

Imagination 02
Image Business Park
Knowsley
L33 7UF

Environmental Noise Survey and
Plant Noise Impact Assessment Report

Date: 19 November 2025

Client: Wilten Construction Ltd
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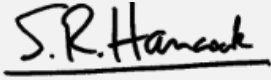
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Document Approvals

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For Information

Please Note

Quantum Acoustics Ltd have prepared this report with generally accepted acoustic consultancy principles, using all reasonable skill, care and diligence. This is as per the terms agreed between Quantum Acoustics Ltd and our Client. Information referred to herein which may have been provided by third parties should not be assumed to have been checked and verified by Quantum Acoustics Ltd, unless specifically confirmed to the contrary. Both confidential and commercially sensitive information is contained within this document, and as such it should not be disclosed to third parties. Any third party choosing to rely on this document does so at their own risk.

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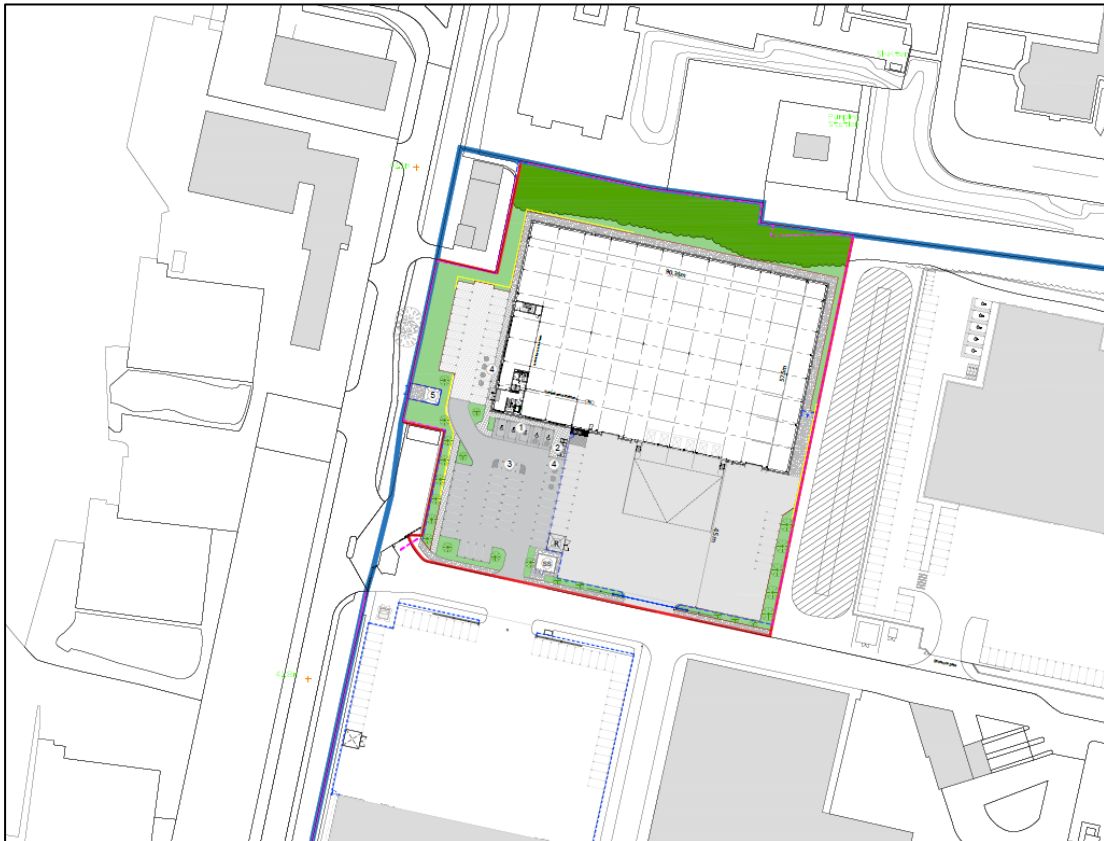
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1.0 INTRODUCTION

