Able Acoustics

ROBINSON ESCOTT PLANNING LLP

41 CHURCH ROAD, BEXLEYHEATH

ACOUSTIC ASSESSMENT

JANUARY 2024

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Prepared By:	*Edward Crofton-Martin*	*Principal Acoustic Consultant*	
Checked By:	*Edward Crofton-Martin*	*Principal Acoustic Consultant*	
Approved By:	*Edward Crofton-Martin*	*Principal Acoustic Consultant*	

Able Acoustics Limited
Unit 20, Connect 10
Foster Road
Ashford
Kent
TN24 0FE
England
www.ableacoustics.com
info@ableacoustics.com

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1. INTRODUCTION

1.1 Introduction

1.1.1 Permission is sought to redevelop the site: Land at 41 Church Road, Bexleyheath, Kent, DA7 4DD for residential purposes.

1.1.2 Following the Pre-Application meeting with the Local Planning Authority It has been communicated by the client that an acoustic assessment (of both sound and vibration) is required to inform the application.

1.1.3 Robinson Escott Planning LLP acting on behalf of the client has instructed Able Acoustics Ltd to carry out an acoustic assessment for the site.

1.1.4 This report presents the monitoring undertaken, the results of the assessment and suggestions for mitigation where applicable.

2. UNITS AND STANDARDS

2.1 General

2.1.1 The range of audible sound is from 0 dB to 140 dB and a range of typical levels is presented in Table 2.1 below. Noise is a subjective term and can be defined as unwanted sound.

Table 2.1 Typical Sound Levels

Sound Pressure Level dB(A)	Source	Subjective Level
130 - 140	Jet (at 10m)	Threshold of pain
120 – 130	Pneumatic Drill (at 1m)	Extremely Loud
110 – 120	Loud Car Horn (at 1m)	Very Loud
100 – 110	Alarm Bell (at 1m)	Very Loud
80 – 90	Inside General Factory	Loud
70 – 80	Average Traffic (on street corner)	Loud
60 – 70	Conversational Speech	Moderate
50 – 60	Typical Business Offices	Moderate
40 – 50	Living-room Urban Area	Quiet
30 – 40	Library	Quiet
20 – 30	Bedroom (at night)	Very Quiet
10 - 20	Broadcasting Studio	Very Quiet

2.1.2 For variable sound sources a difference of 3 dB(A) is just distinguishable. For road traffic or railway sound sources, a doubling of traffic flow will increase the overall noise by 3 dB(A). The "loudness" of a sound is a purely subjective parameter, but it is generally accepted that an increase/decrease of 10 dB(A) corresponds to a doubling/halving in perceived loudness.

2.1.3 The frequency response of the ear is usually taken to be about 20 Hz (number of oscillations per second) to 20 kHz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the measuring instrument. The weighting which is most widely used and which correlates best with subjective response to sound is the dB(A) weighting. This is an internationally accepted standard for environmental sound measurements.

2.1.4 External sound levels are rarely steady, but rise and fall according to activities within an area at any given time. In an attempt to produce a figure that relates this variable sound level to subjective response, a number of indices have been developed. These include:

i) *$L_{Aeq,T}$ Sound Level*

This is the "equivalent continuous A-weighted sound pressure level, in decibels", and is defined in British Standard BS 7445 [1] as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe sound attributable to construction and

sound from industrial premises and is the most suitable unit for the description of other forms of environmental sound. In simpler terms, it is a measure of energy within the varying sound.

ii) *The L_{Amax} level*

This is the maximum level recorded over the measurement period.

iii) The L_{A90} level

This is the level that is exceeded for 90% of the measurement period and gives an indication of the level during quieter periods. It is often referred to as the background sound level and is used in the assessment of disturbance from industrial sound.

iv) Ambient Sound

This is the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. The ambient sound comprises the residual sound and the specific sound when present.

v) Residual Sound

This is the sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

vi) Specific Sound

This is the sound from the sound source under investigation. The specific sound may be determined by subtracting the measured Residual Sound Level from the measured Ambient Sound Level.

2.2 Planning and Noise

2.2.1 The National Planning Policy Framework (NPPF) [2] provides guidance on noise and planning issues. The purpose of this document is to help achieve sustainable development.

2.2.2 In Section 191, The NPPF states that:

> *"191. 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[69];*

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

2.2.3 In Section 193, The NPPF states:

"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."

2.2.4 Footnote 69 of Section 191 makes reference to The Noise Policy Statement for England (NPSE) [3]. Since March 2010 NPSE applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

2.2.5 The NPSE sets out the long term vision for 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."

This is supported by the following aims:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *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."*

2.2.6 The first aim of the NPSE should be read in the context of Government policy on sustainable development indicating that significant adverse effects on health and quality of life should be avoided while accommodating the principles of sustainable development.

2.2.7 The second aim of the NPSE is applicable where the impact falls between LOAEL and SOAEL (see 2.2.9 below) requiring that all reasonable measures to mitigate and minimise adverse impacts on health and quality of life be implemented while accommodating the principles of sustainable development. This does not imply that any adverse effects cannot occur.

2.2.8 The third aim of the NPSE is to actively improve health and quality of life through

effective management of noise within the context of Government policy on sustainable development where ever it is possible and reasonable to do so.

2.2.9 The NPSE applies the following concepts adapted from toxicology:

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.

SOAEL – Significant Observed Adverse Effect Level

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

2.2.10 It should be noted that there are no numerical values for these concepts defined in the NPSE. There is also no single objective noise-based measure that defines Observed Effect Levels that is applicable to all sources of noise in all situations and, consequently, the levels are likely to be different for different noise sources, for different receptors and at different times.

2.3 Local Authority Requirements

2.3.1 The local planning authority: London Borough of Bexley (LBB) has requested an assessment of noise and vibration be carried out as follows:

"Officers are considered [sic] about adverse noise impact arising from vibration generated from the existing nursery operation at No.41 [sic] would not be conducive to future residential intensification along this site. In the absence of a noise impact assessment from a suitably qualified expert, it is not possible to fully assess the potential impact on neighbouring amenity. Notwithstanding the above, officers are concerned that the proposed development by virtue of its proximity to the ongoing use at No.41, could give rise to adverse noise impact during hours of use.

The Agent of Change principle is set out in the London Plan. It places the responsibility for mitigating the impact of existing noise and other nuisances firmly on the new development. The onus is on the new use to ensure its building or activity is designed to protect existing users or residents from noise impacts. Applications for development proposals in town centres should clearly demonstrate how noise and other nuisances will be mitigated and managed.

Should an application be forthcoming it should be accompanied by a Noise impact Assessment produced by and [sic] accredited Noise Consultants which presents the findings of a baseline sound survey and the results of an assessment of sound impacts resulting from the proposed installations [sic], in accordance with BS 4142:2014+A1:2019 methodology. The Assessment concludes [sic] the proposed noise sensitive receptors, with the rated sound levels a[sic] below the adopted background sound level."

2.3.2 The local authority's local plan was adopted April 2023

2.3.3 Policy DP11 of the Bexley Local Plan, Achieving High-Quality Design and clauses d and e of the relevant sub heading Privacy Outlook and Adverse Impacts [4] states the following:

"1. Development proposals within a Primarily Residential Area, as defined on the Policies Map, must seek to protect or enhance the area's character and its amenities. Proposals for uses other than those residential in nature, will only be acceptable where they provide community, social or leisure facilities, or employment uses compatible with a residential area.

2. Irrespective of location, all development proposals for new buildings, extensions and alterations, conversions, changes of use and public and private spaces will be expected to follow the principles and requirements set out in this document… :

…Privacy, outlook and adverse impacts

…d. ensure existing properties' amenity is appropriately protected

e. ensure that all proposed development and uses do not unacceptably affect residents or occupiers of either the proposed development or of existing neighbouring residents, businesses and community facilities by means of noise, odour, vibration and light spill or other disturbances"

2.4 Standards and Guidance Sound

BS 8233:2014

2.4.1 Guidance on internal sound levels is provided in Table 4 of British Standard (BS) 8233 [5]. With regard to residential accommodation, the following guidance is given:

Table 2.2: Indoor Ambient Noise Levels In Spaces When They Are Unoccupied

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,\ 16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,\ 16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16hour}$	30 dB $L_{Aeq,\ 8hour}$

2.4.2 The levels shown in Table 4 of BS 8233 are based on the existing guidelines issued by the World Health Organisation (WHO) and assume normal diurnal fluctuations in external noise.

2.4.3 The World Health Organisation has produced guidance on noise limits which should prevent the onset of sleep disturbance [6]. The WHO guidelines state:

"When noise is continuous, the equivalent sound pressure level should not exceed 30 dB(A) indoors, if negative effects on sleep are to be avoided…..Indoor guideline values for bedrooms are 30 dB LAeq for continuous noise and 45 dB LAmax for single sound events."

2.4.4 The guidance given by the WHO therefore is consistent with internal noise levels as specified by BS 8233 at night and it is recommended, that internal noise levels within the proposed residential accommodation should not exceed 30 dB $L_{Aeq,\ 8hr}$ and 45 dB $L_{Amax,\ F}$ at night. During the daytime, noise levels within living rooms and bedrooms should not exceed 35 dB $L_{Aeq,\ 16hr.}$ However, it should be noted that BS 8233:2014 also provides the following informative note:

"Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

2.4.5 The internal noise level within a dwelling is dependent on the noise level arriving at the external facade of the dwelling, the sound insulation properties of the dwelling (wall and window construction) and the size and furnishings in the rooms. The prediction of internal levels is therefore a complex process, dependent upon many factors.

2.4.6 In the absence of specific guidance on L_{AMax} levels during the night in BS 8233:2014 supplementary guidance on nighttime L_{AMax} events is given in the ANC[1], IOA[2] and CIEH[3] joint issue document: Professional Practice Guidance on Planning & Noise (ProPG) [7] which is aimed at new residential development. The guidance recommends that in most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used to ensure that individual noise events do not normally exceed 45dB $L_{Amax,F}$ 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. It is further noted that Appendix A of the ProPG guidance notes that physiological awakenings (as distinct from behavioural awakenings) of which the individual may neither be aware at the time nor recall the next day, may occur where events of 55dB L_{AMax} were present.

2.4.7 BS 8233:2014 is consistent with the WHO guidelines and also states the following:

"Design criteria for external noise

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

[1] Association of Noise Consultants
[2] Institute of Acoustics
[3] Chartered Institute of Environmental Health

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."

2.4.8 The latest revision of the online document: Planning Practice Guidance: Noise [8] makes the following observation at paragraph 11:

"Are there further considerations relating to mitigating the impact of noise on residential developments?

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

…a relatively quiet, protected, external publically [sic] accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance)."

2.4.9 The document: also provides the following matrix of likely average response:

Table 2.3: Planning Practice Guidance – Noise Exposure Hierarchy

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

BS 4142 Method

2.4.10 BS 4142 is not intended to be used for assessing sound from people but may supplement an absolute level assessment, on the basis the nursery is a commercial facility and assist in providing a more measured assessment.

2.4.11 BS 4142:2014+A1:2019 [9] provides methods for rating and assessing industrial and commercial sound. The Standard is used by local authorities and consultants to rate sound from fixed installations. The Standard was considerably revised in 2014 and amended in 2019.

2.4.12 The Standard advocates the use of L_{Aeq}, a level which is directly measurable. The L_{Aeq} is either measured or calculated at a receptor location and termed the "Specific Sound Level". The Specific Sound Level may then be corrected for the character of the sound and is then termed the "Rating Level".

2.4.13 When presenting values to be used in an assessment BS 4142:2014 requires that levels should be expressed as whole numbers on the grounds that expressing to one or more decimal places implies an improper degree of precision.[4]

2.4.14 When used to assess the impacts, the Rating Level is determined and the L_{A90} background sound level is subtracted from it, the result is then considered alongside a range of pertinent factors to determine the context. The Standard states:

"a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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."

The Standard notes that more than one assessment may be necessary[5] and continues to further qualify the assessment protocol by outlining conditions to the comparative assessment and stating that "not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact", thus implying that all sites should be assessed on their own merits and specifics. The Standard quantifies the typical reference periods (for the purposes of the standard) to be used in the assessment and these are shown in Table 2.2 below:

[4] This convention has also been applied in the presentation of the measured levels in the Appendices for consistency.
[5] Note 1 to Clause 11 Assessment of the impacts.

Table 2.4 Reference Periods

Period	Hours	Assessment Period
Typical Daytime	07:00 – 23:00	1hr assessment period
Typical Night-time	23:00 – 07:00	15min assessment period

2.4.15 The Standard notes that sound with prominent impulses has been shown to be more annoying than continuous types of sound (without impulses or tones) with the same equivalent sound pressure level. The Standard outlines a number of methods for defining appropriate "character corrections" within the Rating Sound Level to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency. These are a) the Subjective Method, b) the Reference Method for tonality and c) the Objective Methods for assessing both tonality and impulsivity. It is noted by the Standard that where multiple features are present the corrections should be added in a linear fashion to the Specific Sound Level. The Subjective Method is based on the following corrections shown in Table 2.3 below:

Table 2.5 Subjective Method Rating Corrections

Level of Perceptibility	Tonal Correction	Impulsivity Correction	Intermittency Correction	Correction for "Other sound characteristics"
No Perceptibility	+0dB	+0dB	If intermittency is readily identifiable +3dB	When neither tonal nor impulsive, nor intermittent but clearly identifiable +3dB
Just Perceptible	+2dB	+3dB		
Clearly Perceptible	+4dB	+6dB		
Highly Perceptible	+6dB	+9dB		

2.4.16 The Objective Methods are based around the actual quantification of frequency data and the impulsive prominence of the sound under investigation where possible.

