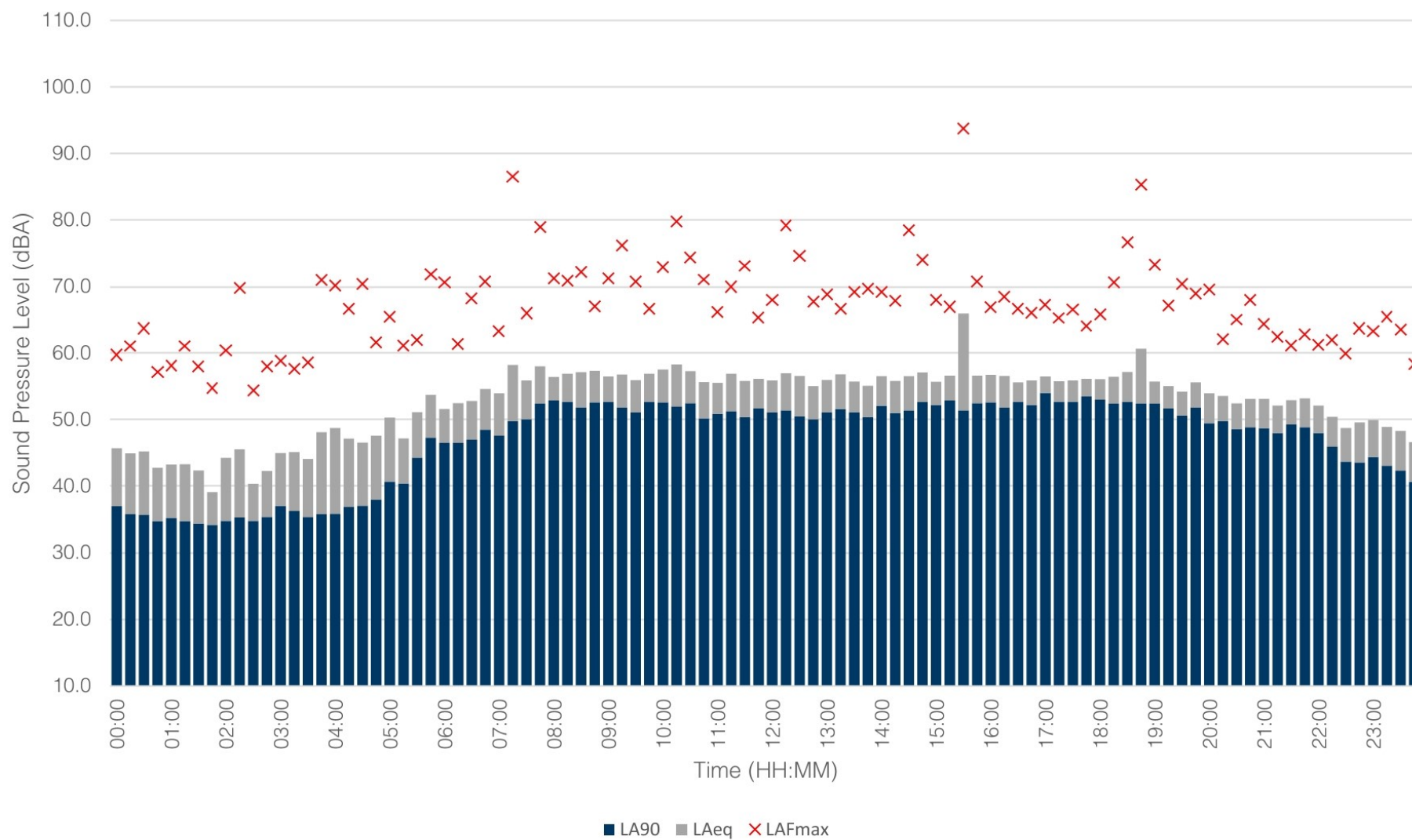
Time History Graph B.1

Project Name:	Bennet Court
Measurement Location:	L1
Survey Date:	29/11/2022



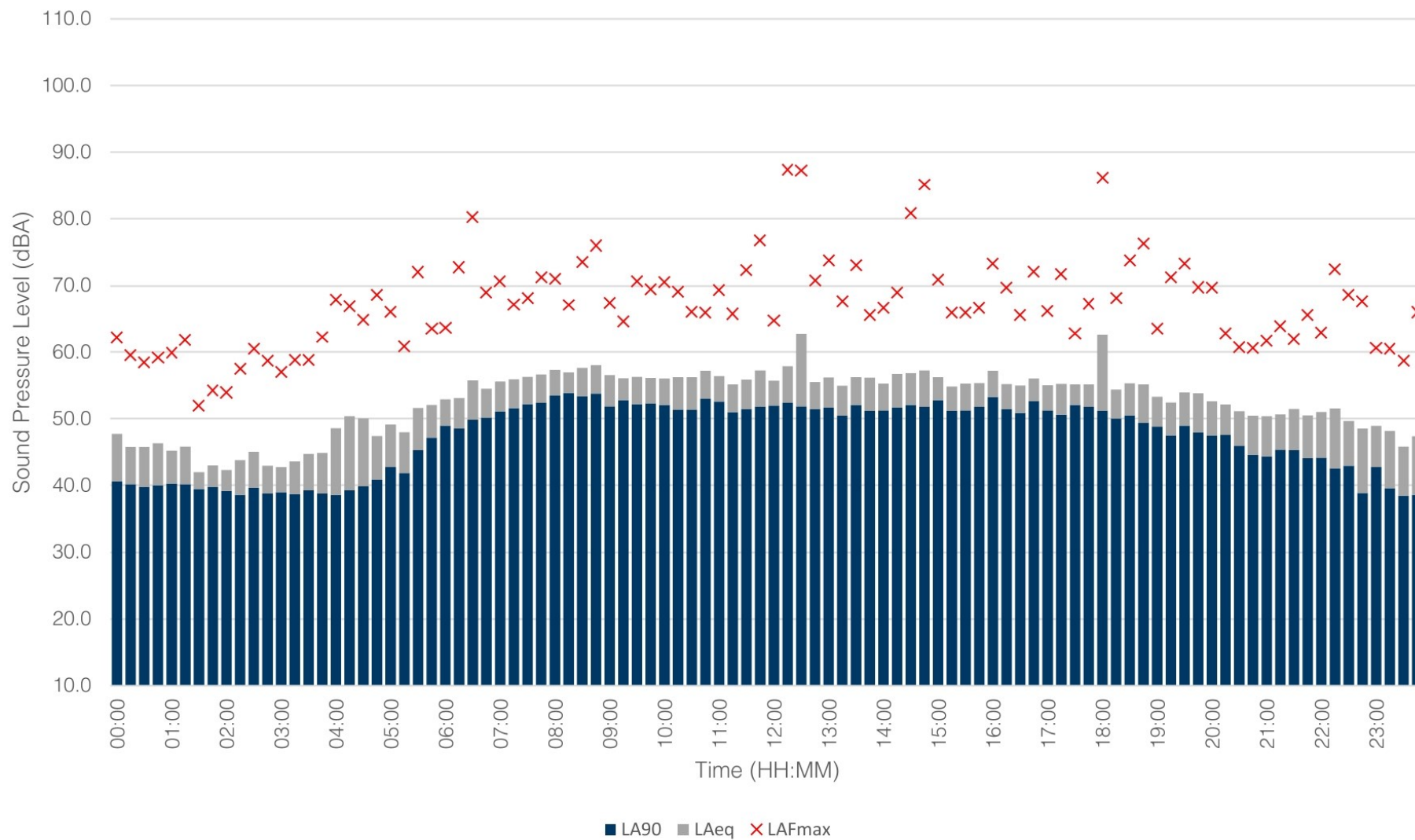
Time History Graph B.2

Project Name:	Bennet Court
Measurement Location:	L1