- 1.1 Imagination O2, Image Business Park, Knowsley comprises a newly erected detached industrial building (mixed E(g)(iii), B2 and B8 uses) with ancillary offices, car parking, service area and soft landscaping.
- 1.2 Quantum Acoustics have been appointed by Wilten Construction Ltd to undertake an environmental background noise survey to establish appropriate plant noise emission criteria, and subsequently assess atmospheric noise emission from the proposed plant to discharge the Planning Condition for the site in respect of plant noise for the planning application references 21/00959/FUL and 21/00959/NMA.
- 1.3 This report presents our methodology and findings.

2.0 SITE DESCRIPTION

- 2.1 Imagination O2 is located on Image Business Park, Knowsley, L33 7UF. The site layout plan is indicated below, with the boundary outlined in red.



Proposed Site Plan (Drawing No. 21065 – 1004, dated 06.11.25)

- 2.2 The surrounding area is a large industrial area which includes Knowsley Industrial Park. The nearest residential to the site is located on Boundary Lane at a distance of approximately 780m.
- 2.3 The local planning authority is Knowsley Council.

3.0 ACOUSTIC TERMINOLOGY

3.1 The following section uses the following acoustic terms:

- A-weighted noise levels are frequency-weighted in a way that approximates the frequency response of the human ear and allows sound levels to be expressed as a single figure value. The A-weighted level is therefore a measure of the subjective loudness, rather than physical amplitude.
- L_{90} is the noise levels that is exceeded for 90% of the measurement period. It reflects the quiet periods during that time and is often referred to as the "background noise level". It is often used as a basis for setting noise emission criteria. The A-weighted value over time period (T) is written as $L_{A90,T}$.
- L_{eq} is the level of a notional continuous sound that would deliver the same sound energy as the actual fluctuating sound over the measurement period. This may be thought of as the "average" level during the measurement period.
- L_{max} is the maximum noise level during the measurement period.

4.0 NOISE SURVEY METHODOLOGY

Survey Period

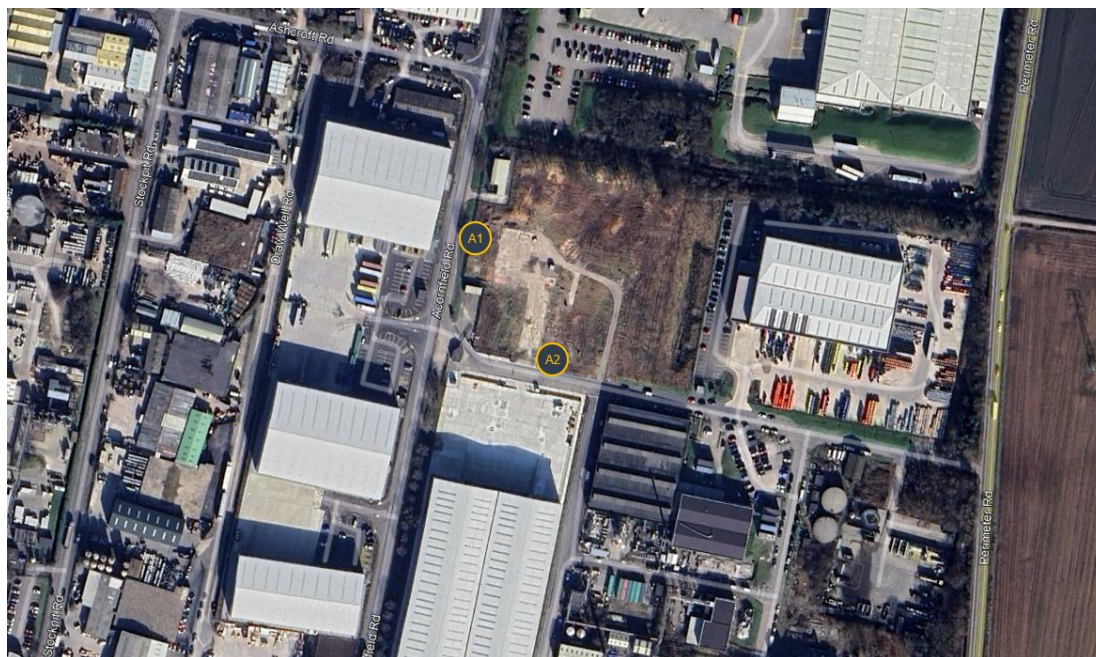
- 4.1 An unattended fully automated environmental noise survey was undertaken from approximately 11:30 hours on 06 November to approximately 11:30 hours on 06 November 2025.