2.4.17 It should be noted that the Standard states that the assessment methodology provided is not intended for the derivation of internal levels arising from sound levels outside or for the assessment of low frequency sound.

2.4.18 The Standard requires that when assessing the impacts the initial estimate of the impact may need to be modified due to context in which case pertinent factors (See Section 3 and Section 5) need to be taken into consideration. These may include:

- The absolute level of sound in comparison to the residual sound level
- The character and level of the residual sound compared with the character[6] and level of the specific sound, e.g. does the residual sound contain already existing sources of impulsive or tonal sound and do these operate at similar times to a proposed new source and to what degree this would represent an incongruous sound by comparison with the acoustic environment in the absence of the specific sound.
- The sensitivity of the receptor and whether dwellings or other premises used for

[6] The use of the word "character" in association with terms residual sound and specific sound indicates consideration be given to acoustic features which may increase the significance of impact of a sound.

residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

i) Façade insulation treatment

ii) Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation

iii) Acoustic screening

Approved Document O

2.4.19 Approved Document O (ADO) of the Building Regulations [10] refers to noting that the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (23:00 – 07:00) and provides target thresholds above which an overheating assessment will be required as follows:

"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)."

2.5 Standards and Guidance Vibration

2.5.1 Vibration is normally measured in terms of Vibration Dose Value (VDV) to establish a relationship between the source of vibration and subjective response. This is based on the fourth root of the time integral of the fourth power of the weighted acceleration value and is weighted towards magnitude rather than duration. It is normally used as a measure of human response to vibration.

2.5.2 Vibration may also be measured in terms of the Peak Particle Velocity (PPV) which is the maximum instantaneous velocity of a particle at a given point during a specified time interval and is normally used for the evaluation of damage levels from ground borne vibration. It should be noted that VDV and PPV are different quantities and are not directly comparable. The assessment of human response to vibration (other than from blasting) within buildings is currently guided by British Standard, BS 6472, Part 1 [11]. British Standard 7385: Parts 1 and 2 [12] & [13] defines the methodology for measuring vibration and the evaluation of the effect of vibration on buildings.

2.5.3 The relevant criteria outlined in each British Standard are summarised below.

BS 6472-1:2008 Guide to Evaluation of Human Exposure to Vibration in Buildings

2.5.4 BS 6472 Part 1 defines the method of evaluating human response with respect to vibration from sources other than blasting. BS 6472-1 requires that vibration is assessed over 16-hour daytime and 8 hour night-time periods using VDV.

2.5.5 Table 1 of the Standard provides a matrix of VDV ranges intended to provide an indication of the probability of adverse comment, reproduced in Table 2.4 below:

Table 2.6: Vibration dose value ranges which might result in various probabilities of adverse comment within residential buildings.

Place and time	Low probability of adverse comment $ms^{-1.75}$ 1)	Adverse comment possible $ms^{-1.75}$	Adverse comment probable $ms^{-1.75}$ 2)
Residential buildings 16hr day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8hr night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Notes: 1) Below these ranges adverse comment is not expected.
2) Above these ranges adverse comment is very likely

BS 7385: 1990 Evaluation and Measurement for Vibration in Buildings

2.5.6 British Standard 7385: Parts 1 and 2 define the methodology to be applied to the measurements undertaken and the levels at which damage to buildings may occur. The standard takes into account the type of building under consideration (foundation design and age) and underlying soil types.

2.5.7 Varying degrees of damage may occur to a building that is subject to vibration. The first degree of damage is termed "cosmetic" and it is subsequently recommended that vibration limits are chosen to avoid the onset of cosmetic damage.

2.5.8 Vibration is assessed in terms of PPV when evaluating building damage. Table 1 of BS 7385-2 defines the limits of PPV, above which cosmetic damage may occur. These are reproduced in Table 2.5 below: Minor building damage is possible at vibration magnitudes which are twice the limit.

Table 2.7: Transient vibration guide values for cosmetic damage

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50mm/s at 4Hz and above	
Unreinforced or light framed structures Residential or light commercial buildings	15mm/s at 4 Hz increasing to 20mm/s at 15Hz	20mm/s at 15 Hz increasing to 50mm/s at 40 Hz and above

2.5.9 It is recommended that PPV values in any of the three orthogonal axes (when measured at the foundation of the building) should not exceed 15 mm/s to prevent the onset of cosmetic damage. However, it should be noted that vibration of this magnitude would be likely to give rise to disturbance in residential environments and would be expected to be unacceptable when assessed using BS 6472 as detailed above.

3. SITE LAYOUT

3.1 Overview

3.1.1 The application site is located at the rear of 41 Church Road, Bexleyheath, Kent, DA7 4DD and is located on the east side of Church Road and is shown in Figure 01.

3.1.2 The scheme proposes to replace the existing industrial/commercial buildings to the rear of the site and also the staff parking/garden area of the nursery with three residential buildings split across 7 plots and the proposed layout is shown in Figure 02.

3.1.3 The site is primarily flat and currently comprises a staff parking/garden area associated with the nursery at 41 Church Road, industrial use buildings scheduled to be demolished and replaced and associated parking/turning areas.

3.1.4 The site is bounded by residential buildings on Church Road to the north, a cemetery to the east, residential buildings on Church Road and Trinity Place to the south and Church Road to the west.

3.1.5 Further from the site to the south circa 130m is the Bexley Town Centre and The Broadway (A207).

3.1.6 Further from the site circa 1000m is Russell Park, which is considered to be *'a relatively quiet, protected, external publically accessible amenity space'* in the context of the latest revision of the Planning Practice Guidance outlined in Section 2.4.8 above.

3.1.7 LBB has specified the nursery as the source of sound and vibration with the potential to affect the future residential units that must be assessed (Section 2.3.1 above). The nursery is restricted to a maximum of 25 children and use of the external play areas is limited to 09:30-11:30 and 14:45-16:15.

3.1.8 It is further noted the nursery footprint (external play area) will be reduced in size as part of the application.

3.1.9 The opening hours of the nursery are 07:30 to 18:00 Mondays to Fridays only and it was reported staff arrive at the nursery between 07:00 and 07:15 and leave between 18:00 and 18:15.

4. MEASUREMENTS

4.1 General

4.1.2 To establish existing levels at site unattended monitoring has been undertaken at one location for sound and a second location (closer to the existing A228) for vibration.

4.2 Instrumentation

4.2.1 The following instrumentation was used for the measurements:

- Rion type NL-52 Sound Level Meter (Serial No. 01143557)
- Rion type NH-25 Pre-amplifier (Serial No. 43574)
- Rion type UC-59 Microphone (Serial No. 16931)
- Rion type NC-74 Sound Level Calibrator (Serial No 34936366)
- Rion XV-2P Tri-axial Vibration Monitor (Serial No 00370011)

4.2.2 All equipment was within current manufacturer's periods of calibration/conformance and calibration/conformance certificates are attached in Appendix A.

4.2.3 Additionally, the following instrumentation was used to monitor the weather conditions:

- Lutron type LM-8000A 4 in 1 Measuring Instrument (Serial No AG.39828)

4.3 Unattended Monitoring - Sound

4.3.1 An unattended measurement survey was undertaken at the site between 14:30 hours on Thursday 11th January until 15:45 hours on Friday 12th January 2024.

4.3.2 The microphone was mounted on a tripod in free field conditions at the edge of the proposed building footprint closest the nursery play area at a height of 1.5m and had a direct line of sight to children and staff in the external play area. The monitoring location is also shown in Figure 02.

4.3.3 The meter was set to record the following metrics automatically over 15-minute periods:

- L_{eq}
- L_{max}
- L_{90}

The meter was additionally set to record the above metrics in 1/3 Octave centre frequency bands.

4.3.4 The frequency response of the meter was set to "A" and the time response set to "Fast".

4.3.5 At the start of the unattended measurement survey the meteorological conditions were dry, 2° Celsius with 100% cloud cover with no measurable breeze.

4.3.6 Upon retrieval of the equipment the meteorological conditions were noted to be dry, with temperatures of 6° Celsius, 75% broken cloud cover and changeable wind of up to 1.0m/s^{-1}.

4.3.7 At the start and end of the unattended measurement survey the acoustic environment was subjectively considered to be primarily attributable to children and staff in the

external play area and road traffic from local roads.

4.3.8 Before the measurement survey was started the instrumentation was field calibrated using a reference sound calibrator to a level of 94.0dB. The instrumentation was then checked using the same reference sound calibrator when the measurement survey was stopped and a value of 94.0dB was also recorded.

4.3.9 The measured $L_{Aeq,\ 15min}$ levels have been combined to give the $L_{Aeq,\ 16hr\ daytime}$ & $L_{Aeq,\ 8hr\ night\ time}$ levels and also the maximum noise level measured during these periods. Full measurement results are provided in tabular form in Appendix B. The period L_{Aeq} values are summarised in the table below.

Table 4.1: Summary of Measurement Results

Period Commencing	$L_{Aeq,\ T}$	L_{AMax}
11/01/2024 14:30[7]	49	77
11/01/2024 23:00	41	79
12/11/2024 07:00[8]	49	80

4.4 Background and Residual Sound Levels

4.4.1 The measured level ranges in the absence of nursery play area operations are presented in the table below[9]. Full measurement results are presented in Appendix B.

Table 4.2: Summary of Night-time Measurement Results Location A

Night	L_{Aeq} range	L_{Amax} range	L_{A90} range
Highest	55	80	45
Lowest	44	55	40
Mode	-	-	44

*Values presented as whole numbers as is the convention within BS 4142

4.4.2 The measurement results indicate a range of values from 40dB $L_{A90,T}$ to 45dB $L_{A90,T}$. A modal analysis of the measurement indicates a value of 44dB $L_{A90,T}$

4.4.3 The measurement results indicate a range of values from 44dB $L_{Aeq,T}$ to 55dB $L_{Aeq,T}$. For the purpose of this assessment the representative residual sound level is considered to be the logarithmic average value of the measurement results for all of the measured night time values. A value of 48dB $L_{Aeq,T}$ has been determined as the representative residual sound level value.

4.5 Commercial Sound

4.5.1 Due to the sensitive nature of the site it was not possible to gather measurements at source and the ambient level for the worst case period has been determined by taking the logarithmic average of all the measurements when the play area was in use over both days and a value of 52dB $L_{Aeq,T}$ has been taken as the ambient level when nursery operations are at the most prevalent.

4.5.2 The specific sound level was determined by subtracting the residual sound level from

[7] Not a complete 16 hour period
[8] Not a complete 16 hour period
[9] Measured values from the periods 07:30-18:00 excluding periods the play area could be in use i.e. 09:30-11:30 and 14:45-16:15.

the ambient sound level and a value of 49dB $L_{Aeq,Tr}$ has been determined.

4.6 Rating Level

4.6.1 BS 4142 notes that sound with certain acoustic characteristics has been shown to be more annoying than continuous types of sound with the same equivalent sound level and where this is the case, corrections for acoustic characteristics maybe applied.

4.6.2 The specific sound (49dB $L_{Aeq,Tr}$) is similar in level to the residual sound (48dB $L_{Aeq,T}$). Based on site observations the specific sound was readily identifiable over the residual acoustic environment and a +3dB character correction for intermittency has been applied. It should be noted that while sound from the play area was intermittent it was estimated as present for approximately 25% of the reference period (this would equate to a 6dB reduction to the specific level). However, the source (play area) has been assumed to be in constant operation through the reference period for the purpose of an absolute worst case scenario and to build additional protection into the report and a rating level of 52dB $L_{Ar,1hr}$ has been determined.

4.7 Unattended Monitoring - Vibration

4.7.1 Vibration monitoring was undertaken at the site between 14:30 hours on Thursday 11th January until 15:45 hours on Friday 12th January 2024.

4.7.2 A Rion XV-2P vibration meter was used to undertake unattended vibration monitoring. The sensor of the XV-2P was rigidly mounted to a heavy plate fitted with spiked feet and the plate was positioned directly onto the ground at the edge of the existing building closest to the nursery staff vehicle access route and the associated play area. The monitoring location was selected on the basis of being closest to the most significant source of vibration and any mitigation that would be sufficient for this location would also be sufficient for receptors located further away.

4.7.3 The X- and Y-axes (in the horizontal plane) were orientated so that the Y-axis was parallel to the building façade at the monitoring location while the X-Axis was at right angles. The Z-axis was in the vertical direction. The measurement position is also shown on Figure 02.

4.7.4 The unit was set to record both VDV and PPV in each of the three orthogonal directions at 5-minute intervals. These values have been combined to give VDV values for comparison with the value ranges for various probabilities of adverse comment given in BS 6472. All equipment is within current manufacturer's periods of calibration for new equipment and the manufacturer's conformance certificate is attached in Appendix A.

4.7.5 The results of the unattended vibration survey are presented in tabular form in Appendix B. The measurement values have been summarised in the table below.

Table 4.3: Summary of Unattended Vibration Measurements

Day	Measured 16-hr Daytime VDV ($m/s^{1.75}$)			Measured 8-hr Night-time VDV ($m/s^{1.75}$)		
	X (parallel)	Y (radial)	Z (vertical)	X (parallel)	Y (radial)	Z (vertical)
Thursday 11/01/2024[10]	0.013	0.002	0.033	0.000	0.000	0.000
Friday 12/01/2024[11]	0.056	0.002	0.030	-	-	-
Total Survey	**Highest Measured PPV (mm/s)**					
	2.1 (Z Axis)					

The highest individual measured PPV value was 9.8mm/s on the Z Axis and was the only instance of a similar event on scrutiny it was reported to be attributable to a gate slam immediately adjacent to the monitor and has been discounted as atypical.

