

Telecycle Europe Limited

Unit One, First Avenue, Wrexham

Environmental Permitting Noise & Vibration
Impact Assessment



Telecycle Europe Limited

UNIT ONE, FIRST AVENUE, WREXHAM

Environmental Permitting Noise & Vibration Impact
Assessment

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. PA1275

DATE: NOVEMBER 2025

Peninsular Acoustics

Liverpool: Office 14 Clock Tower Building, Clock Tower Park, Liverpool, England, L10 1LD

Birmingham: Studio 214, Scott House, Custard Factory, Gibb Street, Birmingham, B9 4AA

London: 16 Upper Woburn Pl, London, WC1H 0AF



Website: www.peninsularacoustics.co.uk



QUALITY CONTROL

Issue/revision	P01	P02	P03	P04
Remarks	First issue	DWG Update		
Date	November 2025	November 2025		
Prepared by	J Healey	J Healey		
Checked by	J Howell	J Howell		
Authorised by	J Healey	J Healey		
Project number	PA1275	PA1275		
Report number	R02	R02		
File reference	PA1275-R02-P01 Wrexham Telecycle Permitting Noise Impact Assessment	PA1275-R02-P02 Wrexham Telecycle Permitting Noise Impact Assessment		

CONTENTS

1.	INTRODUCTION	6
1.1.	SCOPE OF WORK	6
1.2.	SITE DESCRIPTION	7
2.	BS 4142 ASSESSMENT APPROACH	9
3.	SURVEY	10
3.1.	METHODOLOGY	10
3.2.	EQUIPMENT	11
3.3.	OBSERVATIONS	11
3.4.	RESULTS	11
4.	BS 4142 IMPACT ASSESSMENT	12
4.1.	ACOUSTIC MODEL	12
4.2.	SOURCE SOUND LEVELS	13
4.3.	EMBEDDED SCHEME MITIGATION	14
4.4.	SPECIFIC SOUND LEVEL	15
4.5.	RATING LEVEL	16
4.6.	INITIAL NOISE IMPACT ASSESSMENT	16
4.7.	CONTEXT	17
4.8.	SUMMARY	18
4.9.	UNCERTAINTY	18
5.	CONCLUSIONS	19

APPENDICES

APPENDIX A

TECHNICAL TERMINOLOGY

APPENDIX B

EQUIPMENT CALIBRATION CERTIFICATES

APPENDIX C

UNCERTAINTY

APPENDIX D

REPORT LIMITATIONS

1. INTRODUCTION

Peninsular Acoustics Ltd. has been commissioned by Telecycle Europe Limited (hereafter referred to as 'the Client') to undertake a Noise Impact Assessment considering their facility at Unit One, First Avenue, Wrexham (hereafter referred to as 'the Site') on the surrounding area.

This assessment is structured to provide the necessary information for Environmental Permitting as outlined in the Environment Agency [Method of Implementation](#) (MID) document.

This report is necessarily technical in nature and therefore, to assist the reader, an acoustics glossary is provided in Appendix A.

1.1. SCOPE OF WORK

It is understood that the Client is applying for a waste permit, and therefore a BS 4142 assessment is required be undertaken to determine any potential impact at nearby receptors.

The nearest residential receptor has been identified as being over 600 metres from the Site. Given the distance between the source and receptor, the impact of vibration has not been considered in this assessment.

The following scope of works has been undertaken:

- A detailed sound survey was undertaken on Thursday 18th and the morning (09:00-11:00) of Friday 19th September 2025 at the nearest receptors to determine background sound levels in accordance with BS 4142:2014 +A1:2019 'Methods for rating and assessing industrial and commercial sound' (BS 4142);
- Using library data and noise limits for plant, a 3D acoustic model has been created to predict specific sound levels;
- An initial numerical impact assessment has been undertaken; and
- A noise management strategy has been provided.

The assessment has followed the approach of BS 4142 including all relevant information in Environment Agency (EA) document *Method implementation document (MID) for BS 4142 (December 2023)*.

As outlined in the Environment Agency guidance *Noise and vibration management: environmental permits (January 2022)* if noise is audible at any of the following types of locations, it is regarded as 'possibly causing an impact':

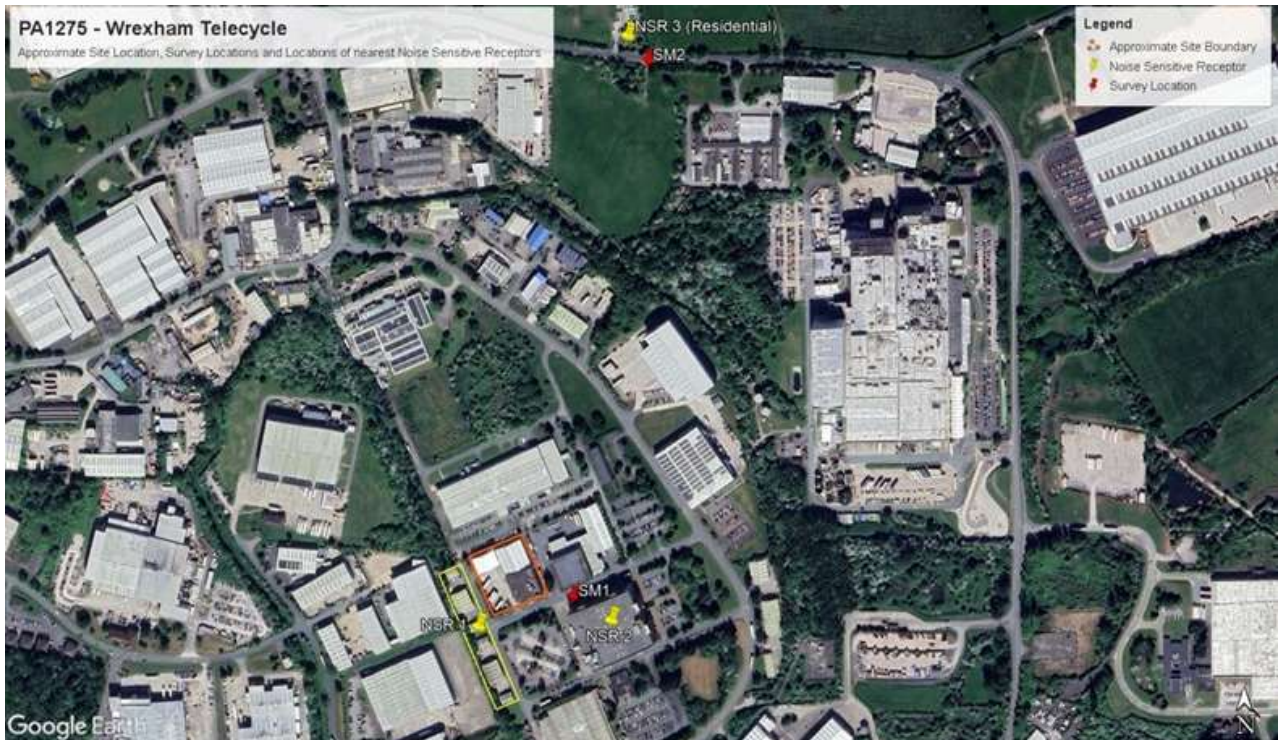
- residential properties
- schools
- hospitals
- offices
- public recreation areas
- other NSRs
- noise sensitive habitats