Measurement Positions

- 4.2 Noise monitoring equipment was located at the following position/positions:

Noise Monitoring Positions	
Position	Description
Position A1	Located along the western boundary of the site, at a height of approximately 2m above ground level.
Position A2	Located on the southern boundary of the site, at a height of approximately 1.5m above ground level.

- 4.3 The noise monitoring positions are indicated on the following plan.



Plan Showing Measurement Positions (Google Imagery 2025, The GeoInformation Group)

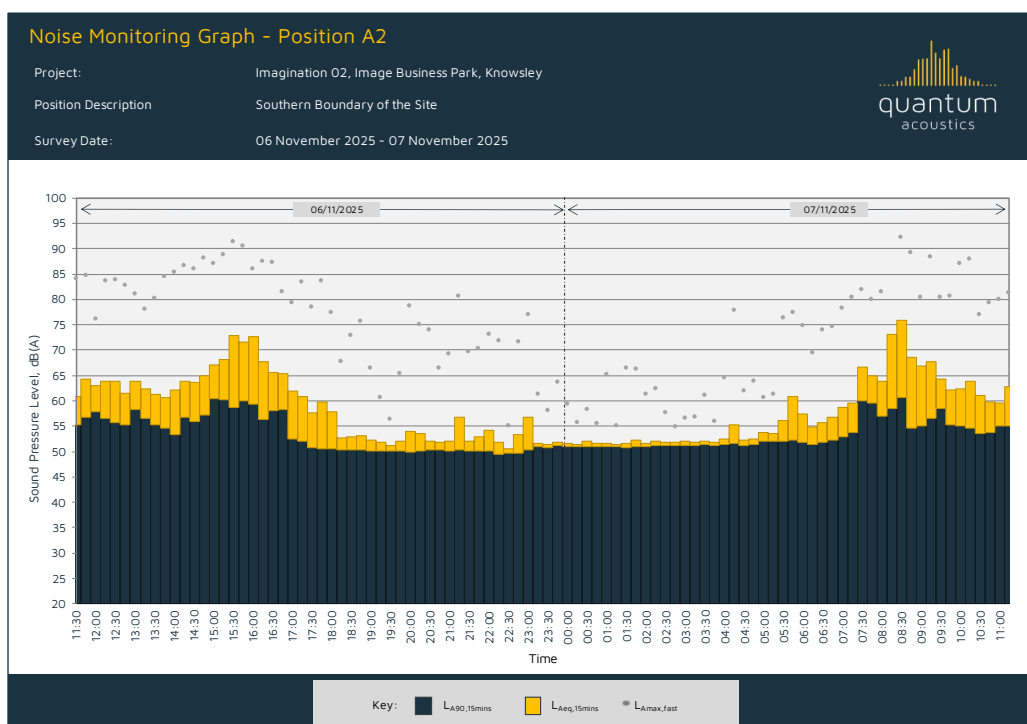
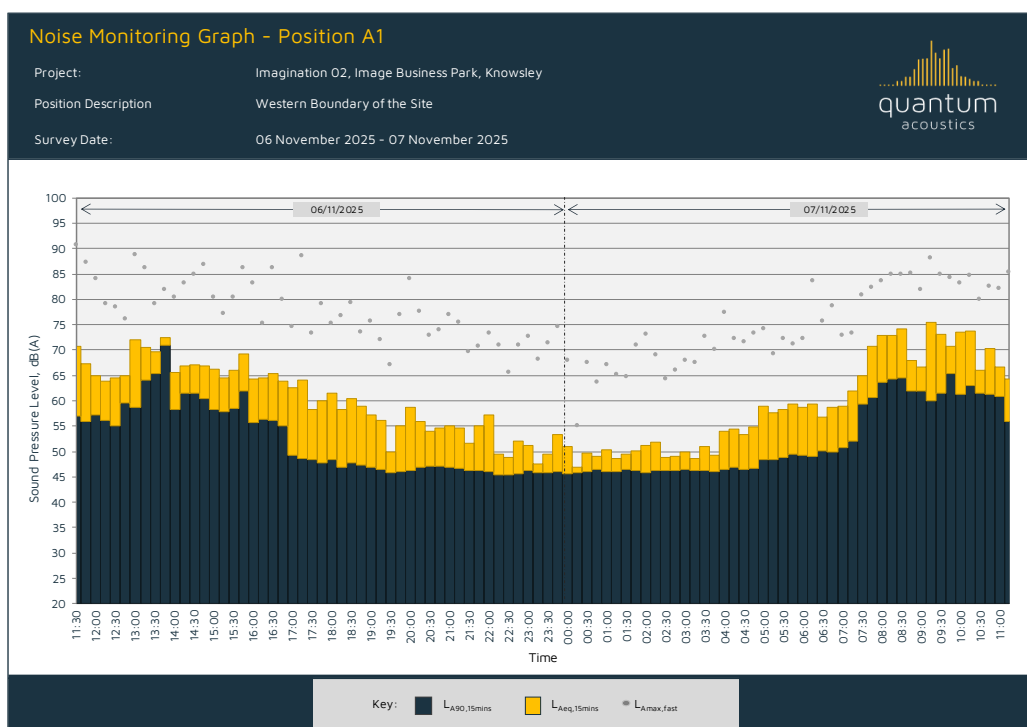
Equipment