Survey Date:	30/11/2022



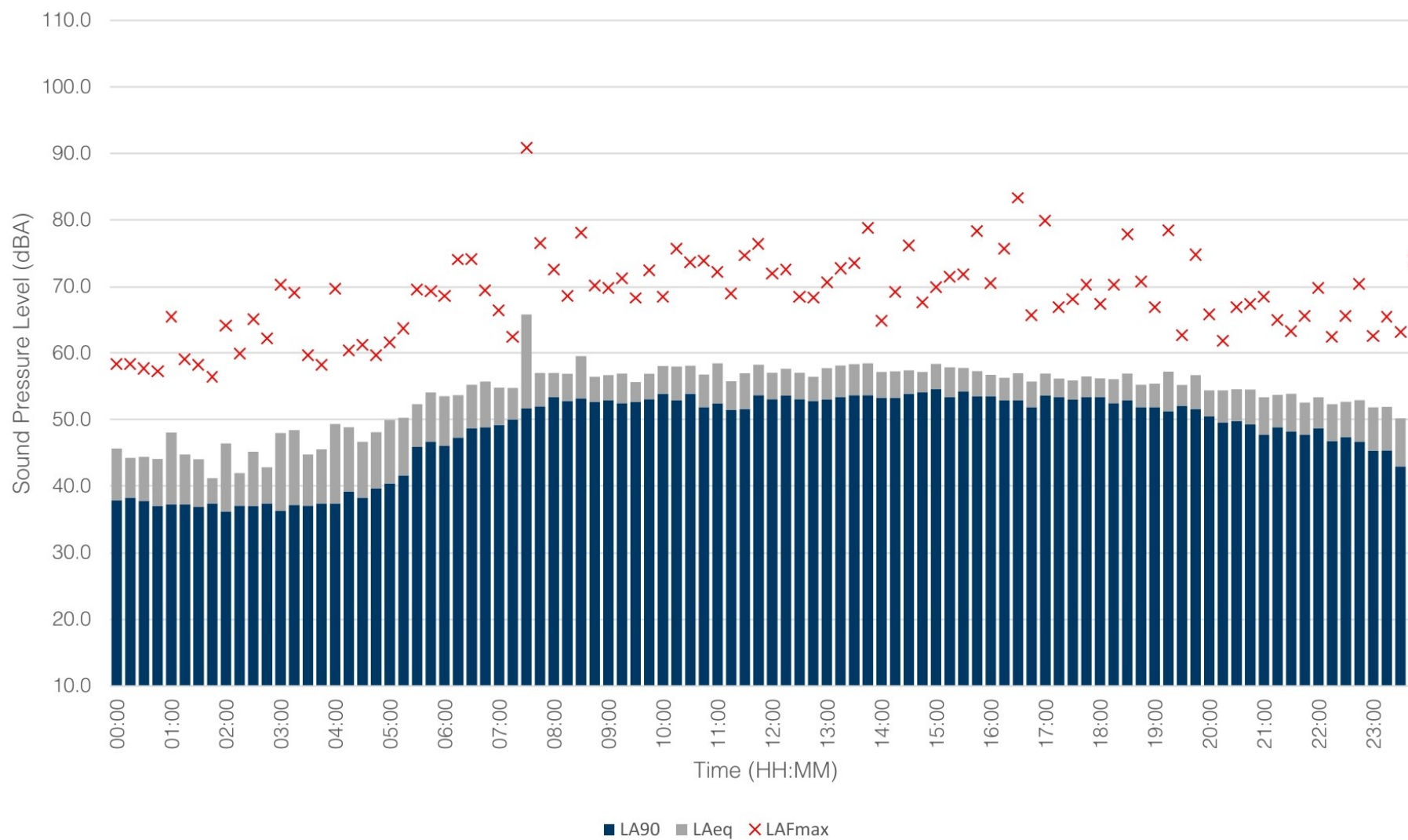
Time History Graph B.3

Project Name:	Bennet Court
Measurement Location:	L1
Survey Date:	01/12/2022



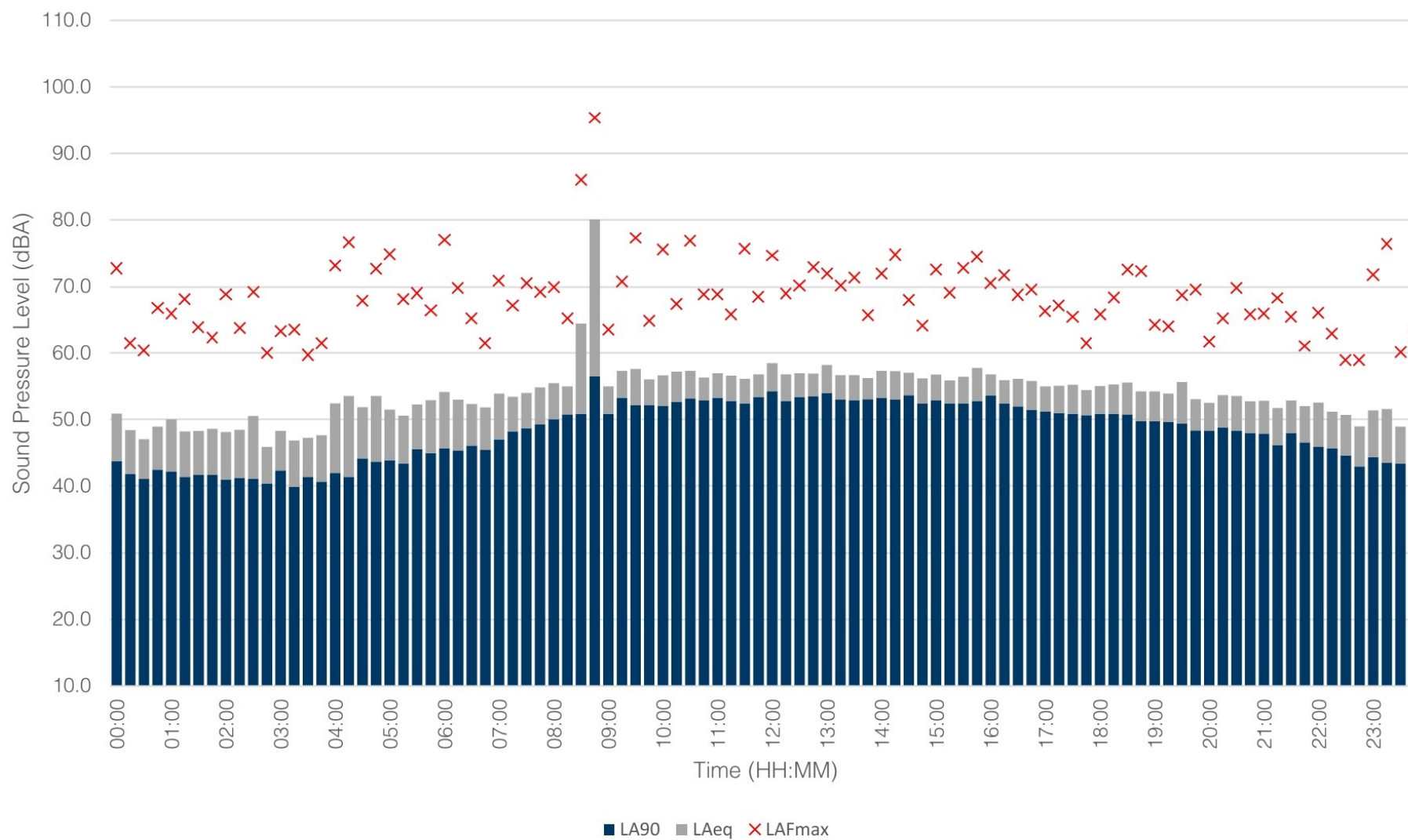
Time History Graph B.4

Project Name:	Bennet Court