[10] Not a full 16 hour period
[11] Not a full 16 hour period

5. ASSESSMENT

5.1 General

5.1.1 The highest measured L_{Aeq} and L_{AMax} levels have been used to form the basis of the calculations and to determine any glazing and ventilation requirements as well as any mitigation requirements for external amenity areas.

5.1.2 BS 8233 indicates that the good design range level for sleeping conditions in bedrooms should not exceed 30dB $L_{Aeq, 8Hour}$. It continues to suggest that the reasonable design range level for sleeping conditions in bedrooms should not exceed 35dB $L_{Aeq, 16Hour}$. The standard continues to recognise that regular individual noise events may cause sleep disturbance.

5.1.3 The guidance presented in the WHO guidelines on community noise and the ProPG document indicate that if negative effects on sleep are to be avoided individual noise levels within bedrooms at night should not normally exceed 45dB L_{Amax} 10 times a night.

5.1.4 The highest absolute level $L_{Amax,F}$ value measured during the night was 78.8dB $L_{Amax,F}$.

5.1.5 An open window is expected to provide approximately 15dB of façade attenuation, and an external absolute maximum level of 78.8dB $L_{AMax,F}$ and would correspond to an internal absolute maximum level of 63.8dB $L_{AMax,F}$

5.1.6 This is in excess of the threshold values presented in Approved Document O at which windows are likely to be closed during sleeping hours and an overheating assessment will be required.

5.1.7 In line with the ProPG Guidance an evaluation of the remaining highest 10 measured values during the night was undertaken. In the absence of these a value of 55.6dB $L_{Amax,F}$ at the monitoring location has been determined. This is more than 10dB below the highest measured typical $L_{Amax,F}$ value of 78.8dB L_{Amax} and any mitigation that will sufficiently mitigate this (55.6dB $L_{Amax,F}$) to 45dB $L_{Amax,F}$ will need to be increased by 13.2 dB to a performance value of at least 24dB R_w be sufficient to also ensure that highest absolute value (78.8 $L_{Amax,F}$) will not exceed an upper limit of 55dB $L_{Amax,F}$ at which there is potential for physiological awakenings of which the individual may neither be aware at the time nor recall the next day.

5.1.8 Further consideration is given to mitigation as part of the assessments below.

5.2 External Amenity Areas

5.2.1 The measurements show levels are below the desirable guideline value of 50dB $L_{Aeq,T}$ provided by BS 8233:2014 and levels in the proposed gardens (located to the far side of the residential units overlooking the cemetery are expected to be lower due to the increase in screening provided by future site geometry.

5.2.2 Supplementary Commercial Sound Assessment

5.2.3 BS 4142 is not intended to be used for assessing sound from people, and its use here is supplementary to the absolute level assessment on the basis the nursery is a commercial operation.

5.2.4 A summary of the commercial sound assessment is presented in Table 5.1 below:

Table 5.1 Summary of Initial Assessment

Results	Value	Relevant Clause	Commentary
Ambient sound level	52 dB $L_{Aeq,T}$	**7.3.1**	Logarithmic average of all the measurement values made while the play area was in use.
Residual sound level	48 dB $L_{Aeq,T}$	**7.3.2**	Logarithmic average of all the residual level measurement values
Reference Time Interval	1 hour	**7.2**	Assessment made during the day (07:00-23:00) so reference time interval is 1 hour.
Specific sound level	49 dB $L_{Aeq,1hr}$	**7.3.4**	Specific sound level determined by measurement and calculation.
Acoustic feature correction	+3 dB	**9.2**	The specific sound level is at least 3dB below the residual sound level and is unlikely to be inaudible over and above the residual sound level. A worst case correction has been applied for perceptible impulsive sound characteristics which (although not observed) have the potential to be ordinarily present in such environments.
Rating level	52dB $L_{Ar,1hr}$	**9.1** **9.2**	Specific sound level plus the Acoustic feature correction value
Background sound level	44dB $L_{A90,T}$	**8**	The $L_{A90,T}$ value was taken when the source was not present and at a time the unit could operate.
Excess of rating level over background sound level	+8 dB	**11**	Background sound level subtracted from the Rating level
Assessment indication	Initial assessment indicates an adverse impact to significant adverse impact prior to taking context into account	**11**	See Section 5.3 below
Uncertainty		10	The rating level is 8dB over the background sound level and the residual sound level and in this instance the uncertainty of the measurement does not have any significance to the outcome of the assessment. Measurements were taken under repeatable conditions and uncertainty in the result will be low.

5.3 Context

5.3.1 The initial assessment indicates an adverse impact to significant adverse impact.

5.3.2 BS 4142:2014 requires that the conclusions of the assessment must take the context in which the sound occurs into account.

5.3.3 The main contextual considerations are as follows:

- The character of the area is already mixed residential and industrial/commercial in nature. Given the proximity of the proposed dwellings it is considered any future residents would have an expectation of industrial/commercial sound being present during the day.

- The development represents a scenario where future occupants would come to an existing sound source rather than introducing a new source to existing residents as such there is an increased level of tolerance as the future resident is afforded a choice.

- The external play area will reduce in size as part of the development and the distance from the receiver to the source will increase (away from the proposed residential units).

- BS 4142 notes that where a new noise-sensitive receptor is introduced and there is *'extant'* industrial and/or commercial sound, it should be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation. Other guidance is additionally considered below.

- During the day the external daytime level is 49dB $L_{Aeq,16hr}$ [12] and a glazing specification of at least 14dB R_w will be required to sufficiently the daytime period noise level to meet the internal criteria of 35dB $L_{Aeq,16hr}$ from BS 8233. This is achieved with standard double glazing which Table 1 of BS EN 12758:2019 [14] indicates has a performance value of 25dB R_w (value for standard glazing 4mm pane/(6-16mm air gap)/4mm pane)

- The initial assessment indicates an adverse impact-significant adverse impact with a rating level (52dB $L_{Ar,Tr}$) that is 8dB above the background sound level (44dB $L_{A90,T}$). The nursery only operates during the day.

- A mitigation strategy of 14dB R_w is sufficient to reduce absolute daytime external levels to meet the internal criteria from BS 8233 (i.e 30dB $L_{Aeq,16hr}$). Increasing the glazing strategy (8dB more stringent) to account for the difference in rating and background sound level would be adequate and glazing with an acoustic performance value of at least 22dB R_w will be sufficient for habitable rooms during the day. Glazing with a performance value of 24dB Rw has already been proposed in Section 5.1.7. Standard glazing has a minimum performance that exceeds both

[12] Valeus take from all daytime values 15:30 to 15:30 without engineer present.

requirements and consequently would be suitable for the development.

- Based on the night time absolute maximum levels it is also noted that habitable rooms will require alternative ventilation options such as trickle ventilators or wall ventilation units to prevent the need for relying on open windows for thermal comfort.

- The absolute specific level is within 1dB of the residual sound level.

- The rating level exceeds the residual sound level by 4dB and is intermittently present. However, no additional percentage on-time correction has been applied for the purpose of an absolute worst case scenario.

- The proposed external amenity areas (gardens) will be located at the far side of the proposed residential units and completely screened from the commercial facility by the residential dwellings. No form of external amenity space (either gardens or balconies) overlooking the nursery play area has been proposed.

5.3.4 The initial assessment of the impact of the specific sound level has been obtained by subtracting the background sound level from the rating level and indicates a low adverse impact prior to taking context into account.

5.3.5 Subject to the implementation of mitigation measures it is considered appropriate to modify the outcome of the initial assessment to a low impact once context and all pertinent factors such as the absolute level of sound internally with additional protection to account for the difference in rating and background sound levels is taken into account.

5.4 Potential Impact of Uncertainty

5.4.1 When assessing commercial and industrial sound the BS 4142 requires that the potential impact of uncertainty upon the assessment should be reported. Uncertainty in the context of BS 4142 does not provide an indication of error, but is a recognition of variable factors that may influence the assessment.

5.4.2 The following steps have been taken to minimise uncertainty affecting the measurement values:

- Consideration has been given to the residual sound level as part of the assessment.

- Measurements were taken at a representative position of the closest and potentially most noise sensitive premises.

- Multiple measurements were also undertaken in the absence of the specific sound level.

- Measurements were made over 15 minute intervals to obtain a representative value of the background sound level for the period of interest. This has been done following the guidance given in clause 8.1.3 of BS 4142 that indicates that the measurement time interval should comprise continuous measurements of normally not less than 15 minute intervals.

- The assessment adopts residual and background measurements taken over the remainder of the daytime period the nursery is open but the play area is not in use and include relevant periods the residual and background sound levels would be at their lowest.

- Details of weather conditions at the start and end of the measurement periods were made using a handheld weather monitor at the measurement location.

- Best practice as indicated in the ANC Guidelines [15] has been followed when undertaking the measurements.

- Class 1 Instrumentation has been used for all measurements and a field calibration check was performed both before and after each measurement survey using a Reference Sound Calibrator that has been calibrated to UKAS standards.

- A microphone protection system was used to reduce sound attributable to wind at the microphone. Site measurements were also scheduled for a period when wind speeds were not expected to be unacceptably high and this was confirmed by the on-site measurements made at the start of the measurement survey.

- The survey was primarily unattended and notes were made on site of the relevant sound sources and their respective direction or origin.

- Observations and statements regarding the application site were based on measurement data as well as photographic and documented evidence.

- Measurements were undertaken under repeatable conditions.

- The field work for this assessment was undertaken by a person who holds acoustic qualifications relevant to the application of the Standard and is experienced in undertaking work of this nature.

5.4.3 The following steps have been taken to minimise uncertainty affecting the calculation values:

- The calculations are based on measurement data taken under repeatable conditions.

- Measurements of the residual and background sound levels were made on the application site at a position away from atypical influence (industrial use scheduled to be demolished and replaced as part of the application).

- The assessment calculations have adopted a simplistic approach following the prescribed method in BS 4142.

- The level of rounding used has expressed the results as whole numbers with a value of 0.5 being rounded up as is the convention within BS 4142.

5.4.4 It is considered that all reasonable steps to reduce uncertainty have been taken and while uncertainty maybe present, the level of uncertainty in the result is low.

5.5 Glazing and Ventilation Requirements

5.5.1 It is recommended a standard glazing specification of at least R_w 25dB, be applied to habitable rooms.

5.5.2 The indicative glazing specifications are based on windows being closed to maintain the required internal noise levels. This introduces the issue of ventilation, which must be assessed separately to comply with Building Regulations. Section 5.1 notes an open window is expected to provide approximately 15dB of façade attenuation, and an external absolute maximum level of 78.8dB $L_{AMax,F}$ and would correspond to an internal absolute maximum level of 63.8dB $L_{AMax,F}$ exceeding the threshold values in Approved Document O at which an overheating assessment will be required.

5.5.3 Alternative ventilation greater than the minimum standard in the Building Regulations maybe required to achieve *open window equivalence* and may involve a system that offers user control of ventilation rates to habitable rooms such as living rooms and bedrooms.

5.5.4 It is recommended (subject to confirmation of acceptability from a qualified air quality practitioner) that either passive or powered ventilators be fitted to habitable rooms or that a mechanical system that corresponds to System 4[13] of Approved Document F of the Building Regulations [16] be installed in the event it is not possible to fit ventilators to each of the habitable rooms.

5.5.5 The specification of the final ventilation strategy falls outside the scope of an acoustic assessment.

5.5.6 To retain the acoustic performance of any bedroom windows any ventilation method to be installed must not increase the internal level of noise above the ambient noise level guideline values from Section 2.3 and Section 2.4. Companies which supply alternative ventilation solutions include Greenwood, Titon and Xpelair[14] and example product brochures of alternative ventilation and heat recovery systems are presented in order of increasing performance in Appendix D.

5.6 Vibration Assessment

5.6.1 Measured VDVs are presented in Table 4.2 above. The highest period VDV values measured in each orthogonal axis are summarised in the table below.

Table 5.3: Highest Measured Levels

X (Parallel)	Y (Radial)	Z (Vertical)	PPV
0.056	0.002	0.033	2.1

5.6.2 BS 6472 provides categories for probability of adverse comment and the highest VDV level in any axis falls below the range for “Low probability of adverse comment” when assessed against the criteria for both the day and the night. BS 6472 notes that below this range adverse comment is not expected.

5.6.3 The maximum measured PPV level was 2.1 mm/s. This is significantly below the limit of 15 mm/s given in BS 7385 for the onset of cosmetic damage.

[13] Continuous mechanical supply and extract with heat recovery (MVHR)

[14] Able Acoustics Ltd makes no representations or guarantees in respect of 3rd party products or workmanship.

5.6.4 Additional consideration has been given to an increase in vehicle movements due to displaced nursery staff vehicles and new vehicles associated with the residential units for which there are no more than seven parking spaces. Calculations have been undertaken for the highest individual VDV event in each axis over the entire measurement survey, multiplied by the number of trips and combined with the highest existing daytime period VDV value in each orthogonal axis (from table 5.3 above).

5.6.5 The calculations show that an additional 164 vehicle movements (split between 3 staff vehicles and the 7 residential units) would be required to reach the lower end of the range for *"Low probability of adverse comment."* This would equate to in excess of 16 trips per vehicle per day and is considered an extreme scenario.