- 4.4 The sound level meters were set up to continuously measure the A-weighted (dBA) L_{90} , L_{eq} and L_{max} sound pressure levels over sampling periods of 15 minutes duration.
- 4.5 Calibration certificates for the equipment, traceable to national standards, used in this survey are available upon request.
- 4.6 Calibration checks were carried out prior to and on completion of the survey, with no significant calibration drift observed.
- 4.7 Details of the equipment used for the survey are summarised below:

Survey Equipment				
Location ID	Description	Manufacturer	Type	Serial Number
A1	Type 1 Sound Level Meter	Svantek	971A	151366
A2	Type 1 Sound Level Meter	Convergence	Nsrt_mk4	AHFWpf0a0X83lpFy60h5vD
-	Acoustic Calibrator	Svantek	SV 33B	125699

5.0 NOISE SURVEY FINDINGS

- 5.1 The noise survey results are presented in the graphs below, showing the A-weighted L_{90} , L_{eq} and L_{max} noise levels measured during each consecutive 15-minute period of the survey.



- 5.2 The measured daytime L_{Aeq} (16 hour) and night-time L_{Aeq} (8 hour) noise levels are presented in the table below:

L_{Aeq} Noise Levels [dB]		
Position	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Position A1	69	54
Position A2	66	54

- 5.3 The measured modal background L_{A90} noise levels are presented in the table below:

Modal Background L_{A90} Noise Levels [dB]		
Position	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Position A1	58	46
Position A2	53	49

- 5.4 The measured minimum background L_{A90} noise levels are presented in the table below:

Minimum Background L_{A90} Noise Levels [dB]		
Position	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Position A1	45	46
Position A2	51	50

- 5.5 During the periods we were present on site, the subjectively dominant noise sources at measurement Position A1 and A2 activities associated with the surrounding commercial warehouses and road traffic noise along Perimeter Road and Acornfield Road. Construction noise on the site was ongoing during the typical working daytime hours. It is believed that the majority of commercial activities are confined to normal working/trading hours, with some of the surrounding units operating 24 hours a day.
- 5.6 Weather conditions during the survey period were generally suitable for measuring environmental noise, it being dry and calm.