Measurement Location:	L1
Survey Date:	02/12/2022



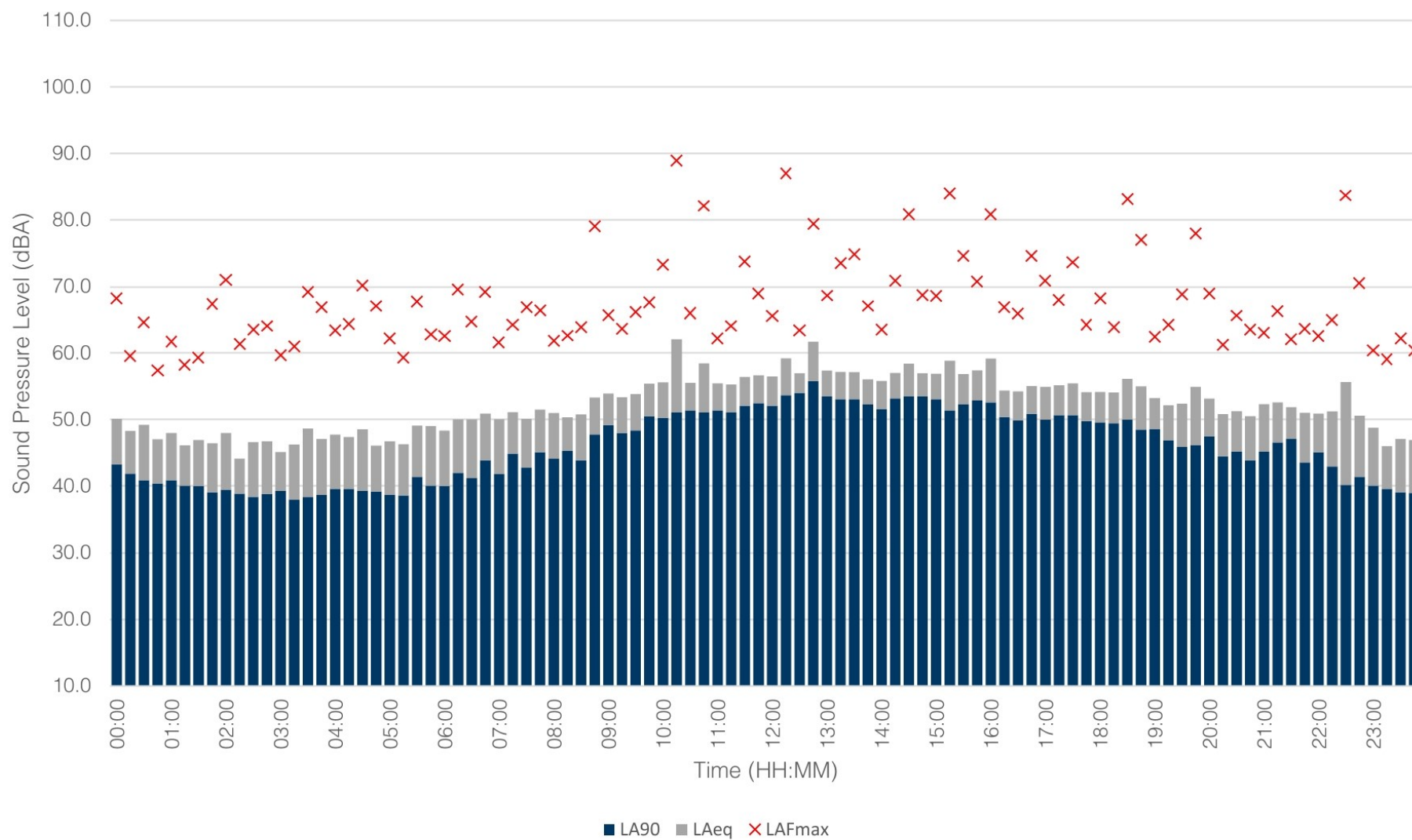
Time History Graph B.5

Project Name:	Bennet Court
Measurement Location:	L1
Survey Date:	03/12/2022



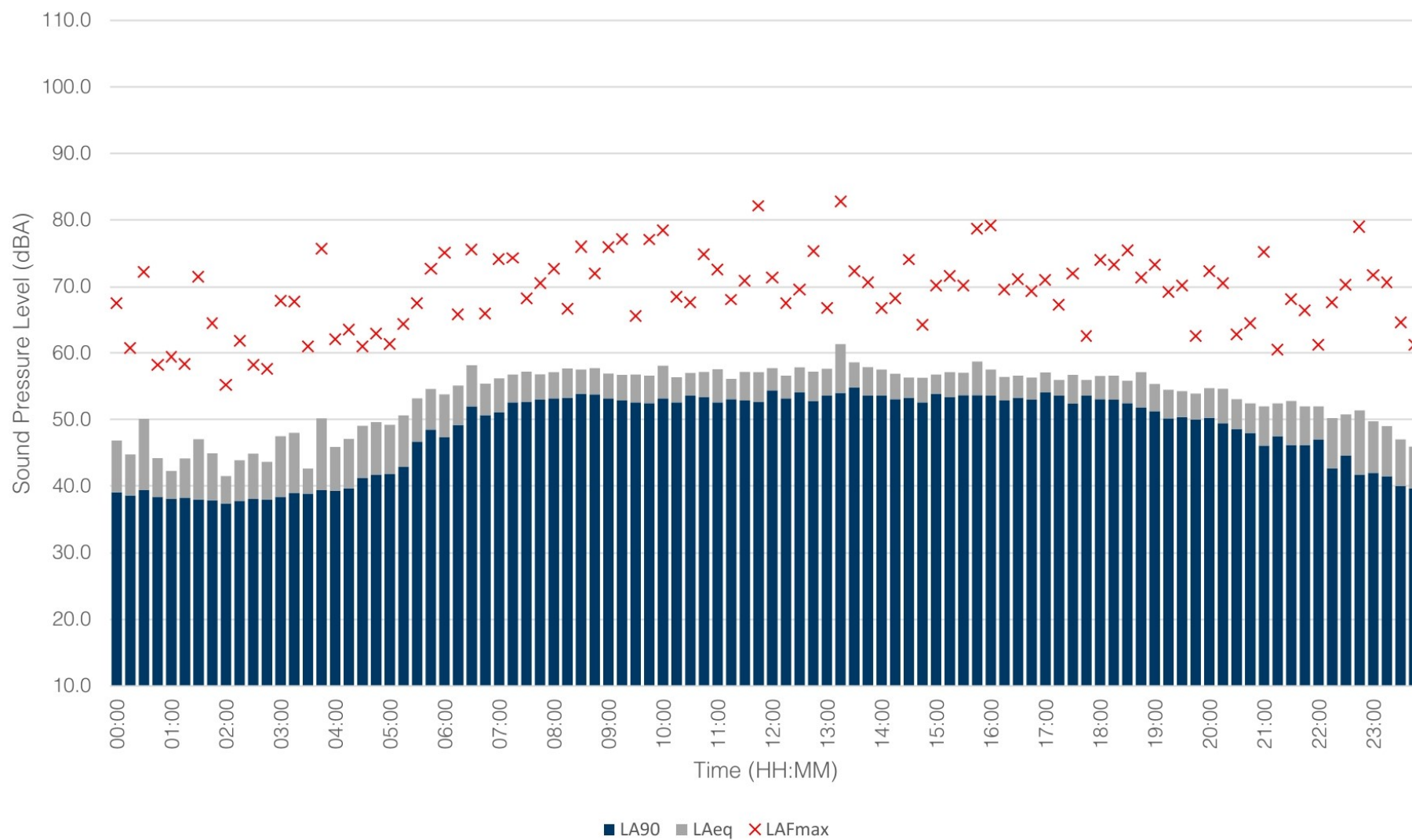
Time History Graph B.6