5.6.6 It is considered that any increase in vibration attributable to vehicle movements is negligible and adverse comment is not expected.

6. CONCLUSIONS

6.1 Summary of Conclusions

6.1.1 This assessment concludes the following:

- The assessment indicates a low impact for the scheme subject to the implementation of suitable mitigation measures.
- The character of the area is that of a mixed residential and commercial nature and given the proximity of the proposed dwellings it is considered any future residents coming to the sound source would have an expectation of *extant* commercial sound being present during the day.
- Standard glazing 4/(6-16)/4 with an acoustic performance value of at least 25dB R_w will be sufficient for habitable rooms, and habitable rooms should be fitted with alternative ventilation options to negate the need to rely on openable windows for thermal comfort.
- The glazing specification will need to ensure that the internal noise levels detailed in Section 2.4 are not exceeded.
- Internal absolute maximum levels will be above the threshold limits from Section 3.3 of Approved Document O at which windows are expected to be closed during sleeping hours and an over-heating assessment will be required.
  - It is recommended any habitable rooms incorporate alternative ventilation options such as trickle ventilators or wall ventilators. The installed unit/units must not give rise to an increase in internal noise levels over the desired internal noise level values. Example brochures are provided in Appendix D.
  - Details of the specific glazing and ventilation measures[15] to be installed must be submitted to the local planning authority in advance.
  - Daytime period levels in the external amenity areas are below the desirable guideline level of 50dB $L_{Aeq,T}$.
  - VDV levels attributable to all sources fall below the range of *"Low probability of adverse comment"* BS 6472 notes: below this range adverse comment is not expected.
  - PPV levels attributable to all sources are significantly below limits for the onset of cosmetic building damage.

6.1.2 It is concluded (pursuant to the implementation of suitable mitigation options) that there are no further reasons on noise or vibration grounds, why permission should not be granted.

[15] Details include make, model and acoustic performance data to be obtained from the product provider.

7. REFERENCES

1. British Standard 7445: Description and Measurement of Environmental Noise, Part 1. Guide to Quantities and Procedures, 1991.

2. National Planning Policy Framework. UK Department for Communities and Local Government. March, 2012, Updated 21st December 2023.

3. Noise Policy Statement for England (NPSE). DEFRA. March 2010.

4. London Borough of Bexley, Bexley Local Plan – Part 1: strategic and non-strategic policies, Policy DP11, Adopted April 2023.

5. British Standards Institution. British Standard 8233: Guidance on sound insulation and noise reduction for buildings, 2014.

6. World Health Organisation. Guidelines for Community Noise. 2000.

7. Association of Noise Consultants, Institute of Acoustics & Chartered Institute of Environmental Health, Professional Practice Guidance on Planning & Noise, 2017.

8. Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, Planning Practice Guidance: Noise 2014, Latest Revision July 2019. https://www.gov.uk/guidance/noise--2

9. British Standards Institution. British Standard 4142:2014 +A1:2019: Methods for rating and assessing industrial and commercial sound. 2019.

10. Department for Levelling Up, Housing and Communities, The Building Regulations Statutory guidance: Overheating: Approved Document O, December 2021.

11. British Standard 6472: Guide to evaluation of human exposure to vibration in buildings, Part 1. Vibration sources other than blasting, 2008.

12. British Standard 7385: Description and Measurement of Environmental Noise, Part 1. Guide for measurement of vibrations and evaluation of their effects on buildings

13. British Standard 7385: Description and Measurement of Environmental Noise, Part 2. Evaluation and measurement for vibration in buildings. Guide to damage levels from ground-borne vibration, 1993.

14. British Standards Institution. British Standard 12758: Glass in building - Glazing and airborne sound insulation - Product descriptions and determination of properties, 2019.

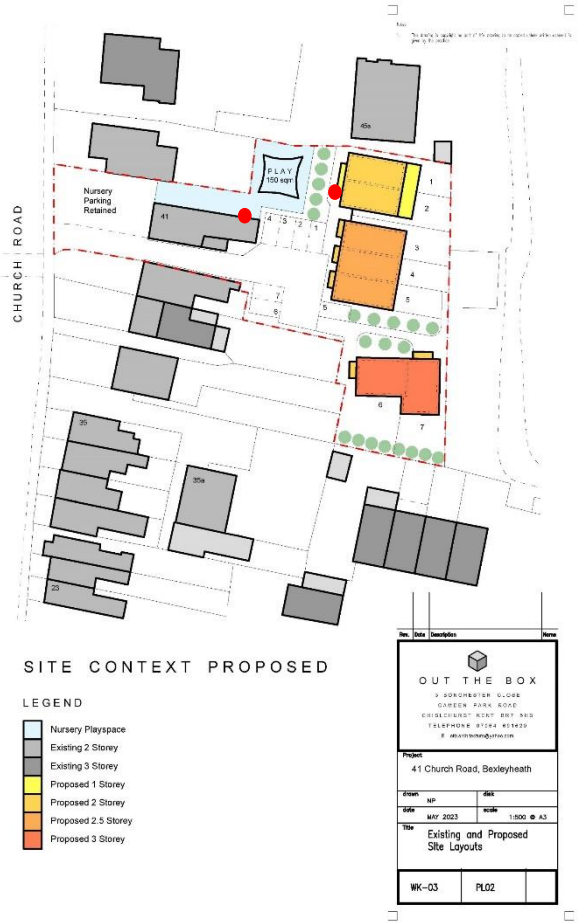
15. The Association of Noise Consultants. ANC Guidelines, ANC Green Book: Environmental Sound Measurement Guide, 2nd Edition. 2021.

16. Department for Levelling Up, Housing and Communities, The Building Regulations Statutory guidance: Ventilation: Approved Document F, June 2022.

FIGURES

Not To Scale Resized From Original Image

Project	No.	Drawing	No.	File	Date
41 Church Road, Bexleyheath	P1562	Site Location	Figure 01	P1562/Figures.ppt	12/01/2024



Not To Scale Resized From Original Image

Project	No.	Drawing	No.	File	Date
41 Church Road, Bexleyheath	P1562	Proposed Layout	Figure 02	P1562/Figures.ppt	12/01/2024

APPENDIX A

Calibration Certificates

CERTIFICATE OF CALIBRATION

Date of Issue: 31 May 2022 **Certificate Number: TCRT22/1337**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	Able Acoustics Ltd Unit 20 Connect 10 Business Park Ashford TN24 0FE
Order No.	P1000
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	01143557
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	43574
	Rion	Microphone	UC-59	16931
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002

Performance Class	1		
Test Procedure	TP 2.SLM 61672-3 TPS-49		
	Procedures from IEC 61672-3:2006 were used to perform the periodic tests.		
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003		
Date Received	27 May 2022	ANV Job No.	TRAC22/05189
Date Calibrated	31 May 2022		

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	29 May 2020	TCRT20/1253	ANV Measurement Systems

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 09 August 2023

Certificate Number: UCRT23/2056

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages

Approved Signatory

K. Mistry

Customer	Able Acoustics Unit 20 Connect 10 Foster Road Ashford Kent TN24 0FE			
Order No.	P1000			
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators			
Description	Acoustic Calibrator			
Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Rion	Calibrator	NC-74	34936366

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.	UKAS23/08550	
Date Received	08 August 2023	
Date Calibrated	09 August 2023	
Previous Certificate	*Dated*	29 July 2021
	Certificate No.	UCRT21/1928
	Laboratory	0653

CERTIFICATE OF CALIBRATION

Date of Issue: 16 June 2022 **Certificate Number: TCRT22/1386**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 3 Pages
Approved Signatory

K. Mistry

Client	Able Acoustics Ltd Unit 20, Connect 10 Business Park Ashford, Kent TN24 0FE
Purchase Order No.	P1000
Instrument	Rion XV-2P (+PPV) Tri-Axial Vibration Meter
Serial No.	00370011
Accelerometer Type	XV-2P
Accelerometer Serial No.	51218
Program	8.1
Client Asset No.	N/A
Procedure ID.	XV-2P (+PPV) Issue 2
Job Number	TRAC22/06209
Date of Calibration	16 Jun 2022
Previous Cert. number	TCRT20/1301
Date of Previous Cert.	15 Jun 2020
Rig Number	5
Kit Number	24
Calibration Status	**Passed Calibration**

This calibration is traceable to National Standards. ANV Measurement Systems sources used to perform calibrations are calibrated at the National Physical Laboratory or by UKAS laboratories accredited for the purpose.

The performance of the system (the meter, accelerometer) was found to be within the manufacturer's specification.

Comment
This certificate reports recorded values for the instrument 'As Received'.

APPENDIX B

Results of Unattended Sound Level Monitoring

Measurement Results

Project Number: P1562
Client: Robinson Escott Planning LLP
Site Location: 41 Church Road, Bexleyheath

Instrumentation	Serial No.
Rion NL-52 Sound Level Meter	01143557
Rion NH-25 Pre-amp	43574
Rion UC-59 Microphone	16931
Rion NC-74 Calibrator	34936366

Calibration prior to survey:	94.0 dB (re 94.0)
Calibration after survey:	94.0 dB (re 94.0)