6.0 PLANNING POLICY AND ASSESSMENT GUIDANCE

Noise Policy Statement for England

- 6.1 The Noise Policy Statement for England (NPSE) was published in March 2010. The NPSE is the primary statement of noise policy for England and applies to all forms of noise other than occupational noise. The NPSE sets out the long-term vision of Government noise policy which is to:

"Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."

"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."*

- 6.2 The Explanatory Note to the NPSE introduces guidance to assist in defining the adverse impacts:

- NOEL – No Observed Effect Level

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

- LOAEL – Lowest Observable 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.

- 6.3 These categories are further discussed in the Planning Practice Guidance section below.

- 6.4 The NPSE acknowledges that it is not possible to have a single objective noise level based measure that is mandatory and applicable to all sources of noise in all situations.

Planning Practice Guidance

- 6.5 The government's Planning Practice Guidance is a web based resource and provide advice on various issues, including noise (<https://www.gov.uk/guidance/noise--2>). The advice (March 2014, latest update July 2019) states in the context of considering when noise is relevant to planning, "noise needs to be considered when new development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced)."

- 6.6 The Planning Practice Guidance pages also include more explanation of the effect level categories noted above, providing an explanatory Noise Exposure Hierarchy Table, which explores how actions such as a requirement for noise mitigation, or prevention of a development, might be assessed with respect to whether noise levels are considered above the category thresholds.

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

National Planning Policy Framework

- 6.7 The following paragraph is from the National Planning Policy Framework (NPPF). The NPPF was revised in December 2024.

"198. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

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

Local Authority Requirements

- 6.8 The site lies within the jurisdiction of Knowsley Council.

- 6.9 Their Planning Condition 6 states the following:

"Fixed plant and equipment associated with the development shall be designed to a level that is at least 5dB(A) below the existing LA90 background noise level as measured during the relevant time-period. Any tonal, impulsive and/or irregular noise would be addressed by imposing a penalty as per the methodology set out in BS 4142:2014+A1:2019, Methods for Rating and Assessing Industrial and Commercial Sound. Noise limits for fixed plant are to apply at a position 1 metre from the closest affected window of the nearest noise sensitive property.

Reason: To safeguard local residents from noise and disturbance, and to comply with Saved Policy ENV2 of the Knowsley Replacement Unitary Development Plan adopted June 2006."