Project Name:	Bennet Court
Measurement Location:	L1
Survey Date:	04/12/2022



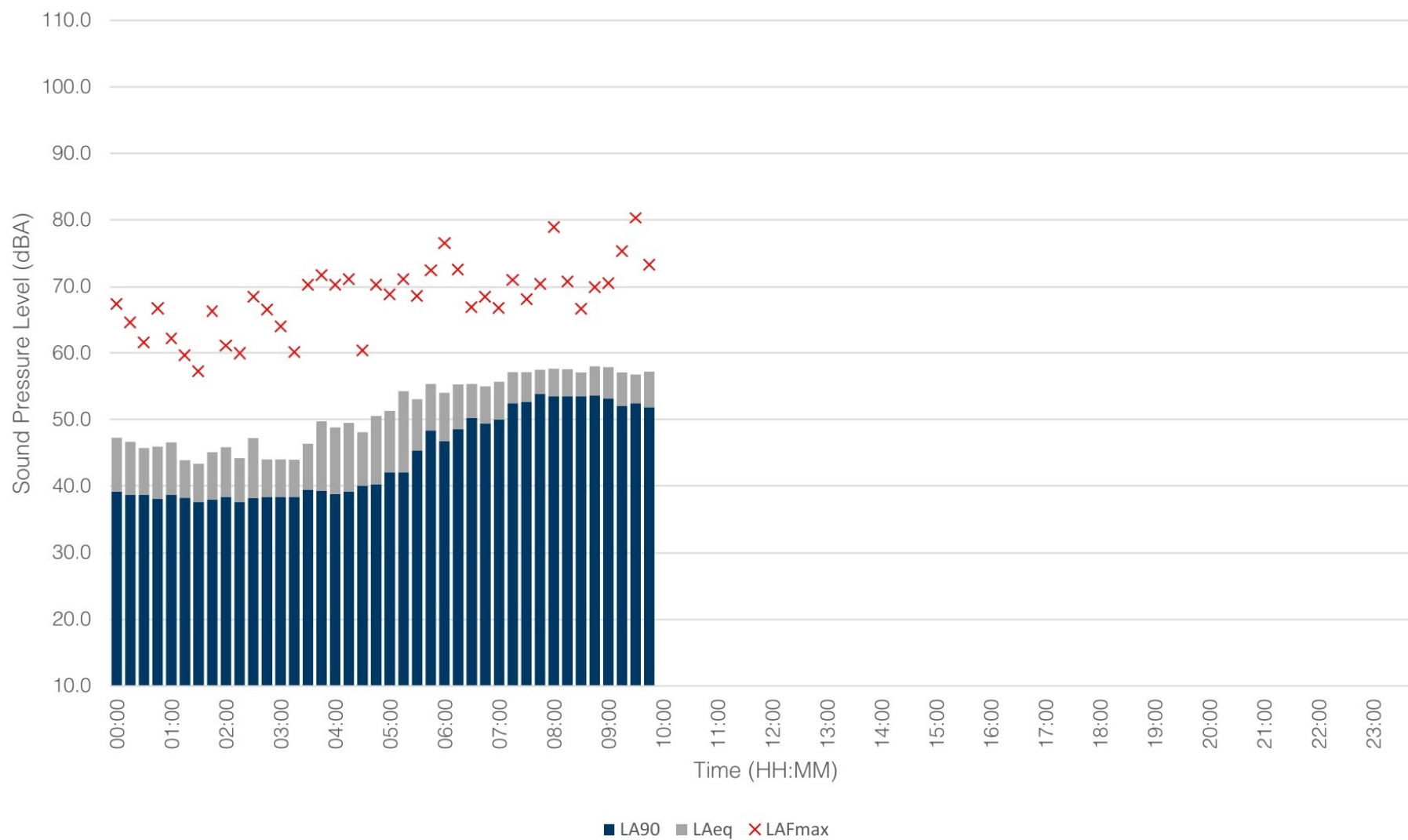
Time History Graph B.7

Project Name:	Bennet Court
Measurement Location:	L1
Survey Date:	05/12/2022



Time History Graph B.8