Start Time	L_{Aeq}	L_{AMax}	L_{A90}	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
11/01/2024 14:30	57	75	44	56	57	56	56	53	49	46	45	44	44	44	43	45	45	46	47	49	48	48	47	44	41	38	36	33	30	28
11/01/2024 14:45	58	82	48	56	57	57	59	54	51	51	45	45	44	44	44	43	46	50	53	49	49	48	47	44	44	39	35	32	24	22
11/01/2024 15:00	55	76	46	58	58	57	59	54	50	47	45	44	44	44	44	44	44	44	45	48	48	45	44	42	37	37	34	27	23	20
11/01/2024 15:15	47	63	45	59	59	57	60	56	55	52	48	44	43	43	43	41	41	40	39	38	34	32	30	27	24	21	18	15	14	14
11/01/2024 15:30	47	63	44	59	60	57	59	54	51	47	46	44	42	41	42	39	39	39	38	37	33	31	29	28	34	33	28	23	20	17
11/01/2024 15:45	48	64	45	57	58	56	59	53	49	45	43	42	41	41	41	39	39	39	39	38	35	33	33	34	38	39	34	30	29	21
11/01/2024 16:00	58	73	46	57	57	56	59	53	51	46	44	43	42	41	41	39	39	39	39	39	37	38	42	44	51	53	48	42	39	36
11/01/2024 16:15	48	67	45	58	58	56	59	54	50	46	43	42	41	41	41	40	39	39	39	38	35	32	31	30	36	38	33	28	26	22
11/01/2024 16:30	50	72	44	60	60	57	59	56	52	47	44	43	43	42	42	40	40	42	42	41	40	38	35	33	33	32	28	26	25	23
11/01/2024 16:45	54	77	44	64	63	58	59	56	52	48	48	45	44	44	45	44	44	46	47	47	45	43	40	37	36	34	32	31	31	30
11/01/2024 17:00	46	56	45	59	59	57	57	52	50	45	43	42	41	41	40	39	39	40	39	38	34	32	28	25	21	18	16	15	14	14
11/01/2024 17:15	47	63	45	56	58	56	57	54	51	48	44	42	41	40	40	39	39	39	40	39	35	33	30	27	23	21	20	19	18	17
11/01/2024 17:30	47	57	45	56	57	56	56	52	49	45	43	42	41	41	41	40	39	40	40	39	36	33	30	26	22	18	15	13	13	14
11/01/2024 17:45	49	76	45	57	59	57	57	54	50	46	44	44	43	42	41	41	41	41	41	41	39	38	35	33	33	31	30	30	28	29
11/01/2024 18:00	47	59	45	57	57	57	57	56	52	48	45	42	41	40	40	40	40	40	40	40	37	35	31	27	23	18	16	14	13	15
11/01/2024 18:15	47	56	45	57	56	56	56	52	50	45	43	42	40	39	39	38	39	40	40	40	37	34	31	27	22	17	14	13	13	14
11/01/2024 18:30	47	55	45	56	56	56	55	52	49	45	43	41	40	39	39	39	39	40	40	39	37	34	31	27	23	18	15	13	13	14
11/01/2024 18:45	46	56	44	56	55	54	54	51	48	44	42	40	39	39	38	37	39	40	40	39	36	33	30	25	21	16	14	13	17	14
11/01/2024 19:00	46	55	44	56	55	55	56	52	49	48	44	42	40	40	40	39	39	39	40	39	36	33	30	26	23	19	15	13	13	14
11/01/2024 19:15	50	68	44	56	55	55	55	52	49	46	43	41	40	39	39	39	39	40	40	39	36	34	36	46	33	23	16	14	14	14
11/01/2024 19:30	46	59	44	55	55	55	56	53	50	46	44	42	41	40	39	39	39	39	39	39	36	33	31	27	23	18	15	14	13	14
11/01/2024 19:45	46	56	43	53	54	54	53	50	48	46	44	41	40	39	39	39	39	40	40	38	35	33	30	26	23	18	15	14	13	14
11/01/2024 20:00	46	58	43	53	53	53	53	50	46	42	39	38	37	37	37	37	38	39	40	38	35	33	30	26	23	18	15	13	14	15
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11/01/2024 20:30	46	61	42	54	53	53	53	50	48	43	41	39	38	38	38	38	38	40	41	38	35	33	30	26	22	17	14	13	13	15
11/01/2024 20:45	45	59	41	52	53	53	55	50	47	44	41	39	38	37	37	37	37	38	39	37	34	32	29	25	21	16	13	12	13	14
11/01/2024 21:00	44	59	41	53	52	53	55	50	47	42	40	39	37	36	36	36	37	38	38	37	34	31	28	24	21	16	13	13	13	14
11/01/2024 21:15	46	67	42	53	53	53	58	50	46	43	41	40	38	37	36	36	37	38	41	39	34	32	29	25	20	15	13	12	13	14
11/01/2024 21:30	45	60	42	52	53	53	60	51	47	45	41	40	38	37	37	36	37	39	40	37	34	32	29	25	20	16	13	12	13	14
11/01/2024 21:45	43	56	40	53	52	52	64	50	45	44	40	40	37	36	36	35	35	36	37	35	32	30	26	22	18	14	12	12	13	14
11/01/2024 22:00	42	60	40	52	51	51	53	49	45	42	39	38	36	35	35	34	34	35	36	35	31	29	26	22	17	13	12	12	12	14
11/01/2024 22:15	43	55	40	52	52	52	52	48	45	42	39	38	36	35	35	34	35	35	36	36	32	29	27	23	18	14	13	13	14	14
11/01/2024 22:30	41	58	38	51	51	49	50	46	44	41	37	38	35	34	34	34	34	34	35	34	30	28	25	21	17	14	12	12	13	14
11/01/2024 22:45	41	53	38	52	51	50	50	48	44	39	36	36	34	35	34	33	33	33	34	33	30	28	25	20	16	13	12	12	13	14
11/01/2024 23:00	40	57	37	53	50	49	50	48	42	41	37	37	35	34	34	33	33	33	33	33	30	28	25	21	18	14	12	12	12	14
11/01/2024 23:15	39	61	36	53	49	50	51	48	44	39	36	35	34	32	32	32	32	32	32	32	29	26	23	19	15	12	11	11	12	14
11/01/2024 23:30	41	68	37	51	50	51	51	48	43	38	37	36	34	34	33	33	34	33	33	33	30	28	25	23	20	17	14	13	13	14
11/01/2024 23:45	38	54	36	51	50	48	50	49	43	38	36	35	33	32	32	31	31	31	30	29	26	23	20	16	13	11	12	12	13	14
12/01/2024 00:00	41	65	35	50	50	50	51	47	44	40	41	43	41	37	33	32	33	33	32	32	29	27	24	21	19	16	15	14	13	14
12/01/2024 00:15	51	79	35	50	48	47	48	46	41	36	36	35	33	33	33	33	32	33	38	42	47	43	29	27	25	27	24	22	19	21
12/01/2024 00:30	38	55	35	49	48	46	48	45	40	37	35	34	32	32	32	32	31	32	30	29	26	23	20	18	16	16	16	16	16	16
12/01/2024 00:45	36	47	33	46	46	47	47	44	39	34	33	33	31	30	30	30	29	29	28	27	24	21	19	15	12	10	10	11	12	14
12/01/2024 01:00	37	61	34	46	46	45	47	43	39	38	35	34	32	32	30	30	31	29	28	28	24	22	21	16	14	11	10	11	12	14
12/01/2024 01:15	36	48	34	46	47	47	48	44	40	39	35	33	32	31	30	29	29	29	28	27	23	21	18	15	12	11	11	12	12	14
12/01/2024 01:30	35	46	34	47	48	49	47	44	40	40	36	33	33	31	30	29	29	28	27	26	22	20	17	14	12	11	11	12	13	14
12/01/2024 01:45	35	50	32	47	47	45	46	43	40	38	34	34	33	30	30	28	28	28	27	26	23	20	17	14	12	11	11	12	13	14
12/01/2024 02:00	33	47	32	45	47	43	44	42	39	36	32	32	31	29	28	28	27	27	25	24	20	16	13	10	9	9	10	11	12	14
12/01/2024 02:15	35	51	33	48	53	49	49	48	43	39	34	33	33	30	30	29	29	28	27	26	23	21	19	16	13	11	11	12	12	14
12/01/2024 02:30	35	51	33	47	51	44	46	44	40	36	34	33	33	30	29	28	28	28	27	26	22	20	17	15	13	12	12	13	14	14
12/01/2024 02:45	36	62	32	47	47	43	44	42	39	34	33	32	31	30	30	29	29	29	28	27	25	23	21	19	18	17	19	17	15	14
12/01/2024 03:00	34	46	32	46	45	43	43	42	37	34	32	31	30	29	28	27	27	27	26	25	22	18	16	12	11	10	11	12	12	14
12/01/2024 03:15	35	56	32	48	45	44	44	42	37	34	32	31	30	29	29	28	28	28	27	26	23	21	19	17	14	13	12	12	13	14
12/01/2024 03:30	37	53	34	45	44	44	44	41	38	34	32	32	32	30	30	30	29	29	29	29	26	24	22	19	18	15	14	14	14	14
12/01/2024 03:45	37	54	34	46	45	44	45	41	38	36	34	32	32	31	30	29	29	29	29	28	26	23	21	17	15	13	12	13	13	14
12/01/2024 04:00	35	48	33	46	47	45	45	42	38	35	34	33	33	32	30	29	29	28	28	27	24	21	18	14	13	12	11	11	12	14
12/01/2024 04:15	37	53	34	46	46	45	46	43	39	36	34	33	33	31	30	29	29	29	29	29	26	23	21	17	16	15	12	12	12	14
12/01/2024 04:30	35	47	34	47	47	45	45	43	39	36	34	33	33	31	30	29	29	29	28	26	22	19	16	12	12	11	10	11	12	14
12/01/2024 04:45	36	51	34	48	47	46	46	43	39	34	33	32	32	30	29	29	29	29	28	27	24	22	19	15	16	15	12	11	12	14
12/01/2024 05:00	38	52	35	49	48	50	46	44	40	36	36	34	34	33	32	32	31	30	30	29	26	23	20	16	17	18	13	12	12	14

Start Time	L_{Aeq}	L_{AMax}	L_{A90}	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
12/01/2024 05:15	39	53	36	49	49	48	48	47	41	37	34	33	33	32	32	31	31	32	32	32	29	26	23	19	16	16	12	12	13	14
12/01/2024 05:30	41	53	37	53	50	49	50	46	42	39	37	35	34	33	32	32	33	33	34	34	30	28	25	20	18	17	14	12	13	14
12/01/2024 05:45	41	55	38	53	50	49	50	46	41	38	35	35	34	33	33	32	33	33	34	34	30	28	24	20	21	20	18	15	15	14
12/01/2024 06:00	42	55	39	54	53	51	51	47	44	39	36	36	35	35	34	34	34	34	35	35	32	29	26	22	19	17	14	13	13	14
12/01/2024 06:15	43	68	39	56	51	52	52	47	44	41	38	37	36	35	34	33	34	34	35	36	36	32	27	22	19	18	15	14	14	14
12/01/2024 06:30	43	56	40	55	52	51	52	50	45	40	38	37	36	35	35	34	35	35	35	35	32	30	27	23	23	23	19	18	16	14
12/01/2024 06:45	47	65	40	58	54	52	53	49	45	42	40	39	37	36	36	35	36	36	36	36	33	31	28	30	39	41	36	30	30	15
12/01/2024 07:00	47	63	41	60	55	54	54	50	48	45	42	40	39	37	37	37	37	36	37	37	34	32	29	29	37	39	36	31	30	15
12/01/2024 07:15	51	75	43	62	59	57	57	53	53	47	43	41	40	40	40	39	40	41	43	44	42	40	38	35	36	37	34	31	30	27
12/01/2024 07:30	48	64	44	57	57	56	57	52	48	46	43	40	40	39	39	38	39	39	39	39	36	34	31	30	37	39	34	30	29	15
12/01/2024 07:45	55	80	45	60	60	56	56	51	48	47	45	44	44	42	41	42	42	44	48	47	46	46	41	40	43	45	41	37	35	27
12/01/2024 08:00	48	64	44	55	57	56	55	50	48	43	42	41	39	39	38	39	39	39	39	39	36	34	32	32	37	39	35	29	24	18
12/01/2024 08:15	47	63	44	56	57	56	55	51	51	45	41	39	39	38	38	38	38	39	39	39	36	34	32	31	35	35	32	28	24	20
12/01/2024 08:30	48	65	44	55	56	56	55	52	49	44	41	40	39	38	38	38	38	39	39	39	36	34	32	30	36	40	37	31	31	16
12/01/2024 08:45	46	58	43	58	57	55	54	50	46	43	40	39	38	38	38	37	38	38	38	38	35	33	32	28	30	28	23	19	17	15
12/01/2024 09:00	46	60	44	57	57	57	55	51	48	45	42	40	38	38	38	37	37	38	38	38	36	34	31	30	32	34	28	22	19	18
12/01/2024 09:15	47	76	43	55	55	55	56	52	49	43	43	41	39	39	38	37	37	38	38	39	36	34	31	33	34	32	33	26	26	21
12/01/2024 09:30	48	66	43	56	57	55	54	50	48	45	42	40	40	39	39	41	44	39	39	38	36	36	35	31	31	29	26	21	19	17
12/01/2024 09:45	48	72	43	56	56	54	55	51	46	46	42	41	39	38	39	39	39	39	39	40	41	37	37	33	31	32	29	25	22	19
12/01/2024 10:00	48	69	42	55	56	55	55	51	48	45	42	44	42	40	38	40	39	38	38	38	36	35	32	31	34	38	33	30	28	21
12/01/2024 10:15	48	66	42	56	56	56	55	50	49	53	52	45	40	40	39	41	43	39	38	38	37	36	33	29	25	24	24	27	26	17
12/01/2024 10:30	51	78	43	55	57	54	54	50	48	45	44	42	41	43	43	43	41	41	42	42	42	41	40	36	33	30	29	25	23	21
12/01/2024 10:45	56	74	44	55	55	53	54	50	48	45	43	43	43	43	43	42	42	43	46	46	48	49	46	43	37	38	37	30	25	22
12/01/2024 11:00	49	70	41	55	54	54	53	50	47	44	42	41	41	41	40	40	39	40	42	40	39	38	34	32	31	29	25	25	23	19
12/01/2024 11:15	47	66	43	55	55	54	54	49	46	42	40	39	39	38	38	39	42	39	40	39	37	35	33	31	31	32	29	25	23	18
12/01/2024 11:30	46	71	42	55	56	54	55	50	46	43	40	39	39	38	38	38	38	38	38	38	37	34	32	30	30	28	28	30	28	23
12/01/2024 11:45	45	59	42	55	55	55	54	50	46	43	41	38	38	37	37	36	38	37	37	37	34	32	30	27	27	29	27	26	26	18
12/01/2024 12:00	47	71	42	57	56	56	56	52	49	51	42	43	42	40	39	38	38	38	38	38	35	33	32	31	32	33	30	28	28	23
12/01/2024 12:15	47	74	42	55	55	54	55	50	46	43	42	39	38	36	36	37	37	37	37	38	36	37	35	33	32	35	31	28	27	21
12/01/2024 12:30	47	66	41	55	55	55	55	51	48	44	43	40	38	37	37	36	37	37	37	38	37	39	38	34	30	27	24	23	21	17
12/01/2024 12:45	45	56	42	55	56	55	56	51	49	44	41	38	37	36	36	36	37	37	38	38	36	34	32	28	24	22	18	18	17	15
12/01/2024 13:00	45	61	41	56	58	56	55	50	47	44	40	38	37	37	36	36	37	37	37	37	35	33	31	27	24	23	22	19	19	15
12/01/2024 13:15	45	59	42	55	56	55	54	50	48	45	40	38	37	36	36	36	37	37	38	38	35	33	31	27	24	24	24	25	21	17
12/01/2024 13:30	45	58	42	55	55	54	54	49	47	44	41	38	37	35	35	35	36	37	38	38	35	33	31	27	27	28	23	21	19	14
12/01/2024 13:45	45	64	41	54	56	55	56	52	49	45	40	38	36	35	35	35	36	36	37	37	34	32	30	29	30	32	28	24	20	18
12/01/2024 14:00	44	64	40	56	56	54	55	50	46	43	41	40	38	38	36	38	36	36	36	36	34	31	29	25	24	22	20	15	13	14
12/01/2024 14:15	44	55	41	56	57	55	55	50	48	46	43	40	38	36	35	35	35	36	36	36	34	32	29	27	22	21	20	17	14	14
12/01/2024 14:30	48	75	41	57	57	55	55	51	48	43	41	39	39	38	39	39	39	39	40	39	41	37	36	31	28	28	24	23	20	16
12/01/2024 14:45	51	69	43	55	56	55	55	52	54	44	42	41	39	38	38	38	39	40	44	44	41	41	40	34	33	33	30	30	22	20
12/01/2024 15:00	45	61	42	56	57	55	54	50	47	43	40	37	36	36	35	36	36	37	38	38	35	33	31	28	27	26	25	25	24	23
12/01/2024 15:15	51	73	42	57	58	56	54	50	47	43	41	39	39	38	38	38	39	40	42	43	43	43	40	36	32	30	29	26	21	18
12/01/2024 15:30	54	74	44	57	57	56	55	50	47	44	42	41	40	41	41	41	42	44	46	45	45	45	43	39	37	36	32	28	24	21

Cells shaded grey have been excluded due to site engineer activity in the vicinty of the microphone

APPENDIX C

Results of Unattended Vibration Monitoring

Appendix C: Vibration Measurements

Project Number: **P1562**
Client: **Robinson Escott Planning LLP**
Site Location: **41 Church Road, Bexleyheath**

