Amber REI Holdings Ltd

GAERWEN INDUSTRIAL ESTATE

Anglesey

Noise Assessment

March 2019

Prepared on behalf of WYG Environment Planning Transport Limited.

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Document Control

Project:	Gaerwen Industrial Estate
Client:	Amber REI Holdings Limited
Job Number:	A109869
File Origin:	O:\Acoustics Air Quality and Noise\Fee Earning Projects\A109869 Gaerwen Industrial Estate

Revision:	Issue 1	
Date:	15th March 2019	
Prepared by:	Checked by:	Approved By:
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Description of revision: Issue 1		

Revision:	Issue 2	
Date:		
Prepared by:	Checked by:	Approved By:
Description of revision:		

Revision:	Issue 3	
Date:		
Prepared by:	Checked by:	Approved By:
Description of revision:		

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Appendix Contents

1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a noise assessment undertaken for a proposed B1, B2 and B8 industrial development at land off Lon Groes, Gaerwen, Anglesey. This report considers the potential noise impact of the following noise sources likely to arise from the development:

- New Building Services Plant;
- Goods Deliveries; and
- Staff Car Parking

A description of the existing noise environment in and around the Site is provided. Noise surveys have been undertaken and the results used to verify predictions of the short-term and long-term effects of noise. The noise levels from the development have been predicted at local representative receptors using CADNA noise modelling software which incorporates CRTN and ISO 9613 methodologies and calculations.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and a set of location plans and noise contour plots are presented in Appendix B. Ra BS 4142 statistical analysis of long-term noise data is presented in Appendix C and Report Conditions are presented in Appendix D.

1.2 Legislative Context (Wales)

This report is intended to provide information relevant to the local planning authority and their consultees in support of a planning application for the above proposed development. Policy guidance with respect to noise is found in Technical Advice Note (Wales) 11 Noise – October 1997 (TAN).

The TAN provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business. The Note gives recommended noise exposure categories for new dwellings and for noise from industrial and commercial developments reference is given to using standard BS 8233:1987 for guidance on acceptable levels of noise within buildings. Additionally, to this, when likelihood of complaints about noise from industrial development can be assessed the Note recommends using guidance from BS 4142:1990, where appropriate.

BS 8233:1987 was superseded by BS 8233:2014, all future references to BS8233 within this report are in regard to the 2014 version of the guidance.

BS 4142: 1990 has been superseded by BS 4142: 1997 and more recently by BS 4142:2014. All future references to BS 4142 within this report are in regard to the 2014 version of the guidance.

1.3 Local Policy

Other relevant policy includes the Development Plan for the area, the Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (adopted July 2017), within which the following policies for noise are relevant:

Policy PCYFF 2: Development Criteria

…additionally, planning permission will be refused where the proposed development would have an unacceptable adverse impact on:

7. The health, safety or amenity of occupiers of local residences, other land and property uses or characteristics of the locality due to increased activity, disturbance, vibration, noise, dust, fumes, litter, drainage, light pollution or other forms of pollution or nuisance

2.0 Assessment Criteria

2.1 BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'

The effects of operational noise associated with the project have been assessed in accordance with BS 4142:2014, '*Methods for rating and assessing industrial and commercial sound'.*

This standard sets down the following guidelines for assessing the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes, based upon difference between the measured background noise level and the rating level of the source under consideration. In particular, the standard states:

"a) Typically, the greater the 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."

In addition to noise levels the significance of the impact depends on the individuals affected and to the acoustic features present which may be assessed subjectively or objectively as appropriate. Section 9 of BS 4142:2014 recommends that correction factors be applied to the specific noise level if the noise contains certain acoustic features such as:

- tonality
- impulsivity
- other sound characteristics which are readily distinctive
- intermittency

It should be noted that the significance of an industrial sound source depends upon both the margin by which the rating level exceeds the background sound level and the overall context in which the sound occurs.

2.2 BS8233:2014 'Sound insulation and noise reduction for buildings – code of practice'

In accordance with TAN guidance the criteria for acceptable levels of noise within residential receptors has been derived from BS8233:2014 *'Sound insulation and noise reduction for buildings – code of practice'*. The criteria which form the basis for the BS8233 assessment are detailed below:

- Daytime (07:00 – 23:00): 35 dB $L_{Aeq,T}$
- Night time (23:00 – 07:00) 30 dB $L_{Aeq,T}$ / 45 dB L_{Amax}

3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict source noise levels at a large number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on ISO 9613 noise propagation methodology. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data, assumptions and model settings as given in the table below have been used.