1.2. SITE DESCRIPTION

The Site is situated on the crossing between First Avenue and Dutton Road, within the wider Redwithers industrial estate, and currently operates as a haulage firm. It is bound on all sides by existing industrial and commercial sites.

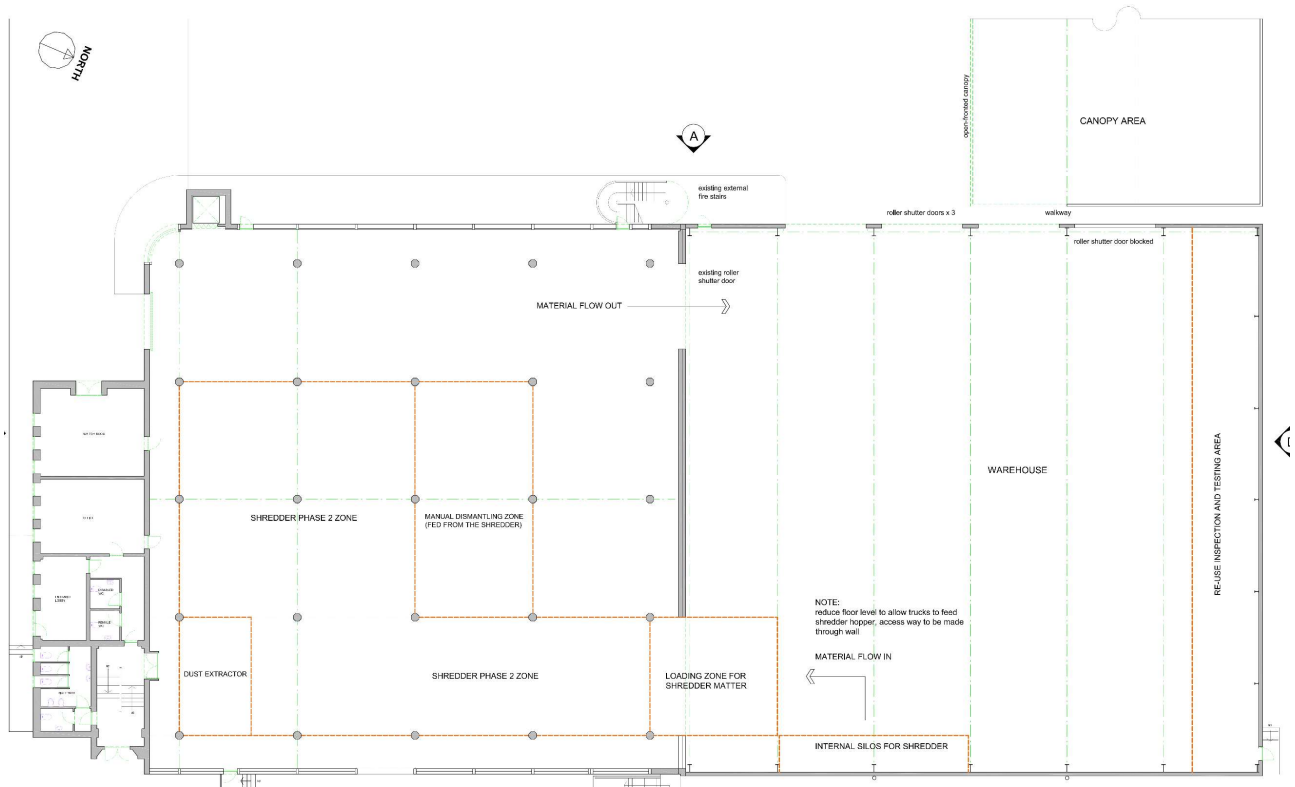
Nearby noise-sensitive receptors comprise the offices of Dockweiler and other businesses (NSR1), offices within Redwither Tower (NSR2) and a dwelling off Bryn Lane (NSR3). Figure 1.1 shows a map of the surrounding area including all receptors.

Figure 1.1 Site Plan



Development proposals at the Site are for the conversion from a haulage site to a reclamation centre, with the primary activity at the Site to be shredding of processed and unprocessed metal. Operating hours at the Site further to redevelopment will be between 08:00 and 18:00. Figure 1.2 shows an indicative Site plan provided by the Client, including the location of proposed activities at the Site. The majority of Site activity is proposed to occur internally, and so the internal layout is presented herein.