Project Name:	Bennet Court
Measurement Location:	L1
Survey Date:	06/12/2022



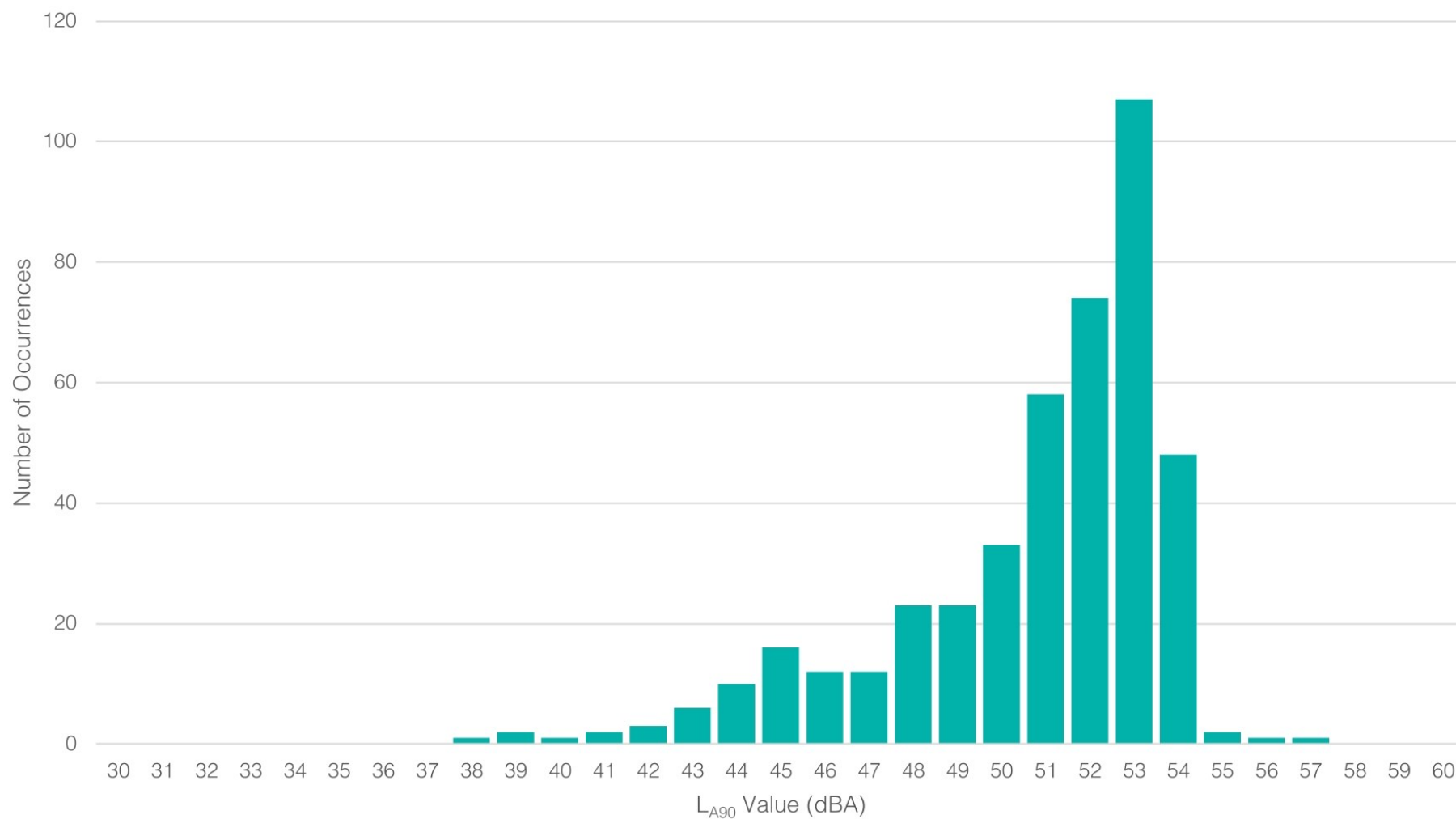
APPENDIX C – STATISTICAL ANALYSIS OF BACKGROUND L_{A90} LEVELS

Statistical Analysis Graph C.1

Project Name:	Bennet Court
Measurement Location:	L1