Instrumentation	Serial No.
Rion XV-2P Tri-axial Vibration Meter	2263404

Start Time	X PPV	Y PPV	Z PPV	X VDV	Y VDV	Z VDV
11/01/2024 14:35	0.3	0.1	1.1	0.002	0.001	0.005
11/01/2024 14:40	0.1	0.1	0.1	0.001	0.000	0.004
11/01/2024 14:45	0.2	0.1	0.1	0.001	0.000	0.004
11/01/2024 14:50	0.2	0.1	0.2	0.001	0.000	0.004
11/01/2024 14:55	0.8	0.2	0.9	0.006	0.001	0.006
11/01/2024 15:00	0.2	0.1	0.1	0.001	0.000	0.004
11/01/2024 15:05	0.3	0.3	0.4	0.002	0.001	0.004
11/01/2024 15:10	0.1	0.1	0.1	0.001	0.000	0.004
11/01/2024 15:15	0.2	0.1	0.2	0.001	0.000	0.004
11/01/2024 15:20	0.4	0.1	0.1	0.003	0.000	0.003
11/01/2024 15:25	0.1	0.0	0.1	0.001	0.000	0.003
11/01/2024 15:30	0.1	0.1	0.1	0.001	0.000	0.004
11/01/2024 15:35	0.2	0.1	0.1	0.001	0.000	0.004
11/01/2024 15:40	0.1	0.1	0.1	0.001	0.000	0.004
11/01/2024 15:45	0.1	0.1	0.1	0.001	0.000	0.003
11/01/2024 15:50	0.1	0.1	0.1	0.001	0.001	0.003
11/01/2024 15:55	0.3	0.2	0.1	0.001	0.001	0.004
11/01/2024 16:00	0.2	0.1	0.1	0.001	0.001	0.004
11/01/2024 16:05	0.1	0.1	0.1	0.001	0.000	0.004
11/01/2024 16:10	0.1	0.1	0.1	0.001	0.001	0.004
11/01/2024 16:15	0.1	0.0	0.1	0.001	0.000	0.004
11/01/2024 16:20	0.1	0.1	0.1	0.001	0.000	0.004
11/01/2024 16:25	0.1	0.1	0.2	0.001	0.000	0.004
11/01/2024 16:30	1.8	0.2	2.1	0.011	0.001	0.007
11/01/2024 16:35	0.1	0.1	0.1	0.001	0.000	0.006
11/01/2024 16:40	0.1	0.1	0.1	0.001	0.000	0.007
11/01/2024 16:45	0.6	0.1	0.7	0.004	0.000	0.005
11/01/2024 16:50	0.3	0.1	0.3	0.002	0.001	0.005
11/01/2024 16:55	0.1	0.0	0.1	0.001	0.000	0.005
11/01/2024 17:00	0.1	0.1	0.1	0.001	0.000	0.005
11/01/2024 17:05	0.1	0.1	0.1	0.001	0.000	0.006
11/01/2024 17:10	0.1	0.1	0.1	0.001	0.000	0.006
11/01/2024 17:15	0.1	0.1	0.1	0.001	0.000	0.007
11/01/2024 17:20	0.1	0.2	0.1	0.001	0.001	0.007
11/01/2024 17:25	0.1	0.0	0.1	0.001	0.000	0.006
11/01/2024 17:30	0.1	0.1	0.1	0.001	0.000	0.006
11/01/2024 17:35	0.1	0.0	0.1	0.001	0.000	0.007
11/01/2024 17:40	0.1	0.0	0.1	0.001	0.000	0.007
11/01/2024 17:45	0.1	0.1	0.1	0.001	0.000	0.008
11/01/2024 17:50	0.2	0.1	0.2	0.001	0.001	0.009
11/01/2024 17:55	0.1	0.1	0.1	0.001	0.000	0.009
11/01/2024 18:00	0.1	0.0	0.1	0.001	0.000	0.011
11/01/2024 18:05	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 18:10	0.1	0.0	0.1	0.001	0.000	0.011
11/01/2024 18:15	0.1	0.0	0.1	0.001	0.000	0.011
11/01/2024 18:20	0.1	0.0	0.1	0.001	0.000	0.013
11/01/2024 18:25	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 18:30	0.1	0.0	0.1	0.001	0.000	0.011
11/01/2024 18:35	0.1	0.0	0.1	0.001	0.000	0.010
11/01/2024 18:40	0.1	0.0	0.1	0.001	0.000	0.010
11/01/2024 18:45	0.1	0.0	0.1	0.001	0.000	0.009
11/01/2024 18:50	0.1	0.0	0.1	0.001	0.000	0.010

Start Time	X PPV	Y PPV	Z PPV	X VDV	Y VDV	Z VDV
11/01/2024 18:55	0.1	0.0	0.1	0.001	0.000	0.010
11/01/2024 19:00	0.1	0.0	0.1	0.001	0.000	0.010
11/01/2024 19:05	0.1	0.0	0.1	0.001	0.000	0.010
11/01/2024 19:10	0.1	0.0	0.1	0.001	0.000	0.013
11/01/2024 19:15	0.1	0.0	0.1	0.001	0.000	0.013
11/01/2024 19:20	0.1	0.0	0.1	0.001	0.000	0.013
11/01/2024 19:25	0.1	0.0	0.1	0.001	0.000	0.010
11/01/2024 19:30	0.1	0.0	0.1	0.001	0.000	0.010
11/01/2024 19:35	0.1	0.0	0.1	0.001	0.000	0.008
11/01/2024 19:40	0.1	0.0	0.1	0.001	0.000	0.008
11/01/2024 19:45	0.1	0.0	0.1	0.001	0.000	0.007
11/01/2024 19:50	0.1	0.0	0.1	0.001	0.000	0.007
11/01/2024 19:55	0.1	0.0	0.1	0.001	0.000	0.007
11/01/2024 20:00	0.1	0.0	0.1	0.001	0.000	0.008
11/01/2024 20:05	0.1	0.0	0.1	0.001	0.000	0.008
11/01/2024 20:10	0.1	0.0	0.1	0.001	0.000	0.008
11/01/2024 20:15	0.1	0.0	0.1	0.001	0.000	0.009
11/01/2024 20:20	0.1	0.0	0.1	0.001	0.000	0.008
11/01/2024 20:25	0.1	0.0	0.1	0.001	0.000	0.010
11/01/2024 20:30	0.1	0.0	0.1	0.001	0.000	0.010
11/01/2024 20:35	0.1	0.0	0.1	0.001	0.000	0.010
11/01/2024 20:40	0.1	0.0	0.1	0.001	0.000	0.011
11/01/2024 20:45	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 20:50	0.1	0.0	0.1	0.001	0.000	0.013
11/01/2024 20:55	0.1	0.0	0.1	0.001	0.000	0.013
11/01/2024 21:00	0.1	0.0	0.1	0.001	0.000	0.013
11/01/2024 21:05	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 21:10	0.1	0.0	0.1	0.001	0.000	0.011
11/01/2024 21:15	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 21:20	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 21:25	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 21:30	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 21:35	0.2	0.1	0.1	0.001	0.000	0.012
11/01/2024 21:40	0.4	0.0	0.1	0.002	0.000	0.011
11/01/2024 21:45	0.2	0.1	0.1	0.001	0.000	0.011
11/01/2024 21:50	0.1	0.0	0.1	0.001	0.000	0.011
11/01/2024 21:55	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 22:00	0.1	0.0	0.1	0.001	0.000	0.013
11/01/2024 22:05	0.1	0.1	0.1	0.001	0.000	0.013
11/01/2024 22:10	0.1	0.0	0.1	0.001	0.000	0.015
11/01/2024 22:15	0.2	0.2	0.1	0.001	0.001	0.014
11/01/2024 22:20	0.1	0.0	0.1	0.001	0.000	0.015
11/01/2024 22:25	0.1	0.0	0.1	0.001	0.000	0.015
11/01/2024 22:30	0.1	0.0	0.1	0.001	0.000	0.015
11/01/2024 22:35	0.1	0.0	0.1	0.001	0.000	0.014
11/01/2024 22:40	0.1	0.0	0.1	0.001	0.000	0.013
11/01/2024 22:45	1.2	0.1	1.4	0.010	0.000	0.014
11/01/2024 22:50	0.3	0.1	0.3	0.002	0.000	0.014
11/01/2024 22:55	0.1	0.0	0.1	0.001	0.000	0.013
11/01/2024 23:00	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 23:05	0.4	0.0	0.5	0.002	0.000	0.012
11/01/2024 23:10	0.8	0.0	0.9	0.005	0.000	0.010
11/01/2024 23:15	1.1	0.0	1.4	0.009	0.000	0.011
11/01/2024 23:20	0.2	0.0	0.3	0.002	0.000	0.011
11/01/2024 23:25	0.1	0.0	0.1	0.001	0.000	0.011
11/01/2024 23:30	0.2	0.1	0.1	0.001	0.001	0.011
11/01/2024 23:35	0.1	0.1	0.1	0.001	0.000	0.012
11/01/2024 23:40	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 23:45	0.1	0.0	0.1	0.001	0.000	0.011
11/01/2024 23:50	0.1	0.0	0.1	0.001	0.000	0.012
11/01/2024 23:55	0.1	0.0	0.1	0.001	0.000	0.011

Start Time	X PPV	Y PPV	Z PPV	X VDV	Y VDV	Z VDV
12/01/2024 00:00	0.1	0.0	0.1	0.001	0.000	0.013
12/01/2024 00:05	0.1	0.0	0.1	0.001	0.000	0.013
12/01/2024 00:10	0.1	0.1	0.1	0.001	0.000	0.012
12/01/2024 00:15	0.1	0.0	0.1	0.001	0.000	0.011
12/01/2024 00:20	0.1	0.0	0.1	0.001	0.000	0.011
12/01/2024 00:25	0.1	0.0	0.1	0.001	0.000	0.011
12/01/2024 00:30	0.1	0.0	0.1	0.001	0.000	0.011
12/01/2024 00:35	0.1	0.0	0.1	0.001	0.000	0.011
12/01/2024 00:40	0.1	0.0	0.1	0.001	0.000	0.010
12/01/2024 00:45	0.1	0.0	0.1	0.001	0.000	0.010
12/01/2024 00:50	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 00:55	0.1	0.0	0.1	0.001	0.000	0.010
12/01/2024 01:00	0.1	0.0	0.1	0.001	0.000	0.010
12/01/2024 01:05	0.1	0.0	0.1	0.001	0.000	0.010
12/01/2024 01:10	0.1	0.0	0.1	0.001	0.000	0.010
12/01/2024 01:15	0.1	0.0	0.1	0.001	0.000	0.010
12/01/2024 01:20	0.1	0.0	0.1	0.001	0.000	0.011
12/01/2024 01:25	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 01:30	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 01:35	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 01:40	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 01:45	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 01:50	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 01:55	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 02:00	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 02:05	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 02:10	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 02:15	0.1	0.0	0.1	0.001	0.000	0.009
12/01/2024 02:20	0.1	0.0	0.1	0.001	0.000	0.008
12/01/2024 02:25	0.1	0.0	0.1	0.001	0.000	0.008
12/01/2024 02:30	0.1	0.0	0.1	0.001	0.000	0.008
12/01/2024 02:35	0.1	0.0	0.1	0.001	0.000	0.007
12/01/2024 02:40	0.1	0.0	0.1	0.001	0.000	0.007
12/01/2024 02:45	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 02:50	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 02:55	0.0	0.0	0.1	0.001	0.000	0.006
12/01/2024 03:00	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 03:05	0.1	0.0	0.1	0.001	0.000	0.007
12/01/2024 03:10	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 03:15	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 03:20	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 03:25	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 03:30	0.1	0.1	0.0	0.001	0.000	0.006
12/01/2024 03:35	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 03:40	0.0	0.0	0.1	0.001	0.000	0.005
12/01/2024 03:45	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 03:50	0.0	0.0	0.1	0.001	0.000	0.005
12/01/2024 03:55	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 04:00	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 04:05	0.0	0.0	0.1	0.001	0.000	0.005
12/01/2024 04:10	0.1	0.0	0.0	0.001	0.000	0.005
12/01/2024 04:15	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 04:20	0.0	0.0	0.1	0.001	0.000	0.005
12/01/2024 04:25	0.0	0.0	0.1	0.001	0.000	0.005
12/01/2024 04:30	0.0	0.0	0.1	0.001	0.000	0.005
12/01/2024 04:35	0.0	0.0	0.1	0.001	0.000	0.005
12/01/2024 04:40	0.0	0.0	0.1	0.001	0.000	0.005
12/01/2024 04:45	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 04:50	0.0	0.0	0.1	0.001	0.000	0.005
12/01/2024 04:55	0.1	0.0	0.0	0.001	0.000	0.004
12/01/2024 05:00	0.0	0.0	0.0	0.001	0.000	0.004