Figure 1.2 Indicative Site Plan (Client Provided Drawing)



The Site consists of two warehouses, henceforth referred to as the “Shredding Warehouse” (leftmost on the above image) and the “Loading Warehouse”. Operation at the Site will follow the general process of the delivery of material into the loading warehouse, from which point it will be loaded via forklift/shovel lifter into the shredder unit, which will be intermittently active throughout the whole day period.

The shredding warehouse is a two-storey building with walls of a solid concrete construction, and an open-plan office space on the second floor of the building, for intermittent use by employees at the Site. The loading warehouse is a secondary single-storey building, with walls and a roof constructed of corrugated metal. Both warehouses have metal roller doors leading to the external environment, although the shredding warehouse’s roller doors are to be kept sealed at all times further to the change in operation.

There will also be deliveries to an external area of the Site for the receipt of processed and unprocessed metals, to be transported from an external service yard into the internal area of the Site. Entry to the Site for deliveries shall be via the roller doors on the northern portion of the rightmost warehouse shown in Figure 1.2, and deliveries, forklift movements and the occasional tipping of unprocessed metal will occur in the service yard.

2. BS 4142 ASSESSMENT APPROACH

BS 4142 describes methods for rating and assessing industrial and/or commercial sound and includes, but is not limited to, the assessment of:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical equipment;
- Sound from the (un)loading of goods and materials at industrial/commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes such as that from forklift trucks on or around an industrial and/or commercial site.

The methods described in BS 4142 use outdoor sound levels to assess the likely effects of sound on people who are typically outside residential premises. Although indoor effects can be indicated where the façade composition is known. A summary of the approach set out in BS 4142 is set out below:

Establish or predict the specific sound level of the source(s) by considering both the ambient (includes the source to be assessed) and residual (excludes the source to be assessed but includes all remaining sources) sound level;

- Measure the representative background sound levels, typically by measuring close to the receptor location;
- Rate the specific sound level to account for any distinguishing characteristics (see below);
- Estimate the impact by subtracting the background sound level from the rating level; and
- Consider the initial estimate of impact, as determined above, in the context of the noise and its environment.

The specific sound level is rated to account for distinguishing characteristics by using penalties for tonality, impulsivity, intermittency, and other sound characteristics. The dominant acoustic characteristic should be applied to avoid large penalties which is in accordance with the Institute of Acoustics response to BS 4142.

The character corrections are flexible according to whether the acoustic character is just perceptible at the noise receptor, or is clearly perceptible or highly perceptible, and range from 0 to 6 dB for tonal noise, 3 to 9 dB for impulsive noise, and 3 dB for other non-tonal/impulsive acoustic characteristics.

An initial estimate of impact of the specific sound is obtained by subtracting the background sound level from the rating level. Typically, the greater the difference, the greater the magnitude of impact.

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;
- At differences lower than +5 dB a low impact is likely, depending on the context. The lower the rating level is to the measured background sound level, the less likely it is that the specific sound source will have an impact.

The results of the initial assessment should then be considered in light of all pertinent contextual factors.

3. SURVEY

Site visits were undertaken on both the 18th and 19th September 2025. A Site walkaround was conducted to assess the construction details of the buildings at the Site to be retained. Development proposals at the Site are yet to proceed, and so the survey portion of this report details a measurement of background sound levels at nearby receptors.

3.1. Methodology

Due to security conditions at the Site, as well as noise still at times present from the Site's previous tenants, an unattended environmental sound survey was not possible. In lieu of an unattended survey, multiple attended 30-minute measurements were taken at locations representative of nearby NSRs.

Attended environmental sound survey of the current prevailing sound levels was undertaken at locations adjacent to the Site on the afternoon (16:00-18:00) of Thursday 18th and the morning (09:00-11:00) of Friday 19th September 2025. These times were chosen in order to capture the Site and adjacent area during both high and low periods of traffic.

A sound level meter (SLM) was attended at two locations as follows:

- Sample Measurement 1 (**SM1**): Attended measurements taken adjacent to the Site, adjacent to the façade of NSR 1; and
- **SM2**: Attended measurements taken at the nearest residential receptor, adjacent to NSR 3, circa. 650m north from the Site

The above measurement positions are in Figure 1.1, with images of these positions in-situ shown below.



Near to Site, outside adjacent office building
(NSR 2)



Adjacent to nearest residential receptor on Bryn
Lane (NSR 3)

The equipment was setup in free-field conditions to capture L_{Aeq} , L_{AFmax} , and L_{eq} at a minimum.

3.2. EQUIPMENT

Sound levels were measured using a Norsonic Type 140 Class 1 SLM housed in environmental protection apparatus. The SLM was field calibrated before and after the survey using a Class 1 calibrator.

Table 3.1: Field Calibration Results

Field Calibratin Reading Before	Field Calibratin Reading After
114.0 dB at 1 kHz	114.0 dB

Full details of the noise measurement equipment used are contained in Appendix B.

3.3. OBSERVATIONS

Weather conditions fluctuated during the survey, with there being periods of high wind and rain at times during attendance. Weather conditions were monitored, and the attended measurements were timed such that there was no precipitation or windspeeds greater than 5 m/s during measurement periods.

Stood at SM1, the acoustic environment was typically subjectively quiet, with steady distant road traffic as well as occasional impact from adjacent commercial sites (primarily the movement of HGVs). Intermittent activity was still on occasion audible from the previous tenant at the Site; measurements were taken only when this activity was either not present, or inaudible at the measurement position.

Stood at SM2, the acoustic environment was dominated entirely by busy road traffic off Bryn Lane, as well as occasionally audible sound from nearby industrial premises.

3.4. RESULTS

A summary of the measurement results are presented in Table 3.2.