Table 3.1 Modelling Parameters Sources and Assumptions

Parameter	Source	Details
Horizontal distances	Ordnance Survey	Ordnance Survey
Surrounding Area Topographical Data	Ordnance Survey	2 m Contours
Building heights – around site	WYGE Observations	8 m height for two storey residential properties
Barrier Height	AJA Architects LLP	2.5 m high on eastern boundary to the north of units 3 & 4 as per Illustrative Site Plan: 6401-103 A
Receptor positions	WYGE	Building façade and height of 1.5 m for daytime 4 m night-time
Absorbent Ground	CADNA	Frequency dependant ground absorption has been applied based on values specified in VDI 2714/16 clause 6.3.
Proposed Plans	AJA Architects LLP	Illustrative Site Plan: 6401-103 A Unit 1 Floor Plan & Section: 6401-110 A Unit 2 Floor Plan & Section: 6401-120 A

It is acknowledged that a number of these assumptions will affect the overall noise levels presented in this report. However, it should be noted that certain assumptions made, as identified above, are worst-case.

3.2 Model Input Data

3.2.1 HGV Delivery Event Noise Data

Noise of a delivery event has been known to vary from site to site by as much as 22 dB L_{Aeq} at 3 m distance even with the same vehicle type. Similarly, individual events using the same vehicle and at the same location have been recorded to vary by as much as 14 dB.

As such, the following calculations have been based on worst-case measurements of refrigerated, articulated HGVs delivering consumables. All measurements were undertaken in free-field conditions. In addition to noise from the unloading process, the levels used in the assessment include noise from the vehicle pulling up to the unloading bay, manoeuvring into position and then pulling away once unloading/loading is complete, together with other sources such as trolleys and reversing alarms.

As the end users of the units are currently unknown, it is considered that the assessed scenarios for both daytime and night-time periods represent a reasonable worst-case scenario with regard to the proposed

source noise levels. This includes vehicle movements and events from every other assumed delivery bay during both the daytime and night time assessment periods.

Delivery Vehicle Docking and Unloading

- *Daytime $L_{Aeq,1hr}$ Noise Level*
  5 minutes at L_p 75 dB at 3 m distance (vehicle arriving and manoeuvring)
  38 minutes at L_p 70 dB at 3 m distance (vehicle unloading)
  2 minutes at L_p 72 dB at 3 m distance (vehicle leaving)
  15 minutes of quiet (associated with documentation and waiting with engine off)

  $L_{Aeq(60\ mins)}$ = $10\log(1/60\ mins)(5mins \times 10^{0.1x75dB}+38mins \times 10^{0.1x70dB}+2mins \times 10^{0.1x72dB})$

  = 69.8 dB at 3 m distance [L_{wA} = 87.3 dB]

- *Night-time $L_{Aeq,15mins}$ Noise Level*
  5 minutes at L_p 75 dB at 3 m distance (vehicle arriving and manoeuvring)
  10 minutes at L_p 70 dB at 3 m distance (vehicle unloading)

  $L_{Aeq(15\ mins)}$ = $10\log(1/15\ mins)(5mins \times 10^{0.1x75dB}+10mins \times 10^{0.1x70dB})$

  = 72.4 dB at 3 m distance [L_{wA} = 89.9 dB]

- *L_{Amax} Noise levels*

  L_{Amax} used is as 85.4dB at 3 m distance [L_{wA} = 102.9 dB]

Delivery Vehicle Arriving/Exiting along service yard access road

The following calculations have been used to represent this as a line source in the model.

- *Daytime $L_{Aeq,(60mins)}$ Noise Level (Per HGV)*

  1 x 10 seconds L_p = 69.3 dB at 3 m distance (vehicle arriving and leaving)

  $L_{Aeq(60\ mins)}$ = $10\log(1/60\ mins)(10\ sec \times 10^{0.1x69.3\ dB}+ 10\ sec \times 10^{0.1x69.3\ dB})$

  = 46.7 dB at 3 m distance

- *Night-time $L_{Aeq,(15mins)}$ Noise Level (Per HGV)*

  1 x 10 seconds L_p = 69.3 dB at 3 m distance (vehicle arriving or leaving)

  $L_{Aeq(15\ mins)}$ = $10\log(1/15\ mins)(10\ sec \times 10^{0.1x69.3\ dB})$

  = 49.8 dB at 3 m distance

- *L_{Amax} Noise levels*

  L_{Amax} = 75.0 dB at 3 m distance [L_{wA} = 92.5 dB]

3.2.2 Proposed Commercial Uses - Car Park Noise Data

Noise levels from proposed car parking areas (as defined on the illustrative layout) have been determined based upon observations within an existing distribution centre during a staff changeover period. L_{Aeq} noise levels, as follows, are modelled as area sources across each car parking area.