Start Time	X PPV	Y PPV	Z PPV	X VDV	Y VDV	Z VDV
12/01/2024 05:05	0.0	0.0	0.1	0.001	0.000	0.004
12/01/2024 05:10	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 05:15	0.0	0.0	0.1	0.001	0.000	0.004
12/01/2024 05:20	0.0	0.0	0.1	0.001	0.000	0.004
12/01/2024 05:25	0.0	0.0	0.0	0.001	0.000	0.004
12/01/2024 05:30	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 05:35	0.0	0.0	0.1	0.001	0.000	0.004
12/01/2024 05:40	0.0	0.0	0.1	0.001	0.000	0.004
12/01/2024 05:45	0.0	0.0	0.0	0.001	0.000	0.004
12/01/2024 05:50	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 05:55	0.0	0.0	0.1	0.001	0.000	0.004
12/01/2024 06:00	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 06:05	0.0	0.0	0.1	0.001	0.000	0.004
12/01/2024 06:10	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 06:15	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 06:20	0.0	0.0	0.1	0.001	0.000	0.004
12/01/2024 06:25	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 06:30	0.0	0.0	0.0	0.001	0.000	0.004
12/01/2024 06:35	0.1	0.0	0.0	0.001	0.000	0.004
12/01/2024 06:40	0.1	0.0	0.0	0.001	0.000	0.004
12/01/2024 06:45	0.0	0.0	0.1	0.001	0.000	0.004
12/01/2024 06:50	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 06:55	0.1	0.1	0.1	0.001	0.000	0.004
12/01/2024 07:00	0.0	0.0	0.1	0.001	0.000	0.004
12/01/2024 07:05	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 07:10	0.0	0.0	0.1	0.001	0.000	0.004
12/01/2024 07:15	0.3	0.2	0.2	0.001	0.001	0.004
12/01/2024 07:20	1.0	0.2	1.1	0.006	0.001	0.006
12/01/2024 07:25	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 07:30	0.2	0.1	0.1	0.001	0.000	0.004
12/01/2024 07:35	0.0	0.0	0.0	0.001	0.000	0.004
12/01/2024 07:40	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 07:45	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 07:50	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 07:55	0.1	0.1	0.1	0.001	0.000	0.004
12/01/2024 08:00	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 08:05	0.2	0.1	0.1	0.001	0.001	0.006
12/01/2024 08:10	0.1	0.0	0.0	0.001	0.000	0.005
12/01/2024 08:15	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 08:20	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 08:25	0.6	0.1	0.7	0.004	0.000	0.006
12/01/2024 08:30	0.2	0.1	0.1	0.001	0.001	0.006
12/01/2024 08:35	0.1	0.1	0.1	0.001	0.000	0.006
12/01/2024 08:40	0.1	0.0	0.1	0.001	0.000	0.007
12/01/2024 08:45	0.1	0.0	0.1	0.001	0.000	0.007
12/01/2024 08:50	0.1	0.1	0.1	0.001	0.000	0.008
12/01/2024 08:55	0.1	0.0	0.1	0.001	0.000	0.008
12/01/2024 09:00	0.2	0.1	0.1	0.001	0.001	0.008
12/01/2024 09:05	0.2	0.1	0.1	0.001	0.000	0.007
12/01/2024 09:10	0.1	0.1	0.1	0.001	0.000	0.007
12/01/2024 09:15	0.1	0.1	0.1	0.001	0.000	0.007
12/01/2024 09:20	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 09:25	0.1	0.1	0.1	0.001	0.000	0.007
12/01/2024 09:30	0.1	0.1	0.1	0.001	0.000	0.007
12/01/2024 09:35	0.4	0.2	0.1	0.002	0.001	0.008
12/01/2024 09:40	0.1	0.1	0.1	0.001	0.000	0.007
12/01/2024 09:45	8.4	0.2	9.8	0.056	0.001	0.029
12/01/2024 09:50	0.1	0.1	0.1	0.001	0.000	0.007
12/01/2024 09:55	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 10:00	0.1	0.0	0.1	0.001	0.000	0.007
12/01/2024 10:05	0.1	0.1	0.1	0.001	0.001	0.007

Start Time	X PPV	Y PPV	Z PPV	X VDV	Y VDV	Z VDV
12/01/2024 10:10	0.1	0.1	0.1	0.001	0.000	0.007
12/01/2024 10:15	0.1	0.1	0.1	0.001	0.000	0.006
12/01/2024 10:20	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 10:25	0.1	0.1	0.1	0.001	0.000	0.007
12/01/2024 10:30	0.1	0.0	0.1	0.001	0.000	0.007
12/01/2024 10:35	0.1	0.0	0.1	0.001	0.000	0.007
12/01/2024 10:40	0.2	0.1	0.1	0.001	0.000	0.007
12/01/2024 10:45	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 10:50	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 10:55	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 11:00	0.1	0.1	0.1	0.001	0.001	0.006
12/01/2024 11:05	0.1	0.1	0.1	0.001	0.000	0.007
12/01/2024 11:10	0.1	0.2	0.1	0.001	0.001	0.006
12/01/2024 11:15	0.1	0.1	0.1	0.001	0.000	0.006
12/01/2024 11:20	0.1	0.1	0.1	0.001	0.001	0.006
12/01/2024 11:25	0.1	0.2	0.1	0.001	0.001	0.006
12/01/2024 11:30	0.5	0.2	0.1	0.002	0.001	0.006
12/01/2024 11:35	0.2	0.1	0.1	0.001	0.000	0.005
12/01/2024 11:40	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 11:45	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 11:50	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 11:55	0.2	0.2	0.1	0.001	0.001	0.005
12/01/2024 12:00	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 12:05	1.0	0.3	0.2	0.004	0.002	0.007
12/01/2024 12:10	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 12:15	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 12:20	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 12:25	0.2	0.2	0.2	0.001	0.001	0.005
12/01/2024 12:30	0.1	0.1	0.1	0.001	0.000	0.004
12/01/2024 12:35	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 12:40	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 12:45	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 12:50	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 12:55	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 13:00	0.1	0.1	0.1	0.001	0.000	0.006
12/01/2024 13:05	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 13:10	0.1	0.1	0.1	0.001	0.001	0.006
12/01/2024 13:15	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 13:20	0.1	0.0	0.1	0.001	0.000	0.006
12/01/2024 13:25	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 13:30	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 13:35	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 13:40	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 13:45	0.1	0.1	0.1	0.001	0.000	0.004
12/01/2024 13:50	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 13:55	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 14:00	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 14:05	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 14:10	0.1	0.0	0.1	0.001	0.000	0.005
12/01/2024 14:15	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 14:20	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 14:25	0.1	0.1	0.1	0.001	0.000	0.004
12/01/2024 14:30	0.1	0.1	0.1	0.001	0.000	0.004
12/01/2024 14:35	0.3	0.2	0.1	0.001	0.001	0.004
12/01/2024 14:40	0.2	0.1	0.1	0.001	0.000	0.004
12/01/2024 14:45	0.1	0.1	0.1	0.001	0.000	0.004
12/01/2024 14:50	0.1	0.0	0.1	0.001	0.000	0.004
12/01/2024 14:55	0.1	0.1	0.1	0.001	0.000	0.004
12/01/2024 15:00	0.1	0.1	0.1	0.001	0.000	0.004
12/01/2024 15:05	0.1	0.1	0.1	0.001	0.000	0.004
12/01/2024 15:10	0.1	0.0	0.1	0.001	0.000	0.004

Start Time	X PPV	Y PPV	Z PPV	X VDV	Y VDV	Z VDV
12/01/2024 15:15	0.1	0.1	0.1	0.001	0.000	0.005
12/01/2024 15:20	0.1	0.1	0.1	0.001	0.000	0.006
12/01/2024 15:25	0.1	0.1	0.0	0.001	0.000	0.004
12/01/2024 15:30	0.2	0.1	0.1	0.001	0.000	0.004
12/01/2024 15:35	0.1	0.1	0.1	0.001	0.000	0.004
12/01/2024 15:40	0.3	0.2	0.1	0.001	0.001	0.004

APPENDIX D

Product Brochures for Acoustically Screened Ventilation Systems

UKAS INDEPENDENTLY ACCREDITED TEST INFORMATION

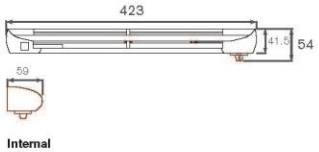
EAR42W

Acoustic window ventilator

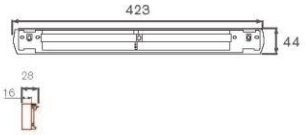
Physical specification

All measurements in millimetres unless otherwise indicated

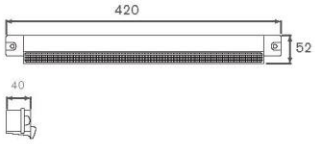
Materials: ABS



Internal



Acoustic spacer



External

Features and benefits

- One of the best performing acoustic window ventilators available in the UK
- Provides an outstanding Dn,e,w; 42dB(A) for areas with high external noise transmission
- Humidity control to regulate supply of fresh air effectively throughout the day in response to changing indoor humidity levels
- Manual override control option for occupants to ensure a comfortable environment at all times
- Upward air deflection to eliminate replacement air causing draughts
- Manufactured from ABS – available in white as standard
- May require add on section in some window installations

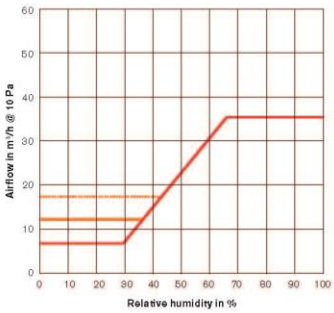
Slot size

Height: 12mm

Length	Central gap	Length
172mm	10mm	172mm

Route slot in window frame as required and screw ventilator over holes.

Performance



Key

EAR² 5-35m³/h

EAR² 17-35m³/h

EAR² 11-35m³/h

Acoustic performance

Dn,e,w: Average weighted performance across frequency range

C: Pink noise

Ctr: Road noise

Models, control options and key data

		Acoustic performance				
Product code	**Controls**	**Dn,e,w**	**Dn,e,w (C)**	**Dn,e,w (Ctr)**	**Equivalent area mm²**	**Colour**
EAR42W *	Bottom	42dB(A)	42dB	42dB	3912	White

* Pricing is variable depending on quantity ordered - please call for details

EHA574

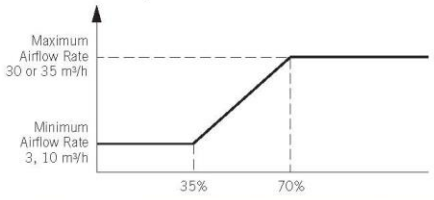
Acoustic Humidity Control Ventilator

GREENWOOD AIRVAC Environmental

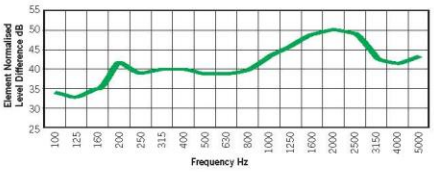
Product Performance

	Min Airflow m³/h	Min Airflow l/s	Max Airflow m³/h	Max Airflow l/s
Flow rates at 10 Pa	3 10	1 3	35 30	10 8
% Relative Internal Humidity*	35%		70%	

*Relative Humidity is the amount of water vapour in the air at any particular temperature compared with the maximum that it will hold at that temperature.



Acoustic Performance



Frequency	100	125	160	200	250	315	400	500
Db	34	33	35	41	39	40	40	39

Frequency	630	800	1000	1250	1600	2000	2500	3150
Db	39	40	43	46	49	50	49	43

Dn,e,w (C;Ctr) = 44(-1;-2) dB

Dn,e,w (C) = 43dB

Dn,e,w (Ctr) = 42dB

Dn,e,w: Average weighted performance across frequency range

C: Pink Noise

Ctr: Road Noise

Full specification detail and test reports are available on request.

Maintenance

Greenwood recommends that any dust be simply removed from the internal mechanism without dismantling.

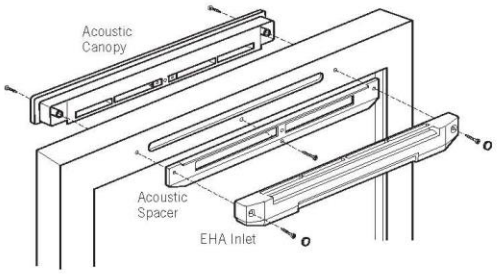
Installation & Fixing Details

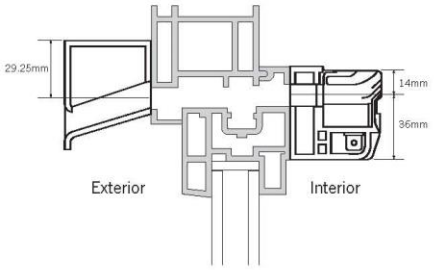
1 Rout slot in window frame 354mm x 12mm.

2 Screw fix acoustic spacer to the internal of the window frame.

3 Screw fix EHA Inlet to the acoustic spacer.

4 Screw fix acoustic canopy to external of window frame.





How to order

Please state:

1 **Model** – EHA574

2 **Colour** – W (white)

4 **Quantity** – 25.

EHA 574W x 25

To order please contact Greenwood Customer Services on 01903 777130

Order lead times available on request.

For further information, please contact Greenwood Technical Services on: 01903 777137

GREENWOOD AIR MANAGEMENT
Greenwood Air Management Ltd Brookside Industrial Estate, Rustington, West Sussex BN16 3LH.
Tel: (01903) 771021 Fax: (01903) 782398 Web: www.greenwood.co.uk Email: info@greenwood.co.uk

an Aliaxis company

MA3051

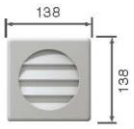
Acoustic wall ventilator

Physical specification

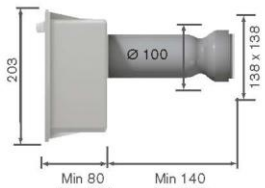
All measurements in millimetres unless otherwise indicated

Weight: 2.65kg

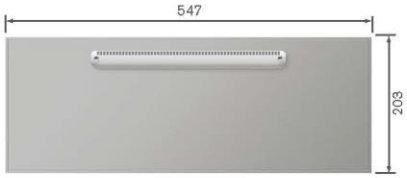
Materials:
PVC: Casing for wall vent, duct, external grille and internal ventilator. Acoustic lining and material inside wall vent.