Table 3.2 Survey Results

Position	Receptor Representative of	Residual Sound $L_{Aeq,30mins}$	Background Sound $L_{A90,30mins}$
SM1	NSR1 & NSR2	54-59 dB	48-50 dB
SM2	NSR3	65-69 dB	49-55 dB

4. BS 4142 IMPACT ASSESSMENT

4.1. ACOUSTIC MODEL

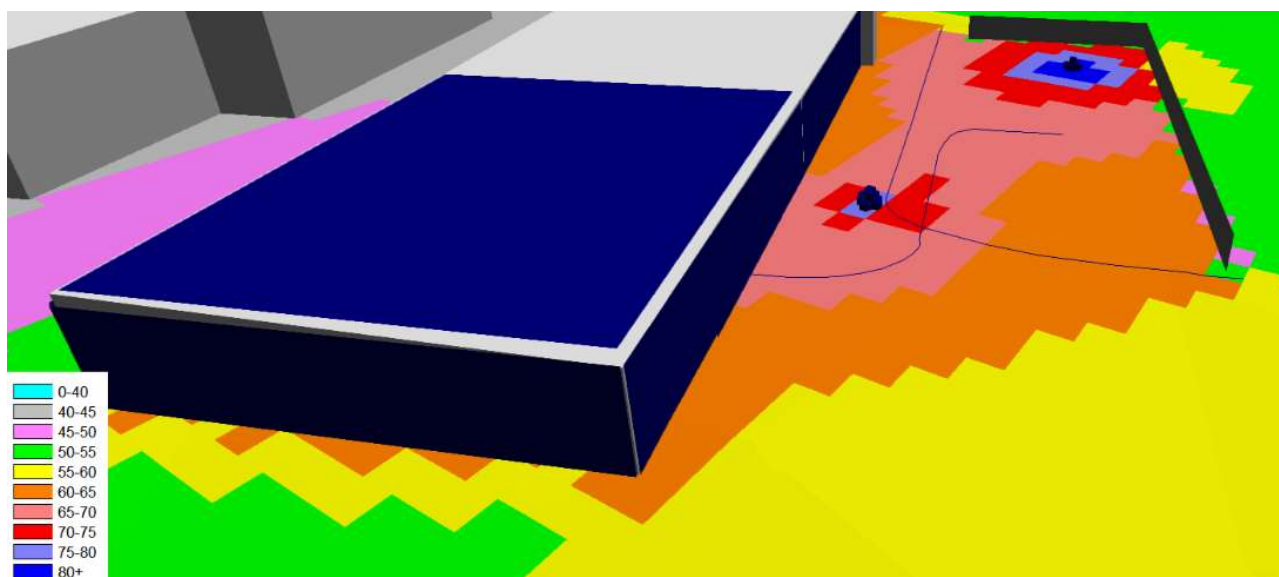
An acoustic model of the Site and environs has been generated in Datakustik CadnaA® modelling software. The model was generated to determine noise levels across the Site and noise source emissions have been informed by survey data.

CadnaA® considers various inputs, including topography, buildings, and road noise sources, and calculates sound levels in accordance with national and international standards; in this case, the relevant UK standards are the procedures set out within ISO 9613-2: 1996 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'.

The modelling assumptions pertinent to the assessment are as follows:

- ground absorption set to 0 (Hard Ground);
- digital terrain included in the model Environment Agency (downloaded on 19th September 2025);
- buildings set to reflective with 2nd order reflections considered;
- Point sources, vertical and horizontal area sources, and line sources with resultant sound power levels shown in Table 4.1 below;
- All considered sources in continuous operation with appropriate time corrections applied, in order to account for a worst-case hourly period, in accordance with BS 4142; and
- Shredding warehouse walls assumed to be constructed of a solid concrete providing 50 dB $R_w + C_{tr}$ sound reduction (e.g. 200mm thickness). Loading warehouse walls and roof assumed to be constructed of corrugated metal providing 25 dB $R_w + C_{tr}$ sound reduction. Roller doors at each warehouse assumed to be of typical roller shutter door construction providing 18 dB $R_w + C_{tr}$ sound reduction.

Figure 4.1 3D Image of Model (Values shown in dB $L_{Aeq,1hr}$)



The second floor of the shredding warehouse has not been included in the model and no breakout via the roof of the shredding warehouse has been considered due to the second floor covering the entirety of the space below.

4.2. SOURCE SOUND LEVELS

Table 4.1 shows the sound sources considered in the acoustic model, including how they were modelled and the resultant Sound Power Level (inclusive of any time correction) in the model.

Table 4.1 Source Sound Levels

Activity	Modelled As	Result. Sound Power Level
HGV Arrival + Idling	Point Source	85 dB L _{WA}
HGV Air Breaks + Unloading Activities	Point Source	86 dB L _{WA}
HGV Movement	Line Source	76 dB L _{WA}
Forklift Movement	Line Source	89 dB L _{WA}
Shredding Warehouse External Break-out	Vertical Area Source	85 dB L _{WA} ⁴
Loading Warehouse External Break-out ¹	Horizontal/Vertical Area Source ³	81 dB L _{WA} ⁴
Warehouse External Break-out ²	Vertical Area Source	67 dB L _{WA}
External Metal Tipping	Point Source	100 dB L _{WA}
1: Includes internal operation of shovel loader, as well as the noise break-in to the loading warehouse from operation of the shredding plant. 2: Break-out from the loading warehouse to the external environment whilst a door remains open in order to receive a delivery. 3: Horizontal area source used to model breakout via the loading warehouse's roof. 4: Internal Reverberant Lp, Datakustik CadnaA® modelling software has been used to calculate predicted external breakout based on the assumed SRI of the respective wall construction.		

For HGV movements to and from the delivery area, source data has been determined based upon the guidance contained within the Noise Advisory Council (NAC) guide¹ which takes the single event noise exposure level of a typical HGV and provides an L_{Aeq,T} value accordingly.