- $L_{Aeq,1hr}$ *Noise Level* = 54 dB at 1.5m height
- L_{Amax} used is as 76 dB at 3 m distance [L_w = 93.5 dB]

3.2.3 Building Services Plant (BSP) Noise Data

As the proposed plant design and end users are not confirmed at this stage a detailed plant noise assessment cannot be undertaken. Therefore, point sources have been defined in the model to represent potential plant associated with the development. The maximum sound pressure levels of the point sources at 3 and 10 metres were estimated in the model as a conditional maximum level such that the noise levels at nearby sensitive receptors were predicted to meet the required criteria of a noise rating level of equal to the background noise level.

3.3 Sensitive Receptors

Table 3.2 and **Error! Reference source not found.** summarise the locations that have been selected to represent worst-case residential receptors with respect to direct noise from the development. Ground and first floor façades of the nearest noise sensitive properties have been represented. The locations of the receptors are shown on SK02 in Appendix B.

Table 3.2 Receptor Locations

Ref.	Description	Height (m)
R1	Rhosydd-Bach	1.5/4.0
R2	The Cottage, Erg Dewg	1.5/4.0
R3	29 Lon Groes	1.5/4.0
R4	Rhos Fain	1.5/4.0

4.0 Noise Survey

4.1 Noise Survey Methodology

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Norsonic 140	Environmental Noise Analyser	s/n	1402987
Norsonic 1251	Sound Calibrator	s/n	31043
Rion NL-32	Environmental Noise Analyser (WYG12)	s/n	213442
Rion NL-52	Environmental Noise Analyser (WYG18)	s/n	843173
Rion NC-74	Sound Calibrator	s/n	35046823

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, and no drift was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

A baseline monitoring survey was undertaken at five locations (as specified in the following table and shown in SK01 of Appendix B) from Thursday 3rd January 2019 to Thursday 10th January 2019. Attended short term measurements were undertaken at four locations during day, evening and night-time periods with two additional locations being measured unattended over a 168-hour period. The raw data collected from the long-term monitoring is available upon request.

Measurements were taken in general accordance with BS 7445-1:2003 *The Description and Measurement of Environmental Noise: Guide to quantities and procedures*. Weather conditions during the survey period were observed as being dry with scattered showers. Anemometer readings confirmed that wind speeds were less than 5 ms^{-1} at all times during the survey, with a variable wind direction, during the survey.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	North-East corner of site near farm.
LT2	South-West corner of site near to abandoned cottage.
ST1	Unnamed Road, near Gaerwen Football Club.
ST2	Track south of Gaerwen Industrial estate.
ST3	Lon Groes

4.2 Noise Survey Results

The dominant noise sources found in the area include: road traffic noise from Lon Groes and Chapel Street, as well as occasional farm animal noises.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period). For the long-term (LT) locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5 minute measurement over the stated survey period.

Table 4.2 Meteorological Conditions during the Survey

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Day ST1	09/01/2019 13:49	7.0	1-2	NW	2	Road traffic noise from Lon Groes.
Day ST2	09/01/2019 14:31	7.0	1-2	NW	2	Road traffic noise from Lon Groes and farm animal cries.
Day ST3	09/01/2019 14:10	7.0	1-2	NW	2	Road traffic noise from Lon Groes.
Evening ST1	09/01/2019 19:38	3.0	0-1	NE	2	Road traffic noise from Lon Groes.
Evening ST2	09/01/2019 19:18	3.0	0-1	NE	2	Road traffic noise from Lon Groes.
Evening ST3	09/01/2019 19:56	3.0	0-1	NE	2	Road traffic noise from Lon Groes.
Night ST1	09/01/2019 23:35	3.0	0-1	S	2	Road traffic noise from Lon Groes.
Night ST2	10/01/2019 23:15	3.0	0-1	S	2	Road traffic noise from Lon Groes and farm animal cries.
Night ST3	09/01/2019 23:52	3.0	0-1	S	2	Road traffic noise from Lon Groes.