External grille



Side



Internal

Features and benefits

- Highest performing acoustic background ventilator
- Provides acoustic attenuation to Dn,e,w 55dB(A)
- 2500mm² equivalent area performance
- Suitable for external wall thicknesses of 140mm and above
- Can be installed in internal wall constructions of between 100mm and 150mm
- Supplied with internal controllable vent and white/sand external grilles
- Conforms to acoustic requirements of Noise Insulation Regulations (NIR) 1975, one of only a small n umber of products available in tl e UK

Key

MA3051

NIR 1975

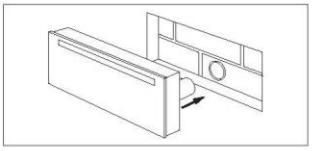
Acoustic performance
Dn,e,w: Average weighted performance across frequency range
C: Pink noise
Ctr: Road noise

Installation

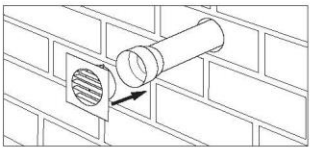
Instructions are provided with product including wall template for cut out.

Bonding compound is required to complete installation.

Protective strip to protect internal unit until decoration is complete within dwelling.

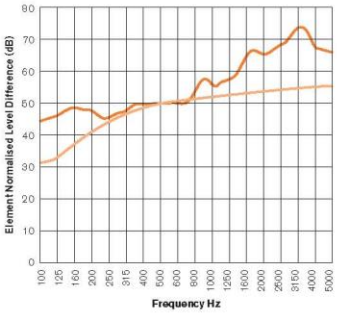


Push into cut out in wall.



Push fit external grille.

Performance



Models, control options and key data

		Acoustic performance			
Product code	**Operation**	**Dn,e,w**	**Dn,e,w (C)**	**Dn,e,w (Ctr)**	**Equivalent area mm²**
MA3051 *	Internal controllable trickle ventilator	55dB	54dB	52dB	2500

* Pricing is variable depending on quantity ordered - please call for details

Sonair

Acoustic (sound attenuating) filtered air supply units

For use fitted through walls

Sonair is for use in buildings where noise or air pollution is a major problem. The units are mechanical input ventilators that can also provide background ventilation as an alternative to trickle vents.

Sonair is a wall mounted input fan featuring touch control with an LCD display. Sonair can be individually operated or used as a part of the unique Air Comfort Control (ACC) system.

- Sonair F+ ventilates and cleans the air
- Sonair A+ ventilates, re-circulates and cleans the air
- Independently tested by the BRE
- Exceptional sound attenuation (up to 56dB*)
- Air cleaning
- Low energy

Sonair

Details

Product	Product Code
Sonair A+ including G2 Filter	S101SAUK
Sonair F+ including G2 Filter	S103SAUK
Sonair A+ including G2 Filter ACC	ACCS101UK
Sonair F+ including G2 Filter ACC	ACCS103UK
Central Exhaust	ACCCA
Central Display Controller	ACCCB
Back Box for Controller	62061
CO^2 Sensor	ACCC02
Phase Connector	ACCFK
Back Box for Phase Controller	68120
Sonair Filter G2	F211
Sonair Filter F6	F209

Performance

(Full test details available on request)
Input air flow rate (m^3/h) – 30-140
Acoustic $D_{n,e,w}$ (+/-) – 52 (Sonair A+), 55/56* (Sonair F+).
*depends on filter
Tested to the 'Noise Insulation Regulations'.

More information

www.titon.co.uk or 01206 814879

Xcell 150QVW and 200QVW

Mechanical Ventilation with Heat Recovery Units

The Xcell 150QVW and 200QVW feature a high-efficiency counterflow heat exchanger, providing up to 90% heat recovery efficiency. These units are purpose-designed for modern, airtight apartments and houses, where less natural leakage can cause increased condensation and mould problems.

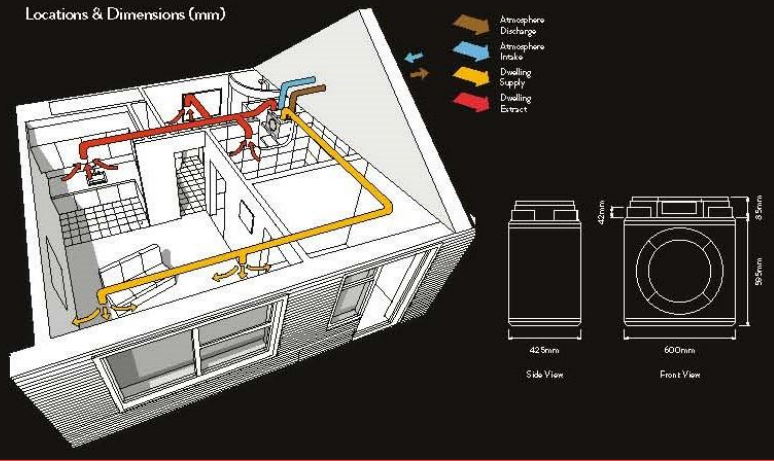
Both models have lightweight EPP construction and may be floor or wall-mounted in loft space. Low-energy EC motors ensure low annual running costs, while the long-life G4 filters can be inspected with ease – simply remove the front access panel for effortless maintenance.

The Xcell 150 with summer bypass provides the added benefit of a summer bypass facility. This stops the heat exchanger warming incoming fresh air during the summer months, for year-round comfort.

Key Features

- Highly efficient unit with EC motors and 90% efficient counterflow heat recovery cell.
- SAP Appendix Q listed and Part L and EST Best Practice compliant.
- Four 125mm Ø top entry connection spigots.
- Highly insulated, lightweight EPP construction.
- Installer-adjustable speed settings to suit dwelling size.
- G4 filters – recommended replacement every six months.
- Supplied with 1m length of 20mm Ø (O/D) plastic condensate tubing.

Locations & Dimensions (mm)

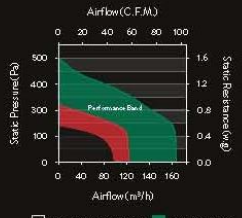


Specification

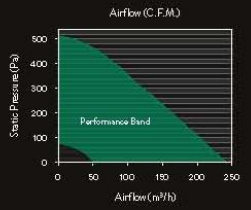
	Xcell 150QVW	Xcell 200QVW	Xcell 150QVW SB
Reference Number	92460AW	92462AW	93189AW
Motor type	EC	EC	EC
Maximum supply / extract performance (FID, m³/h)	160	240	160
Maximum supply / extract performance (m³/h @100Pa)	182	205	182
Maximum system pressure (Pa)	160	250	160
Power usage maximum (W) 220-240V AC 50-60 Hz	85	80	85
Specific fan power (W/l/s)	0.74	0.74	0.74
Efficiency (%)	90	90	90
Speeds	3	3	3
Speed control type	Remote variable DC	Remote variable DC	Remote variable DC
Noise (dB (A)@3m) Low / Medium / Max	20 / 22.5 / 29.5	20 / 24.5 / 34.5	20 / 22.5 / 29.5
Spigot diameter (mm)	125	125	125
Installation orientation	Vertical	Vertical	Vertical
Weight (kg)	17.5	17.5	17.5
UK Guarantee (years)	5*	5*	5*

*Motor only.

Performance (150QVW)



Performance (200QVW)



Pa	Max Speed (m³/h)
0	240
50	221
100	205
150	183
200	163
250	145
300	124

Speed 1 (Holiday/Absent) Speed 3 (Boost)
Speed 2 (Normal)

	S.F.P. (W/l/s)		Heat Recovery Efficiency		
KITCHEN	Xcell 150QVW	Xcell 200QVW	Xcell 150QVW	Xcell 200QVW	Xcell 200QVW
+1 Additional Wet Room	1.33	0.66	88%	91%	E.S.T. Best Performance Compliant
+2 Additional Wet Room	1.08	0.65	87%	91%	
+3 Additional Wet Room	1.17	0.68	86%	90%	
+4 Additional Wet Room	1.30	0.81	86%	89%	
+5 Additional Wet Room	1.53	0.89	85%	88%	

100% Variable

Controller Options

	Reference	Q8 SP Automatic 3 Speed	QC02 CO_2 Sensor	QHS Humidity Sensor
Xcell 150 QVW		96005AA	96003AA	96040AA
Xcell 200 QVW		✓	✓	✓
		✓	✓	✓

Xcell 300QVI and 400QVI

Mechanical Ventilation with Heat Recovery Units

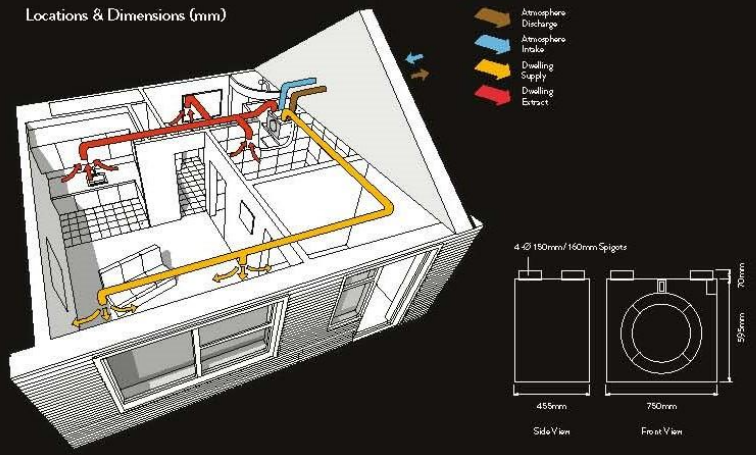
The Xcell 300QVI and 400QVI have been purpose-designed for modern, airtight houses with 3-4 bedrooms, or large apartments. With a counterflow heat exchanger capable of recovering up to 91% of the extracted heat, plus energy-efficient EC motors, they're a cost-effective solution. Both models may be wall or loft-mounted, feature long-life G4 filters, and are SAP Appendix Q listed and Passivhaus approved.

Every QVI unit benefits from a winter defrost cycle and cold home guard. Plus, a summer bypass facility ensures comfortable temperatures all year round. Filter and motor inspection alerts make maintenance simple.

Key Features

- Highly efficient unit with EC motors and 91% efficient counterflow heat recovery cell.
- SAP Appendix Q listed and Part L and EST Best Practice compliant.
- Four 150-160mm Ø top entry connection spigots.
- Highly insulated, lightweight EPP construction.
- Installer-adjustable speed settings to suit dwelling size.
- Winter defrost and summer bypass.
- G4 filters – recommended replacement every six months.
- Supplied with 1m length of 20mm Ø (O/D) plastic condensate tubing

Locations & Dimensions (mm)

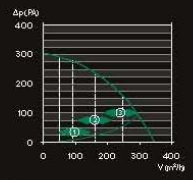


Specification

	Xcell 300 QVI	Xcell 400QVI
Reference Number	92465AW	92478AW
Maximum Extract Performance (FID, m³/h)	290	380
Extract Performance (m³/h @ 100Pa)	265	460
Maximum System Pressure (Pa)	350	410
Speeds	3	3
Speed Control Type	Remote DC	Remote DC
Noise Level (dBA @ 3m)	20.5/24.5/35.5	29/34/44
Power Usage @ 220-240V 50-60Hz (W)	136	338
Specific Fan Power (W/l/s)	0.73	
Weight (kg)	33	35
UK Guarantee (years)	5*	5*
Kg Carbon Saving (per year)	1520†	1520†

†Based on comparison with 3 standard intermittent AC fans on a 557m² detached 6 wet room house, gas heated, build 2006 using SAP 2006 software using best practice (3) tightness.
*Motor only.

Performance (300QVW)

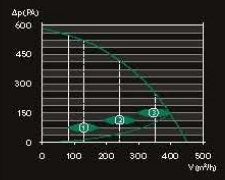


Pa	Max Speed (m³/h)
0	310
50	221
100	205
150	183
200	168
250	145
300	124

1 Speed 1 (default setting*)
2 Speed 2 (default setting*)
3 Speed 3 (default setting*)
*Freely programmable

V Volume flow rate
Δp External pressure loss
Δp ext,min Minimum pressure reserve for the air-duct system

Performance (400QVW)



1 Speed 1 (default setting*)
2 Speed 2 (default setting*)
3 Speed 3 (default setting*)
*Freely programmable

V Volume flow rate
Δp External pressure loss
Δp ext,min Minimum pressure reserve for the air-duct system

KITCHEN	S.F.P.(W/l/s)	Heat Recovery Efficiency
+1 Additional Wet Room	0.65	91%
+2 Additional Wet Room	0.60	91%
+3 Additional Wet Room	0.61	90%
+4 Additional Wet Room	0.68	89%
+5 Additional Wet Room	0.76	88%
+6 Additional Wet Room	0.84	87%
+7 Additional Wet Room	1	87%

100% Variable
EST Best Performance Compliant

92951AA QVI Controller
- Wired operation from a distance of up to 10m
- 3 speeds plus auto
- Indicates when heat recovery filters need changing

Controller Options

Q3SP Automatic 3 Speed

QC02 CO_2 Sensor

QHS Humidity Sensor

Reference	96005AA	96003AA	96040AA
Xcell 300QVI	✓	✓	✓
Xcell 400QVI	✓	✓	✓