Where possible datasheets provided by the Client or taken from a suitably representative datasheet, or otherwise source sound data has been derived from the data available in Appendix C of BS 5228-1². An upper limit of 85 dB reverberant sound pressure level has been chosen as an indicative sound level for sound in the shredding warehouse, chosen as the maximum value a worker inside the warehouse can be exposed to over eight hours in accordance with Noise at Work Regulations³, on the assumption that plant will need to be attenuated such that it does not exceed that level.

¹ A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level, L_{Eq}, Noise Advisory Council, 1978.

² BS 5228-1:2009+A1:2014 – Code of Practice for noise and vibration control on open sites – Part 1: Noise

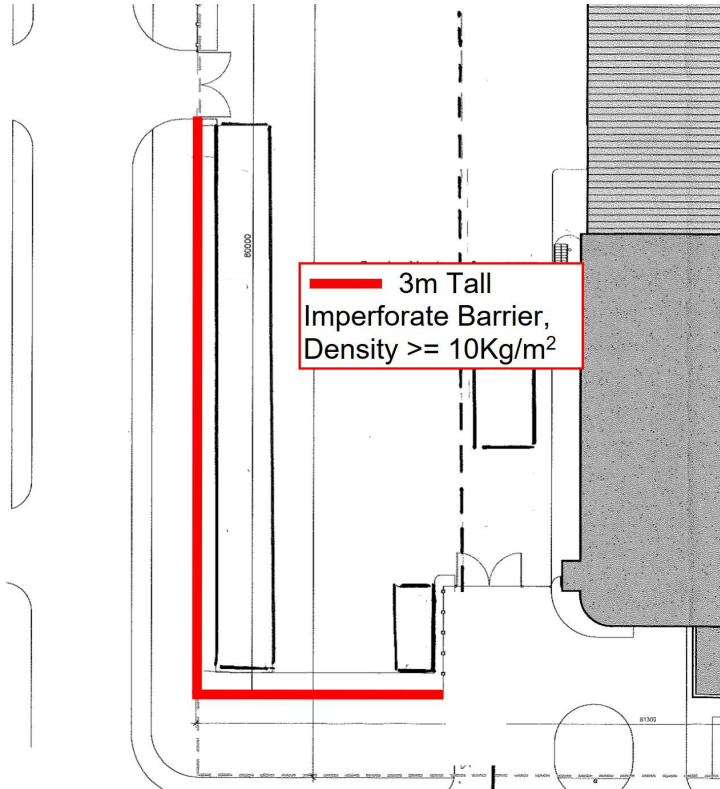
³ 2005 No. 1643 Health and Safety - The Control of Noise at Work Regulations 2005

4.3. EMBEDDED SCHEME MITIGATION

The scheme also assumes a 3m tall imperforate screen to sound as provided by the crates used to hold metals, situated along the south and south-western boundary of the Site.

Figure 4.2 shows the location of this inherent noise barrier.

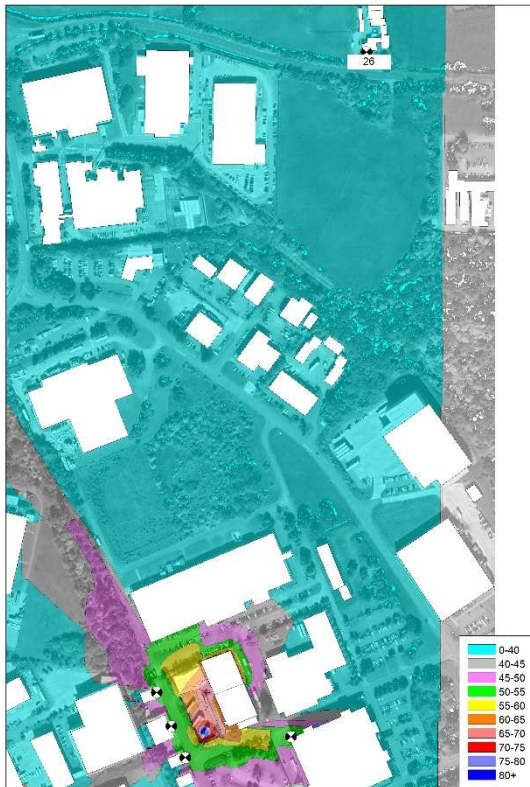
Figure 4.2 Location of Mitigation



4.4. SPECIFIC SOUND LEVEL

The noise map shown in below shows the predicted specific sound level from sound generated at the Site impacting the nearby area (NSR 3 considered in this report shown at the northernmost receptor on this map).

Figure 4.3 Model Output Noise Map (Values Shown in dB $L_{Aeq,1hr}$)



The relevant results are summarised in the following table.

Table 4.2 Modelled Specific Sound Levels

Receptor	Modelled $L_{Aeq,1h}$ Noise Level
NSR1	52 dB
NSR2	54 dB
NSR3	26 dB

4.5. RATING LEVEL

BS 4142 provides guidelines on applying penalties to sound levels should they be determined to be noticeably intermittent, tonal or impulsive, or if there are any other characteristics present that may cause the sound in question to be readily distinctive against the existing acoustic environment. At the time, the sound in question does not exist, and so it cannot be measured to determine if it is objectively tonal or impulsive.

Given the background sound levels measured, and the predicted specific sound at the receptors, the following table outlines the advised feature corrections at each receptor.

Receptor	Tonality	Impulsivity	Other sound characteristics	Intermittency
NSR1	None	+6 dB clearly perceptible	None	None
NSR2	None	+6 dB clearly perceptible	None	None
NSR3	None	None	None	None

4.6. INITIAL NOISE IMPACT ASSESSMENT

The INIA of industrial sound impact is presented in Table 4.3. Operating hours at the Site are proposed to fall entirely within the daytime (07:00-23:00) period, and so only a daytime assessment is presented herein.