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re: 2 x 10^{-5} Pa). For the LT locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5 minute measurement over the stated survey period.

Table 4.3 Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 - 23:00	80 Hours	03/01/2019 - 10/01/2019 10:46 - 10:26	LT1	45.6	82.0	19.3	47.4	44
Weekday Night-time 23:00 – 07:00	40 Hours	03/01/2019 - 10/01/2019 23:00 - 07:00		46.3	77.9	17.1	50.7	20
Weekend Daytime 07:00 - 23:00	32 Hours	05/01/2019 - 06/01/2019 07:00 - 23:00		39.1	79.2	19.3	41.1	36
Weekend Night-time 23:00 – 07:00	16 hours	05/01/2019 - 06/01/2019 23:00 - 07:00		28.3	59.3	17.6	31.0	19
Weekday Daytime 07:00 - 23:00	80 Hours	03/01/2019 - 10/01/2019 11:01 - 10:26	LT2	45.1	81.0	17.3	43.1	38
Weekday Night-time 23:00 – 07:00	40 Hours	03/01/2019 - 10/01/2019 23:00 - 07:00		35.9	68.3	15.5	34.6	24

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekend Daytime 07:00 - 23:00	32 Hours	05/01/2019 - 06/01/2019 07:00 - 23:00		42.9	81.6	18.9	39.7	34
Weekend Night-time 23:00 – 07:00	16 hours	05/01/2019 - 06/01/2019 23:00 - 07:00		29.4	59.7	16.2	30.1	22
Daytime 07:00 - 19:00	15 Mins	09/01/2019 13:49	ST1	51.7	69.3	38.0	51.7	41.5
	15 Mins	09/01/2019 14:31	ST2	47.2	62.8	42.3	49.1	44.3
	15 Mins	09/01/2019 14:10	ST3	61.7	81.5	38.0	65.3	42.1
Evening 19:00 - 23:00	15 Mins	09/01/2019 19:38	ST1	49.9	69.3	32.4	51.9	42.9
	15 Mins	09/01/2019 19:18	ST2	35.3	55.8	27.3	37.3	31.6
	15 Mins	09/01/2019 19:56	ST3	55.2	76.1	30.7	56.8	45.9
Night-time 23:00 - 07:00	15 Mins	09/01/2019 23:35	ST1	33.6	65.2	20.5	38.9	24.8
	15 Mins	10/01/2019 23:15	ST2	31.9	58.3	22.0	35.5	24.9
	15 Mins	09/01/2019 23:52	ST3	30.5	55.1	22.2	32.9	25.7

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa

5.0 Assessment of Key Effects

Assessments have been undertaken in the following sections with regard to:

- Noise generating sources associated with the proposed industrial units including Building Services Plant (BSP), car parking and deliveries.
- Development generated road traffic noise.

The noise models include a 2.5 m noise barrier along the north eastern boundary of the site as shown on SK02 in Appendix B.

5.1 Building Services Plant Noise Assessment

The assessment compares the predicted noise levels from building service plant (BSP) with the existing measured background noise L_{A90} at the surrounding existing residential receptors. The representative existing measured background noise level for each receptor has been established from a review of the ST data and a statistical analysis of the LT noise survey data. The statistical analysis of the LT data is presented in Appendix D.

As details relating to proposed BSP are currently not known, a series of noise predictions were made by defining different sound power levels (assuming hemi-spherical radiation) at the point source. When the sound pressure levels are set as shown in Table 5.1 (which is considered to be achievable), the rating levels at all the representative receptors are predicted to not exceed the background levels during the period when the plant could be operational as shown in Table 5.2. The assessed plant locations are presented in SK02. Typically, when considering noise generation from such developments where there are a large number of plant items, the noise character is considered to be 'bland' without a distinguishable tonal or impulsive characteristic. However, to account for any uncertainty, a + 4 dB correction has been applied to the predicted noise level to create the 'Rating Level'.

Table 5.1 Indicative BSP Emissions as Modelled

BSP Location	Noise Emission - Sound Pressure Level *	
	Daytime	Night-time
Roof Mounted at 1 m above each unit Indicated on SK02	63.0 dB(A) at 3 m *OR* 52.5 dB(A) at 10 m	52.0 dB(A) at 3 m *OR* 41.5 dB(A) at 10 m

All values are sound pressure levels in dB re: 2x 10^{-5} Pa.