BS 4142:2014

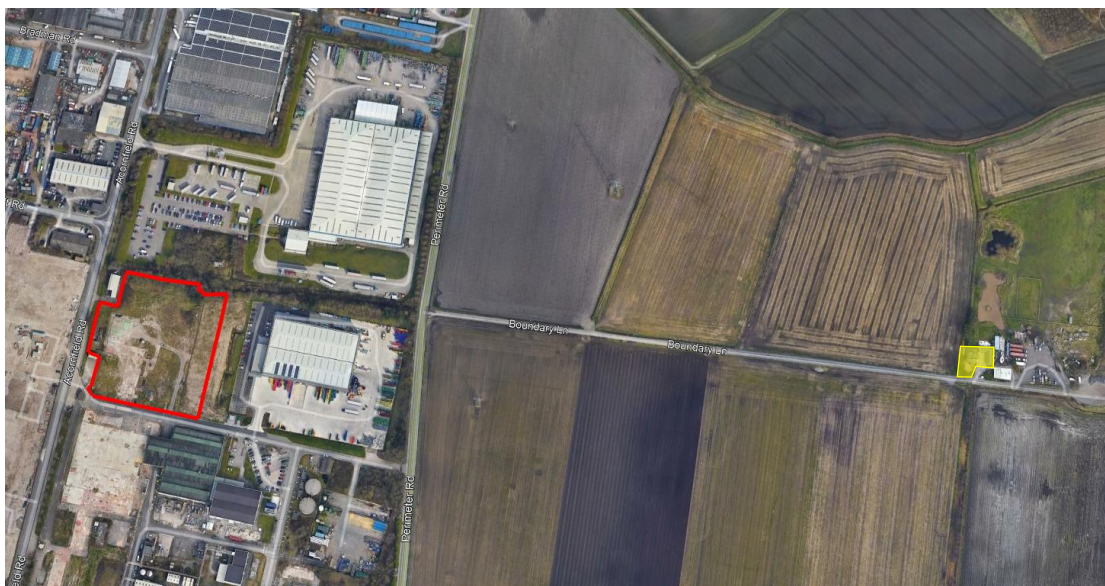
- 6.10 BS 4142:2014+A1:2019 "Methods for Rating and Assessing Industrial and Commercial Sound" addresses the likelihood of adverse impact from noise generated by plant equipment. A noise rating is determined and compared with the existing local background sound level, and several cumulative acoustic feature corrections to the noise rating are available to apply where appropriate. For example, if the noise includes a distinguishable tone, impulse, intermittency or other readily distinguishable sound characteristic.

- 6.11 BS 4142:2014 seeks to determine a “representative” background sound level, stating that “...the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods”.
- 6.12 The assessment of the impact depends upon the margin by which the rating level of the specific sound source exceeds the background sound level but also promotes a consideration of the context in which the sound occurs when making an assessment. BS 4142:2014 states that an initial estimate of the impact of the specific sound is made by subtracting the measured background sound level from the rating level, while considering the following points:
- 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.
- 6.13 Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

7.0 PLANT NOISE EMISSION CRITERIA

Nearest Noise Sensitive Receptor

- 7.1 The potentially most affected noise-sensitive receptor to the proposed plant is a residential window at Boundary Lane, approximately 780 metres from the plant. The identified noise sensitive receptors are indicated by the yellow circle, with the site boundary in red below:



Site Plan (Google Imagery 2025, The GeoInformation Group)

Plant Noise Emission Criteria

- 7.2 Given the proximity of the noise sensitive receptor (NSR) to Perimeter Road and the absence of intervening buildings, it is considered highly likely that the background noise level at the NSR is comparable to the levels measured on site. Accordingly, the lowest measured background noise level will be utilised for the daytime assessment.
- 7.3 During the night-time period the measured background noise level is expected to be elevated due to the operating hours of the industrial estate, from which the NSR will be screened. Therefore, it is more appropriate to assess against absolute noise levels. This approach is consistent with BS 4142, which recommends the use of absolute levels in cases where background noise levels are exceptionally low.
- 7.4 Based on the guidance within British Standard and World Health Organisation, noise levels at or below 30 dB(A) are equivalent to the NOEL during the night-time. Similarly, when compared to the background noise, plant noise at this magnitude would not lead to adverse impacts.

- 7.5 To comply the aforementioned guidance including the Local Authority's requirements, and on the basis of the noise survey results, the following environmental plant noise emission criteria are proposed to be achieved at 1 metre from the noise sensitive residential window:

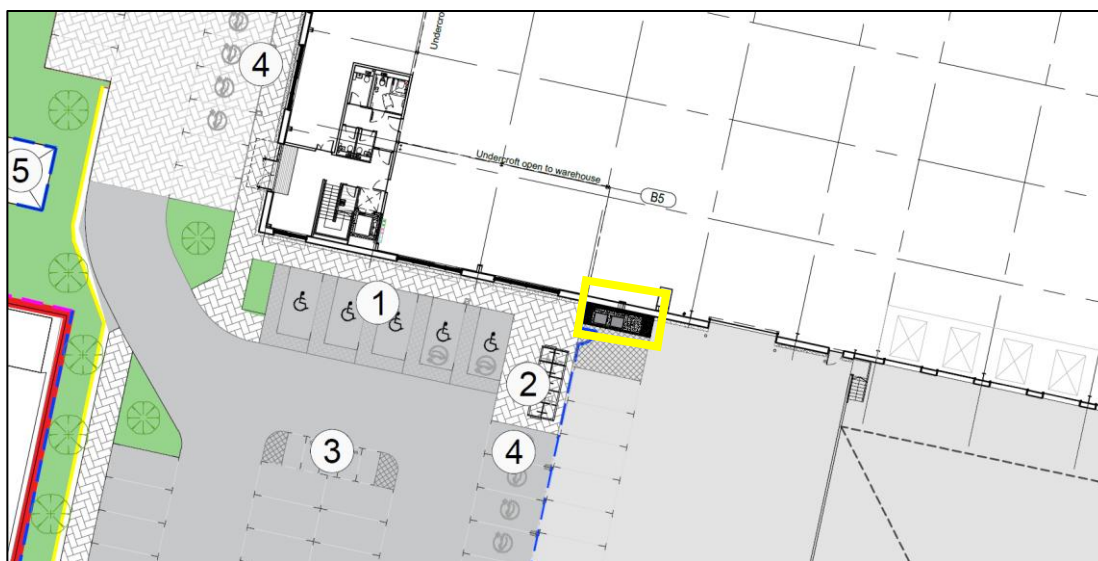
Plant Noise Emission Limits L_{Aeq} dB		
Receptor	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Boundary Lane	40	30

- 7.6 The above criteria apply to cumulative noise level of all plant operating simultaneously, under normal operating conditions.
- 7.7 If plant contains tonal characteristics, the above criteria should be reduced by 5dBA.

8.0 PLANT NOISE IMPACT ASSESSMENT

Proposed Plant Selections

- 8.1 We understand 2No VRF Units are proposed plant.
- 8.2 The VRF units are proposed to be located along the southern façade of the industrial unit as identified in yellow in the figure below:



- 8.3 Wilten Construction Ltd have advise the sound power level for each of the proposed VRF Unit is as shown in the table below:

Proposed Plant	
Plant	Sound Power Level (Lw) (dBA)
VRF Unit	85

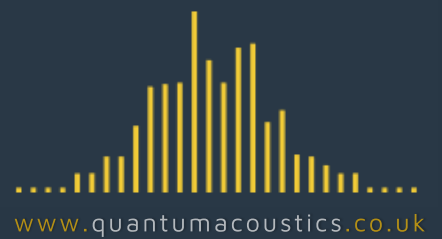
Noise Assessment

- 8.4 The following table summarises our assessment of plant noise to the noise sensitive residential window:

Noise Assessment to Nearest Noise Sensitive Residential Window		
Item	Sound Power[dBA] @ Boundary Lane	
VRF Unit 1	85	
VRF Unit 2	85	
Cumulative Sound Power	88	
Propagation Loss	-58	
Screening Loss	-5	
Predicted Plant Noise Level	25	
Criterion	Daytime	Night-time
	40	30
Compliance	✓	✓

9.0 CONCLUSIONS

- 9.1 Quantum Acoustics have undertaken an unattended automated environmental noise survey to establish the existing noise levels.
- 9.2 Environmental plant noise emission criteria have been proposed based on the noise survey results and in accordance with the relevant guidance including the Local Authority's requirements.
- 9.3 Environmental noise emissions from the proposed plant have been assessed to noise sensitive receptors. Our calculations indicate that environmental plant noise emissions should comply with the proposed criteria.
- 9.4 Compliance with the proposed plant noise emission criteria will ensure the proposed plant has no significant adverse noise impact on nearby noise sensitive receptors.
- 9.5 With regard to atmospheric plant noise emissions, we therefore see no reason why the planning condition cannot be discharged.



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