Table 4.3 Initial Noise Impact Assessment (INIA)

Item	NSR1	NSR2	NSR3
Period	Daytime	Daytime	Daytime
Reference period	1-hour	1-hour	1-hour
Specific Sound Level	52 dB $L_{Aeq,1hr}$	54 dB $L_{Aeq,1hr}$	26 dB $L_{Aeq,1hr}$
Acoustic Feature Corrections	+6 dB	+6 dB	0 dB
Rating Level	58 dB $L_{Ar,1hr}$	60 dB $L_{Ar,1hr}$	26 dB $L_{Ar,1hr}$
Background Sound Level	48 dB $L_{A90,30mins}$	48 dB $L_{A90,30mins}$	49 dB $L_{A90,30mins}$
Excess of Rating Level over Background Sound Level	+10 dB	+12 dB	-23 dB
Assessment Indicates	Significant Adverse Impact, depending on context	Significant Adverse Impact, depending on context	Low impact
Uncertainty	Minimised	Minimised	Minimised

The assessment indicates that the impact at the nearest residential receptor is of a low impact.

The assessment also indicates that a significant adverse impact would exist at the nearby office receptors. However, context must be taken into account before determining the final noise impact.

4.7. CONTEXT

The initial estimate of the sound does not account for all the contextual facts that will be in place once the plant is installed. It is necessary to consider context to receptors NSR1 and NSR2.

As BS 4142 suggests, the impact may be less in practice by accounting for the context where the following factors should be considered:

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

4.7.1. ABSOLUTE LEVEL OF SOUND

BS 4142: 2014 states:

“Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night”.

BS 4142 does not define ‘low’ in the context of background sound levels nor rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30 dB L_{A90} , and low rating levels as being less than about 35 dB $L_{Ar,Tr}$.

Neither the rating level nor the background sound level are considered to be low.

Initial Impact Assessment	Significant Adverse Impact
Modification due to absolute level of sound	Significant Adverse Impact

4.7.2. CHARACTER AND LEVEL OF THE RESIDUAL SOUND

BS 4142: 2014 states:

“Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound.”

The office receptors are part of industrial premises on an industrial estate. The receptors are already exposed to sound of an industrial nature and the assessed sound is not incongruous compared to the environment in which they are located.

Initial Impact Assessment	Significant Adverse Impact
Modification due to character and level of the residual sound	Low Impact

4.7.3. SENSITIVITY OF THE RECEPTOR AND DESIGN MEASURES THAT SECURE GOOD CONDITIONS

BS 4142 says to consider:

The sensitivity of the receptor and whether dwellings or other premises used for residential purpose will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

- *Façade insulation treatment;*
- *Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and*
- *Acoustic screening.*

The receptors are all office/commercial premises and would be considered to be medium sensitivity in respect of effect significance. In addition, the façades of all the premises comprise fixed non-openable glazing, providing a good level of sound insulation.

Initial Impact Assessment	Significant Adverse Impact
Modification due to receptor sensitivity and design measures	Low Impact

4.8. SUMMARY

The BS 4142 initial impact assessment considering the existing sound climate determined that an significant adverse impact is possible at NSR2 and NSR3. However, considering context in which this sound is likely to be present, the impact significance has been modified to low impact.

4.9. UNCERTAINTY

Uncertainty is an unavoidable feature of measurements in the field, which can be subject to many factors; the weather typically being the most significant of which with respect to the measurement of sound. Uncertainty is also unavoidable in the prediction of sound levels, where naturally, before the scenario being considered becomes a reality, a number of assumptions need to be relied upon. There is also the uncertainty of people's reactions, which can be influenced by a number of factors, not just the magnitude or character of the sound in question.

In keeping with the scale of each project, Peninsular Acoustics aims to minimise uncertainty at each stage as far as reasonably practicable. With this in mind, the control measures listed in Appendix C have been followed, which themselves, have been derived from the guidance within BS 4142.

Crucially, measurements have been undertaken by suitably qualified staff, using state of the art, in calibration equipment, over suitable periods and avoiding adverse weather conditions.

The predictions have also been undertaken by suitably qualified staff, and by using a broad spread of source data obtained through archived specific sound level measurements.

Notwithstanding this, naturally some uncertainty remains. Given the sheer number of factors involved, however, it is not feasible to place a numerical value on the level of uncertainty, without resulting in an unhelpful range of possible outcomes.

It is the professional position of Peninsular Acoustics that uncertainty has been kept to a realistic minimum and that the outcome of this assessment is sufficiently representative and robust.

5. CONCLUSIONS

Peninsular Acoustics Limited was commissioned by Telecycle Europe Limited to provide an assessment to investigate the noise impact associated with their proposed reclamation operations at Unit One, First Avenue, Wrexham.

The assessment has followed the approach of BS 4142 including all relevant information in Environment Agency (EA) document *Method implementation document (MID) for BS 4142 (December 2023)* and the Environment Agency guidance *Noise and vibration management: environmental permits (January 2022)*.

The nearest residential receptor is 650m to the north, a dwelling off Bryn Lane, with offices within nearby commercial premises at distances of 50 and 60 metres from the Site. An attended background sound survey was undertaken to determine representative conditions at these receptors.

Client provided data, manufacturer's datasheets, and library source sound data has been used to create a noise model, which in turn has predicted specific sound levels at the receptors.

An initial noise impact assessment determined due to the setback distance between the Site and the nearest residential receptor, sound from the Site at this receptor is predicted to be of low impact.

The initial impact assessment at the two office receptors suggested a significant adverse impact. However, the receptors are offices within industrial facilities on an industrial site, currently exposed to industrial/commercial sound, and they have fixed windows offering a reasonable level of sound insulation. Considering this context, the noise impact at these receptors is also considered to be low.

Limitations on the use of this report are contained in Appendix D.