*Different plant configurations could apply depending on a number of variables, including operating periods, location of plant, which would be established during the detailed M&E design

Table 5.2 Proposed BSP Assessment

Location	Existing Measured Background L_{A90}		Rating level from plant ($L_{A,Tr}$)		BS 4142 Score	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R1	34	23	28	17	-6	-6
R2	36	26	36	26	0	0

Location	Existing Measured Background L_{A90}		Rating level from plant ($L_{A,Tr}$)		BS 4142 Score	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R3	42	26	30	20	-12	-6
R4	42	26	29	20	-13	-7

All values are sound pressure levels in dB re: 2x 10^{-5} Pa.

All calculations used to derive the above tables (including averaging of background noise levels and predicted source noise levels) have been undertaken to 1 decimal place to avoid perpetuation of rounding errors. However, in accordance with BS4142 Para 8.6, the levels are expressed as integers (with 0.5 dB being rounded up). This may mean that the arithmetic in the above table may appear to be up to 1 dB incorrect due to this rounding.

5.2 Delivery / Servicing Noise Assessment

5.2.1 Background Comparison Assessment

The assessment presented in the table below compares existing typical background noise levels (L_{A90}) with predicted delivery / servicing noise at the nearest residential dwellings. The approach to establish the representative existing measured background noise level for each receptor has been presented in Section 5.1. Given the large number of assessed noise sources and low predicted absolute noise levels, it is considered that applying a character correction of +3dB would be reasonable to account for potential impulsive characteristics of the proposed delivery / servicing events. The assessment is based on the model input data presented in Section 3.2.

Table 5.3 Delivery and Goods Handling Assessment

Location	Existing Measured Background L_{A90}		Predicted noise rating level from deliveries ($L_{Ar,Tr}$)		Difference between background and predicted noise level	
	Day time	Night-time	Daytime	Night-time	Day time	Night-time
R1	34	23	32	35	-2	12
R2	36	26	41	44	5	18
R3	42	26	37	43	-5	17
R4	42	26	37	43	-5	17

All values are sound pressure levels in dB re: 2x 10^{-5} Pa.

The assessment in Table 5.3 above shows that delivery noise rating levels are predicted to be within +5 dBA above background noise levels during the daytime. Rating levels during the night time are predicted to be up to +18 dBA above background noise levels when considering the difference between noise rating levels and background noise levels in isolation. However, when background noise levels are low such differences are not unexpected and it should be noted that the guidance presented within BS4142:2014 (Section 11) recognises that:

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

Therefore, consideration has also been given to the assessment of absolute noise levels, assessed in accordance with BS 8233, as presented in Section 5.2.2.

5.2.2 Delivery Noise Assessment – Absolute Noise Levels

Internal ambient noise levels at nearby sensitive receptors from deliveries / services to the Development (on the basis of worst-case assumptions) have been assessed both with windows open, where a reduction from a partially open window of 15 dBA has been used, and with windows closed where an assumption of single glazing with a sound reduction of 30 dBA has been used.

Table 5.4 Daytime Noise Intrusion Levels $L_{Aeq,T}$ (Deliveries Only)

Location	External L_{Aeq} Noise Level	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria (Internal L_{Aeq} dB)
R1	29.3	14.3	0.0	35
R2	38.0	23.0	8.0	35
R3	34.4	19.4	4.4	35
R4	33.7	18.7	3.7	35

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa.

Table 5.5 Night-time Noise Intrusion Levels $L_{Aeq,T}$ (Deliveries Only)

Location	External L_{Aeq} Noise Level	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria (Internal L_{Aeq} dB)
R1	31.5	16.5	1.5	30
R2	40.2	25.2	10.2	30
R3	40.7	25.7	10.7	30
R4	40.4	25.4	10.4	30

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa.

Table 5.6 Night time Noise Intrusion Levels L_{Amax} (Deliveries Only)

Location	External L_{Amax} Noise Level	Internal L_{Amax} with windows open	Internal L_{AMax} with windows closed	Criteria (Internal L_{AMax} dB)
R1	38.1	23.1	8.1	45
R2	48.2	33.2	18.2	45
R3	46.2	31.2	16.2	45
R4	46.4	31.4	16.4	45

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa.

The assessment shown in the Table 5.4 to Table 5.6 demonstrate that internal L_{Aeq} and L_{Amax} noise levels from the proposed delivery operations, during both day time and night time periods with windows open or closed, are predicted to be within the BS 8233 criteria at all sensitive receptor locations.