Survey Date:	29/11/2022 - 6/12/2022



L1 Daytime Background L_{A90} Occurrence Frequency

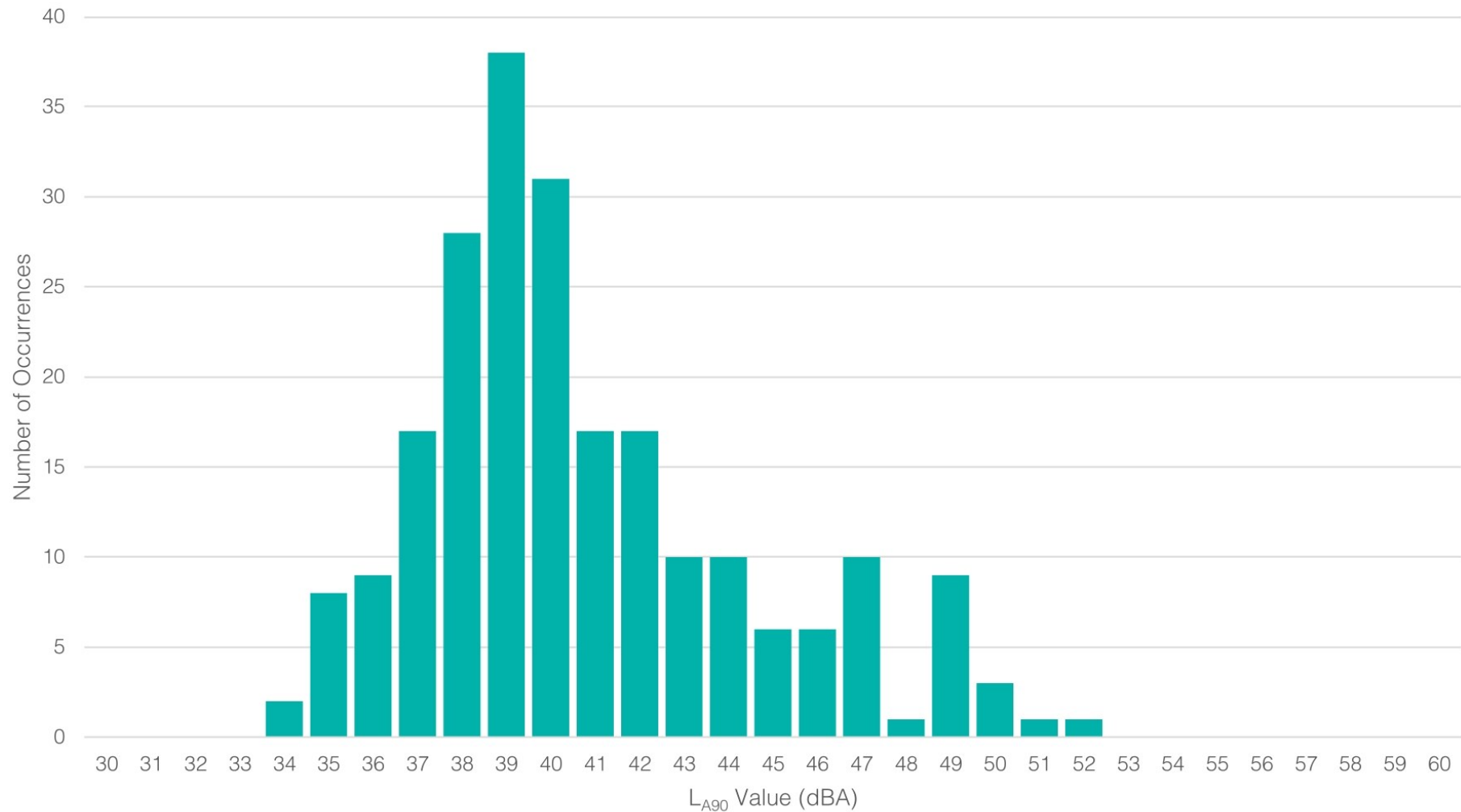


Statistical Analysis Graph C.2

Project Name:	Bennet Court
Measurement Location:	L1
Survey Date:	29/11/2022 - 6/12/2022