Appendix A

TECHNICAL TERMINOLOGY

Noise	Typically defined as unwanted, unpleasant or disturbing sound
Frequency (Hz)	The number of oscillations in acoustic pressure per second. It represents the 'tone' of the sound. Often determined in octave bands
Maximum sound pressure level (L_{Fmax})	The maximum or highest sound pressure level measured with a 'fast' time weighting
Equivalent continuous sound pressure level ($L_{eq,T}$)	The average of the total sound energy over a specified time period (T). L_{eq} represents the equivalent sound level that a fluctuating source would have compared to a steady source with the same total sound energy over a specific time period. Commonly used as a descriptor of human perception of sound over time.
'A' weighting	Frequency-dependent weighting based on the response of the human auditory system which has been found to correlate well with the subjective response to sound. Denoted by the use of the letter 'A'. For example, dBA denotes an 'A' weighted sound level in decibels, or L_{Amax} denotes an 'A' weighted maximum sound pressure level.
Free-field level	A measured sound pressure level that is independent of any contributions due to reflections from nearby surfaces and is therefore representative of the direct path only.
R / R_w	The laboratory tested airborne sound insulation of a building element
Sound insulation	The capacity of a structure to prevent sound from reaching a receiving location. Sound energy is not necessarily absorbed; impedance mismatch, or reflection back toward the source, is often the principal mechanism
Rating Level	The rating level is the specific sound level of the source under assessment, adjusted to account for certain acoustic characteristics that may increase its impact such as tonality, impulsivity, intermittency, or other distinctive features. These corrections are applied in decibels (dB) and reflect how noticeable or intrusive the sound is likely to be. The rating level is then compared against the background sound level to assess the potential for adverse impact.
Specific Sound Level	This is the measured or calculated sound level produced solely by the industrial or commercial source being assessed, excluding all other ambient sounds. It is typically determined under representative operating conditions and expressed as an equivalent continuous sound level ($L_{Aeq,T}$) over a chosen reference time interval—usually 1 hour during the day or 15 minutes at night.
Background Sound Level	The background sound level represents the underlying noise environment in the absence of the specific source under investigation. It is defined as the A-weighted sound pressure level that is exceeded for 90% of the measurement period ($L_{A90,T}$) and is determined during periods when the specific sound is not present or is insignificant. This level serves as the benchmark for assessing the relative impact of the rating level.



Appendix B

EQUIPMENT CALIBRATION CERTIFICATES



Certificate of Calibration

Certificate number: **U51258**

Test Object: **Sound Level Meter, BS EN IEC 61672-1:2013 Class 1**
Associated Frequency Analyser to BS EN IEC 61260:1996 Class 1

Producer: **Norsonic AS.**

Type: **140**

Serial number: **1402728**

Customer: **Peninsular Acoustics**

Address: **Studio 214 Scott House, Custard Factory,
 Gibb Street, Birmingham. B9 4AA.**

Contact Person: **Jonathan Howell**

Order No:

Introduction:

Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	<i>Producer</i>	<i>Type</i>	<i>Serial No</i>	<i>Certificate No</i>
Microphone	Norsonic	1225	72906	51257
Calibrator*	Norsonic	1251	21812	UCRT25/1776
Preamplifier	Norsonic	1209	12142	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield Norsonic Nor1451 (ø 60mm)

Attenuator N/A

Extension cable Norsonic Nor1408A/10M

These items have been taken into account wherever appropriate.

Instruction Manual: Im140_1Ed8R0En Firmware Version: v4.0.1550 The test object is a single channel instrument.

Conditions	<i>Pressure kPa</i>	<i>Temperature °C</i>	<i>Humidity %RH</i>
Reference conditions	101.325	23	50
Measurement conditions	100.99 ±0.03	23.08 ±0.15	48.28 ±1.15

Calibration Dates:

Received date: 03/06/2025 Reviewed date: 11/06/2025

Calibration date: 10/06/2025 Issued date: 11/06/2025

Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Lauren Chitty*

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Certificate of Calibration

Continuation of Certificate number: **U51258**

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	BS EN IEC 61672-1:2013
Periodic Tests:	BS EN IEC 61672-3:2013
Pattern Evaluation:	Not Applicable
Filter Evaluation:	BS EN IEC 61260:1996 Class 1

Conformance:

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - IEC61672-3 Ed.2 #10	Passed
Self-generated noise - IEC 61672-3 Ed.2.0 #11.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.2.0 #12	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.2.0 #13	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.2.0 #14	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.2.0 #16	Passed
Toneburst response - IEC 61672-3 Ed.2.0 #18	Passed
Peak C sound level - IEC 61672-3 Ed.2.0 #19	Passed
Overload indication - IEC 61672-3 Ed.2.0 #20	Passed
High level stability test - IEC 61672-3 Ed.2.0 #21	Passed
Long term stability test - IEC 61672-3 Ed.2.0 #15	Passed
1/1octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed
1/3octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed

Comments

Correct level with associated calibrator is 113.9dB(A). Case reflections have been excluded as tests were made with a microphone extension cable.

Statement of Conformance

The sound level meter submitted for testing has successfully completed the periodic tests for the environmental conditions under which the tests were performed. However, no general statement of conclusion can be made about conformance of the sound level meter to the full requirements of the manufactured standard because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in the manufacturer's standard or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests completed cover only a limited subset of the specifications in the relevant standard

Filter Calibration

The filter functions have been found to conform, by electrical testing, to the relative attenuation requirement of the standard noted over the range of frequencies shown in the attached test report.

Observations

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

Certificate of Calibration

Continuation of Certificate number: **U51258**

Decision Rule

Basic Meter Function - The decision rules will be applied in accordance with the procedure as described in BS EN 61672-3:2013.

Filter Function - A PASS or PASSED statement indicates that the instrument conforms with the relevant accuracy requirements of the testing standard AND the expanded measurement uncertainty ($k = 2$ for approximately 95 % coverage probability) is no greater in magnitude than the accuracy requirements defined in BS EN IEC 61260:1996 standard.