When taking into account context as required by BS 4142:2014, absolute noise levels are predicted to fall below the BS 8233 internal noise level $L_{Aeq,T}$ criteria based on daytime 1 hour and night-time 15 minute assessment durations. Therefore, it is considered that the noise impact is predicted to be of negligible significance.

5.2.3 Uncertainty

With regard to the BS 4142 assessment associated with industrial sources of noise, it is considered that uncertainty in the assessment approach has been reasonably factored into the assessment because:

- There is unlikely to be significant uncertainty in the reference background noise level, particularly given the duration of the survey including weekday and weekend daytime and night-time periods.
- The use of Cadna noise modelling software which incorporates the method of ISO 9613 – 2 "Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation.
- Source noise levels are based on worst-case measurements undertaken by WYG at existing industrial and distribution premises which are comparable to those proposed.
- A significant number of noise sources have been considered to be occurring simultaneously.

5.3 Car Park Noise Assessment

Internal daytime ambient noise levels, at nearby sensitive receptors, from proposed car parking have been assessed both with windows open, where a reduction from a partially open window of 15 dBA has been used, and with windows closed where an assumption of glazing with a sound reduction of 30 dBA (e.g. single glazing) has been used.

Table 5.7 Daytime Noise Intrusion Levels $L_{Aeq,T}$ (Car Parking Only)

Location	External L_{Aeq} Noise Level	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria (Internal L_{Aeq} dB)
R1	18.4	3.4	0.0	35
R2	26.3	11.3	0.0	35
R3	23.6	8.6	0.0	35
R4	23.2	8.2	0.0	35

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa.

Table 5.8 Night-time Noise Intrusion Levels $L_{Aeq,T}$ (Car Parking Only)

Location	External L_{Aeq} Noise Level	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria (Internal L_{Aeq} dB)
R1	19.3	4.3	0.0	30
R2	27.2	12.2	0.0	30
R3	26.9	11.9	0.0	30
R4	27.9	12.9	0.0	30

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa.

Table 5.9 Night-time Noise Intrusion Levels L_{Amax} (Car Parking Only)

Location	External L_{Amax} Noise Level	Internal L_{Amax} with windows open	Internal L_{AMax} with windows closed	Criteria (Internal L_{AMax} dB)
R1	28.2	13.2	0.0	45
R2	39.1	24.1	9.1	45
R3	35.4	20.4	5.4	45

Location	External L_{Amax} Noise Level	Internal L_{Amax} with windows open	Internal L_{AMax} with windows closed	Criteria (Internal L_{AMax} dB)
R4	37.7	22.7	7.7	45

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa.

The assessment shown in the Table 5.7 - Table 5.9 demonstrate internal L_{Aeq} and L_{Amax} noise levels from proposed car parking areas, during both day time and night time periods with windows open or closed, are predicted to be within the BS 8233 criteria at all sensitive receptor locations.

6.0 Conclusions

This report presents the findings of a noise assessment undertaken for a proposed B1, B2 and B8 industrial development at land off Lon Groes, Gaerwen, Anglesey. The report considered the potential noise impact of the following noise sources likely to arise from the development:

- New Building Services Plant;
- Goods Deliveries; and
- Staff Car Parking

Based on the assessment undertaken within he context of baseline and absolute noise levels, the Proposed Development is not expected to have a 'significant adverse impact' on health or quality of life. Effects which are not significant have been predicted in relation to noise generating aspects of the Proposed Development such as BSP, car parking and deliveries / servicing associated with the proposed employment uses.

Appendices

Appendix A – Acoustic Terminology and Abbreviations

An explanation of the specific acoustic terminology referred to within this report is provided below.

dB — Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) — Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} — Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00 - 23:00}$ for example, describes the equivalent continuous noise level over the 12 hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the $L_{Aeq,\ 07:00 - 23:00}$.

L_{Amin} — The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} — The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_{A10} — Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say. 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10,\ 1\ hr}$ = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w — The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

An explanation of abbreviations used within this report is provided below.