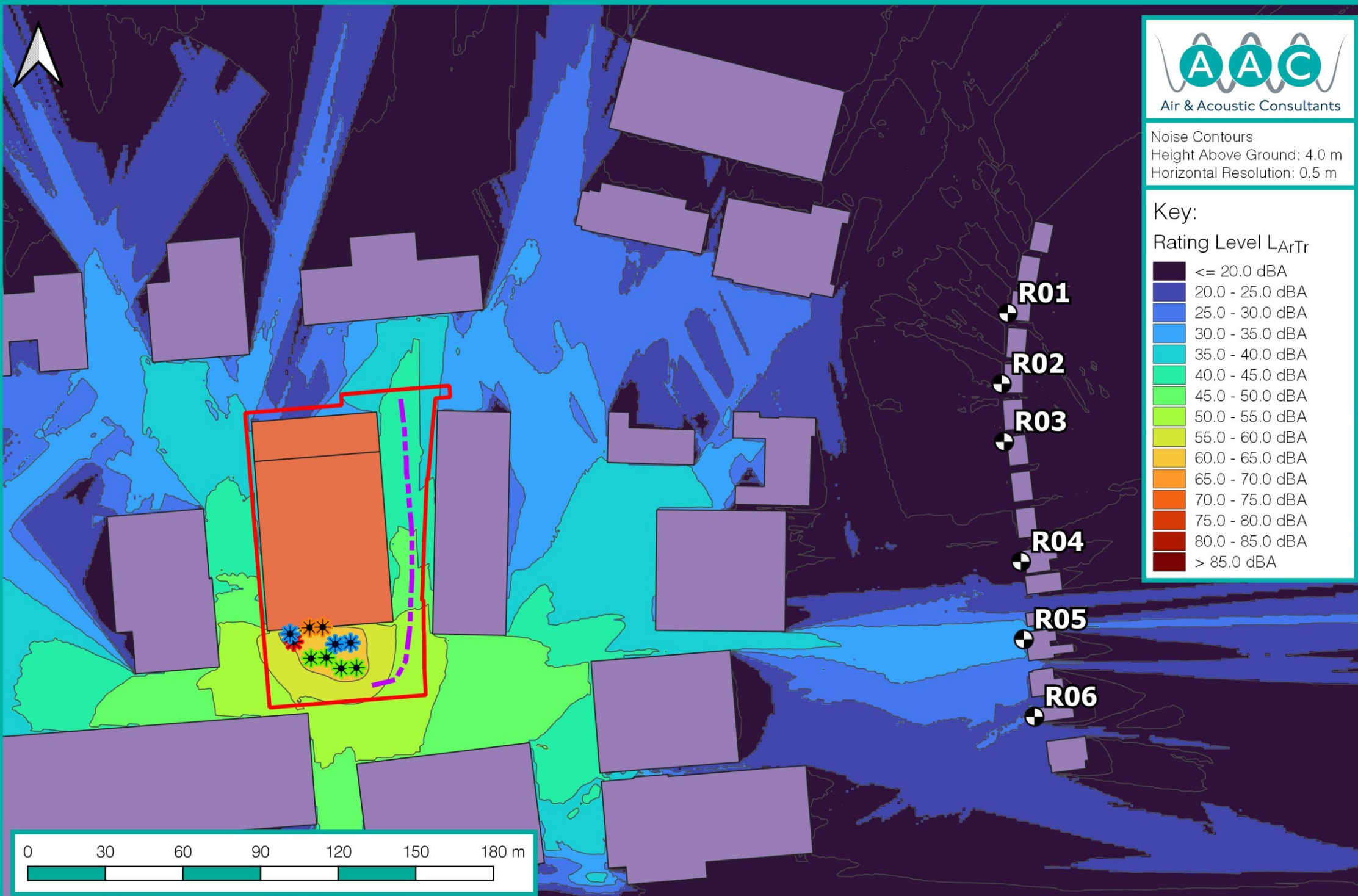


L1 Night-time Background L_{A90} Occurrence Frequency

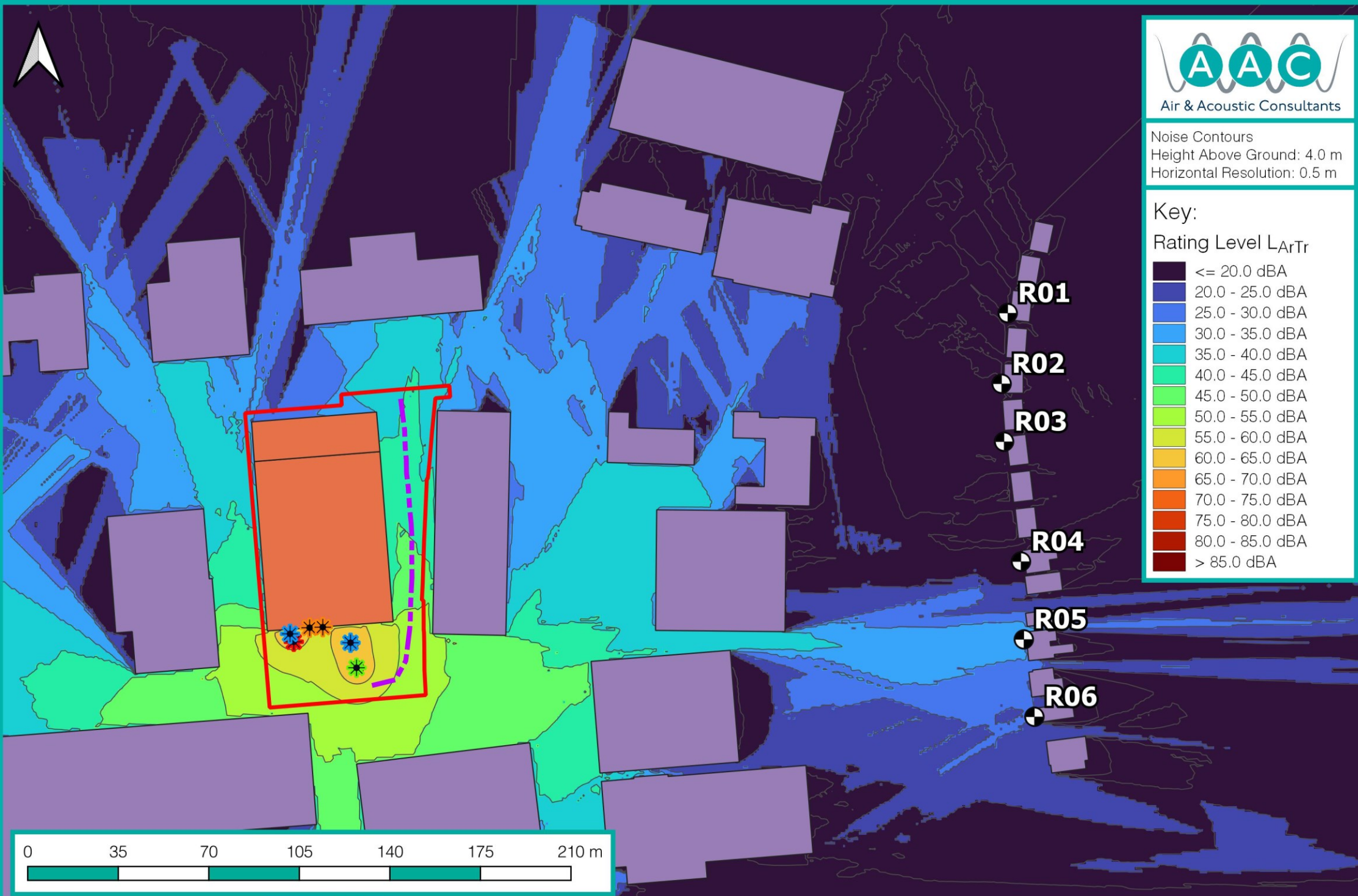


APPENDIX D – NOISE CONTOURS

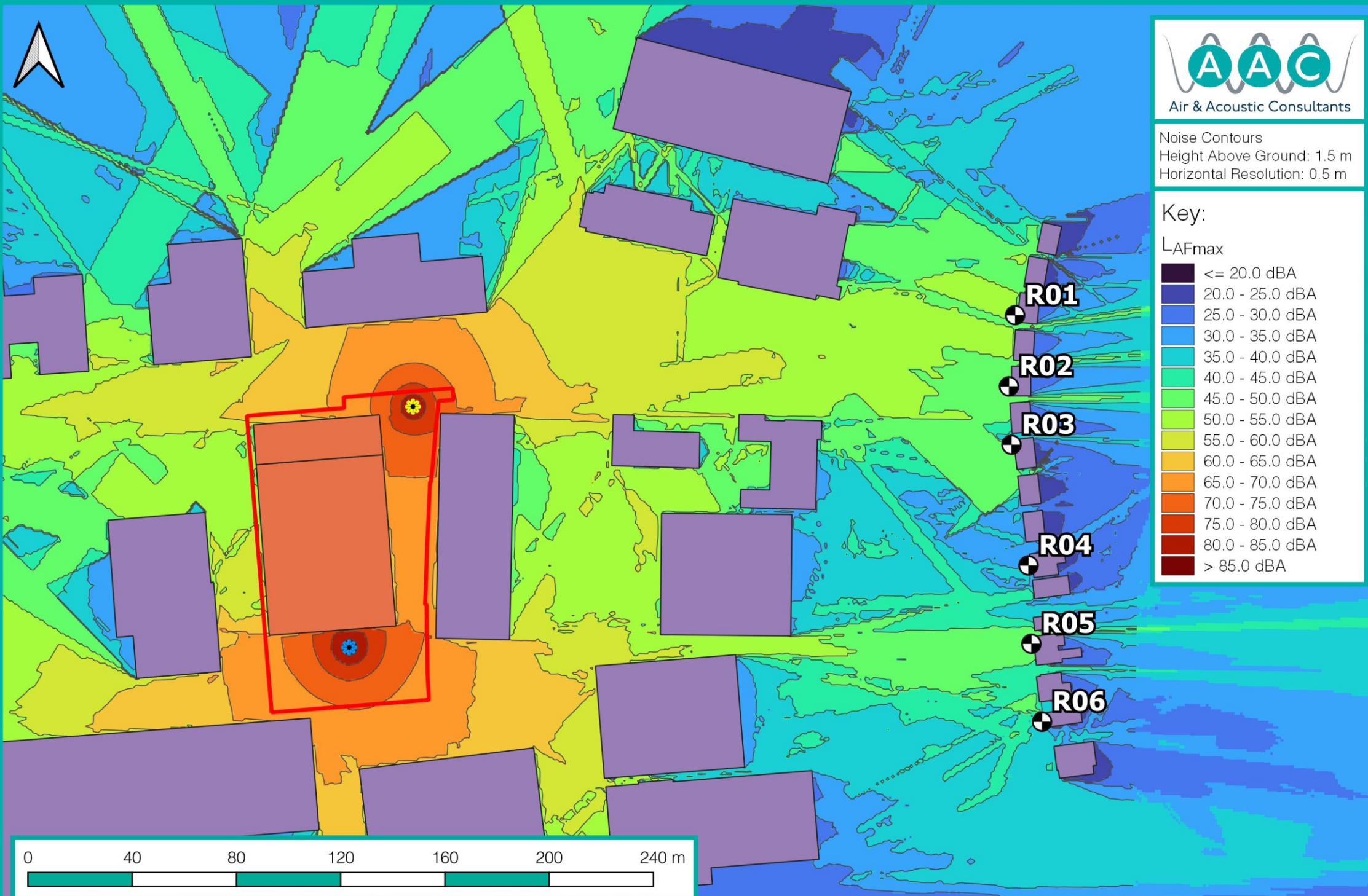
D.1 Daytime Industrial Noise Contours



D.2 Night-Time Industrial Noise Contours



D.3 Maximum Industrial Noise Contours





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