This certificate relates only to the items tested above.

**** End of Certificate ****



Appendix C

UNCERTAINTY

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Measurement		
Only use in calibration Type/Class 1 equipment and check (and record) calibration level before and after measurements	✓	Yes
Measurements taken using the time and frequency weighting specified by the relevant standard?	✓	Yes
Detailed notes made, including details of the equipment, weather, survey positions (including approximate distances), contributing noise sources, presence of screening etc.?	✓	Yes
Photographs taken and recorded survey locations using GPS?	✓	Yes
Avoided standing waves/interference – listen for effects, taken spatial average from several locations or conducted a sweep	✓	Yes
Taken measurements of source at different distances to establish propagation	×	Not relevant, noise not currently generated, used indicative values
Taken measurements at different heights where relevant	×	Not relevant
Avoided just measuring in the “noisiest” parts of the site, and established how “quiet” it is, too, where relevant to the assessment	✓	Yes
Measured under different source operating conditions relevant to the assessment / adopt worst case if known	×	Not relevant
Measured more than one cycle/event	×	Not relevant
Determined the state of repair of any associated source, where relevant	×	Not relevant
Used a windshield and avoided windy conditions (i.e. gusts regularly exceeding 5 m/s)	✓	Yes
Avoided wet conditions (particularly in terms of rain on the windshield/microphone and on neighbouring surfaces)	✓	Yes
Avoided electrical and electromagnetic interference (such as from power cables and radio transmitters)	✓	Yes
Avoided extreme temperatures?	✓	Yes
Traffic conditions can be different in freezing conditions, whilst meters can overheat and fail in a case when in direct sunlight during the summer.		
Made measurements during different weather conditions?	-	Not considered necessary for this assessment
Particularly relevant in terms of wind direction for sites affected by aircraft movements, but also for sites affected by other distant, but significant, sources of noise, in different directions		
Where one source is dominant (such as a main road), have measurements been taken during conditions favourable to propagation (i.e. when wind direction is within +/-45° of the line between the source and receiver or during temperature inversion, such as on clear calm nights)	-	Not considered necessary for this assessment

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Avoided tree/leaf (movement) sound where possible? Ideally take measurements the same distance from sources of such sound as any receptors of interest	✓	Yes – no significant wind present to cause dominant leaf movement
Avoided dawn chorus sound? Ideally take measurements the same distance from trees and bushes as any receptors of interest	✓	Yes
Measured outside the receptor in question where possible? It is worst case typically to measure under free-field conditions and apply +3 dB correction if necessary to convert to “façade” where applicable – for most planning (new residential development) assessments, free-field is preferable	✓	Yes, nearby and used free-field conditions
Avoided atypical traffic conditions (such as during school holidays and road works – road traffic incidents can significantly affect flows, but which can't be predicted and their occurrence can't always be established after the survey – check the data for anomalies)?	✓	Yes, although not relevant and reduced traffic would make assessment more worst-case
Avoided the presence of the engineer and/or the microphone resulting in atypical conditions (e.g. people stopping to talk, workers on site adjusting their way of working, etc.)?	✓	Yes
Data handling		
Was the data downloaded immediately after survey and process promptly whilst details are fresh?	✓	Yes
Were digital transfer methods used and was the data written down too?	✓	Yes
Was the time-history examined (in as fine a resolution as possible) for any unexpected events – preferably with active spectral data (i.e. in dBTRAIT)	×	Attended measurements so no time history
If removing any data (due to an atypical event, for example), was the data saved as a new file, with notes to the data provided within the corresponding Excel file?	✓	Yes, raw data separate from processed data
Prediction		
Was measurement data used at different distances to verify propagation?	×	Not relevant
Were measurements at different heights used to verify screening effects, where relevant?	×	Not relevant
Were propagation calculation procedures relevant to the source and distance used?	✓	Yes, based on ISO 9613-2
Were detailed traffic flow data applicable to the assessment methodology used?	×	N/A
Were detailed sound source data (including octave-bands levels) used, accounting for size, height and directivity, where known?	×	Not relevant
Were detailed topographical data and base mapping used?	✓	Yes
Were different ground types identified	✓	No ground absorption accounted for
Was an order of reflections of at least one applied?	✓	Yes, two

Uncertainty Control Measures	Applicable?	Adopted?/Comments
Was the 3D view feature of the modelling software used to check the accuracy of the model?	✓	Yes
Were contour plots produced as a further means of identifying any abnormalities or errors in the model?	✓	Yes

Appendix D

REPORT LIMITATIONS

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorisation of Peninsular Acoustics Limited. Peninsular Acoustics Limited accept no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/ or Peninsular Acoustics Limited and agree to indemnify Peninsular Acoustics Limited for any and all loss or damage resulting therefrom. Peninsular Acoustics Limited accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned.

The findings and opinions expressed are relevant to the dates of the site works and design drawings/specifications and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations Peninsular Acoustics Limited reserve the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

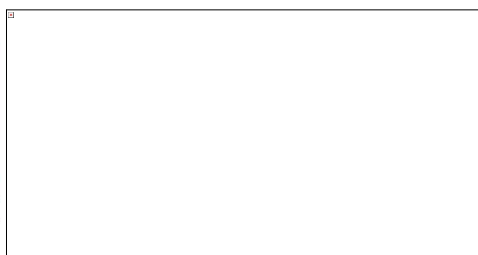


Peninsular Acoustics

Liverpool: Office 14 Clock Tower Building, Clock Tower Park, Liverpool, England, L10 1LD

Birmingham: Studio 214, Scott House, Custard Factory, Gibb Street, Birmingham, B9 4AA

London: 16 Upper Woburn Pl, London, WC1H 0AF



Website: www.peninsularacoustics.co.uk