CADNA – Computer Aided Noise Abatement

DMRB – Design Manual for Roads and Bridges

HGV – Heavy Goods Vehicle

AAWT – Annual Average Weekday Traffic

DM – Do Minimum (Without Development Traffic Flows)

DS – Do Something (With Development Traffic Flows)

PPG – Planning Practice Guidance

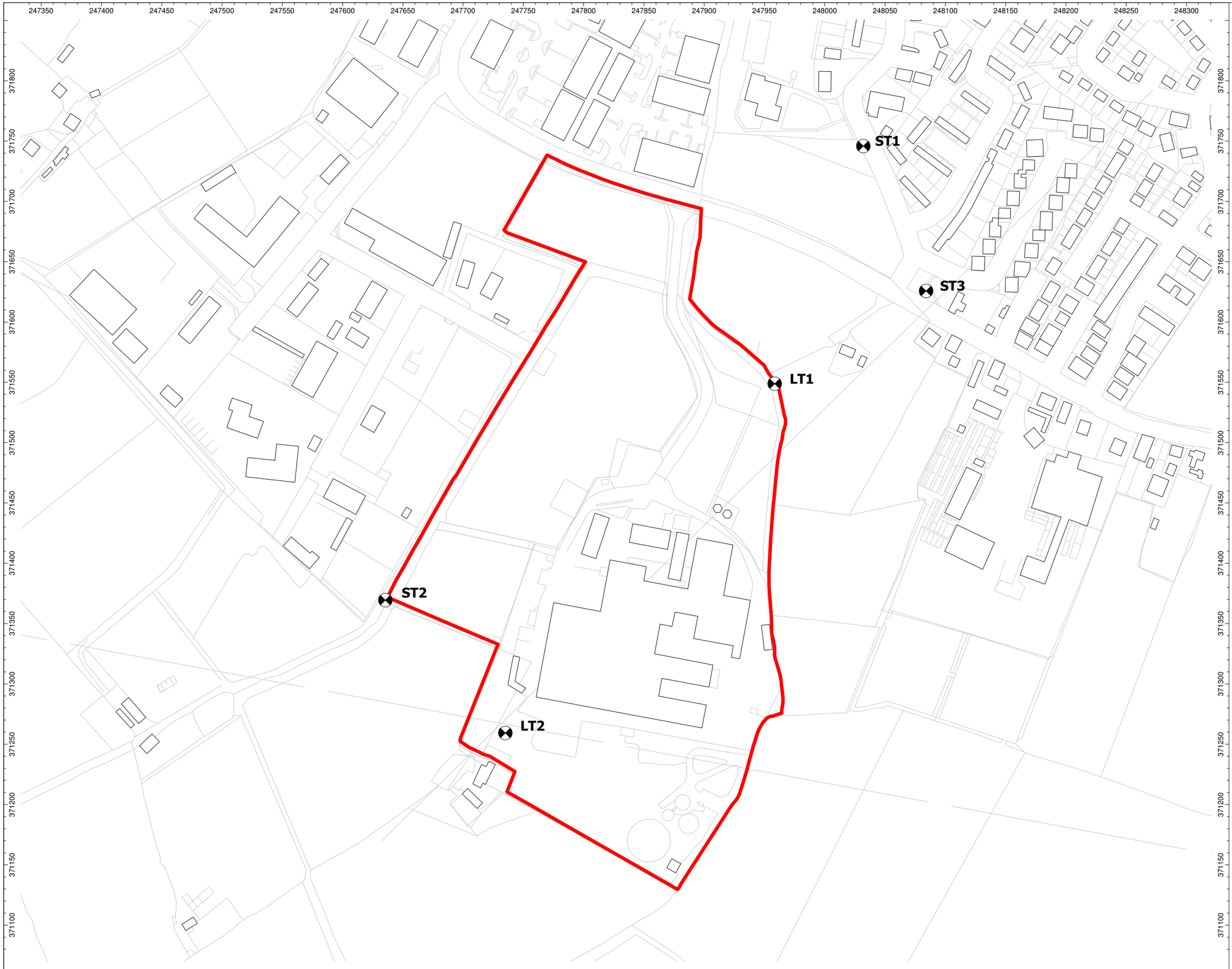
WYGE – WYG Environment

Appendix B – Sketches

SK01 Noise Monitoring Location Plan

SK02 Receptor & Assessed Fixed Plant Location Plan

SK03 Night-time Noise Contour Plot (Delivery / Servicing) $L_{Aeq,15minute}$



Client:
Amber REI Holdings Ltd

Project:
Gaerwen Industrial Estate

Project Number:
A109869

Drawing Title / Scenario:
Noise Monitoring
Location Plan

Drawing Number:
SK01

Key:

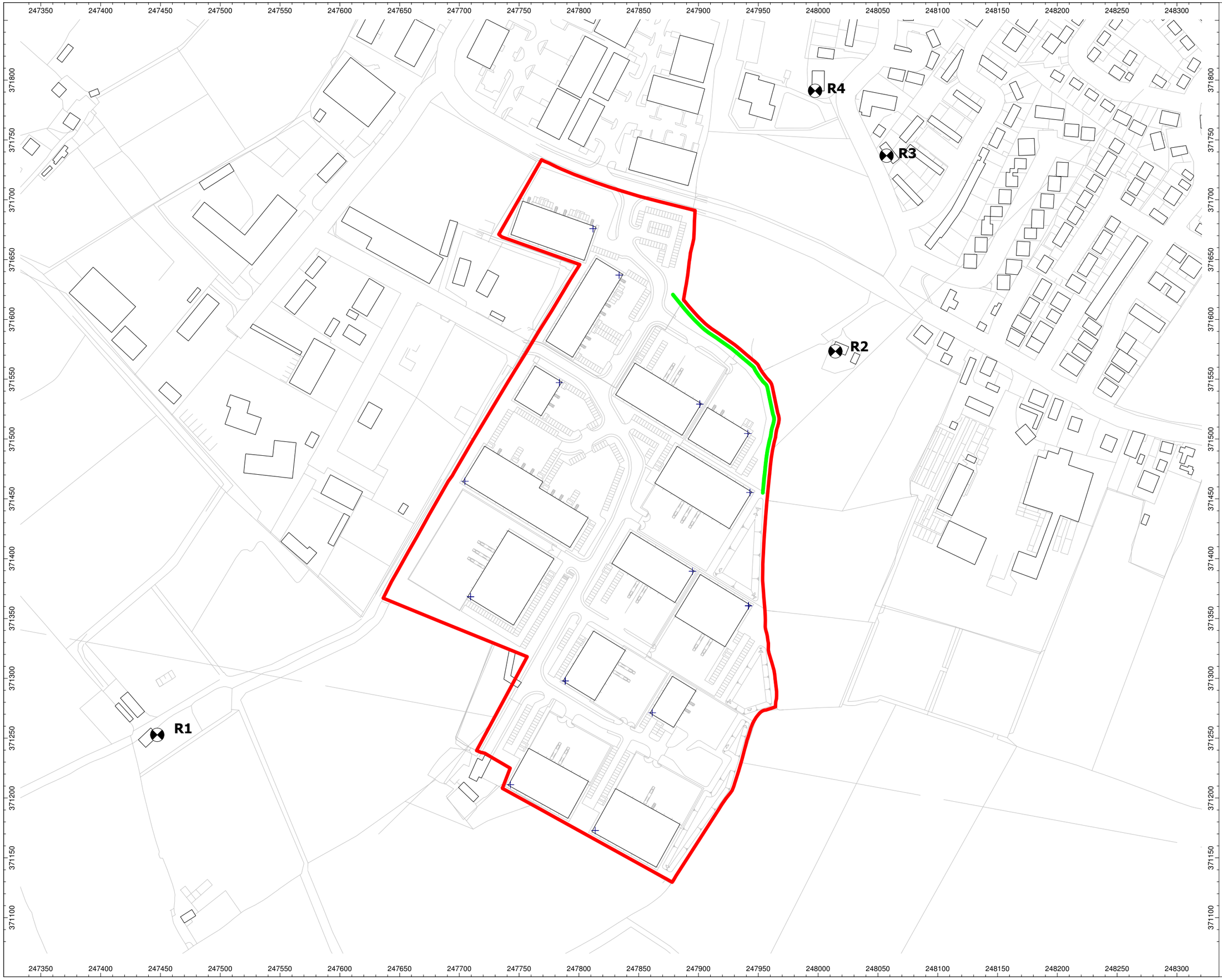
Noise Monitoring Location:

Site Boundary:

Scale : Not to scale

WYGE Leicester 15.03.19

Executive Park
Avalon Way
Anstey
Leicestershire
LE7 7GR
Tel 0116 234 8000



Client:
Amber REI Holdings Ltd

Project:
Gaerwen Industrial Estate

Project Number:
A109869

Drawing Title / Scenario:
Receptor & Assessed Fixed Plant Location Plan

Drawing Number:
SK02

Key:

Receptor Location:

Assessed Fixed Plant Location:

2.5 m Noise Barrier:

Site Boundary:

Scale : Not to scale

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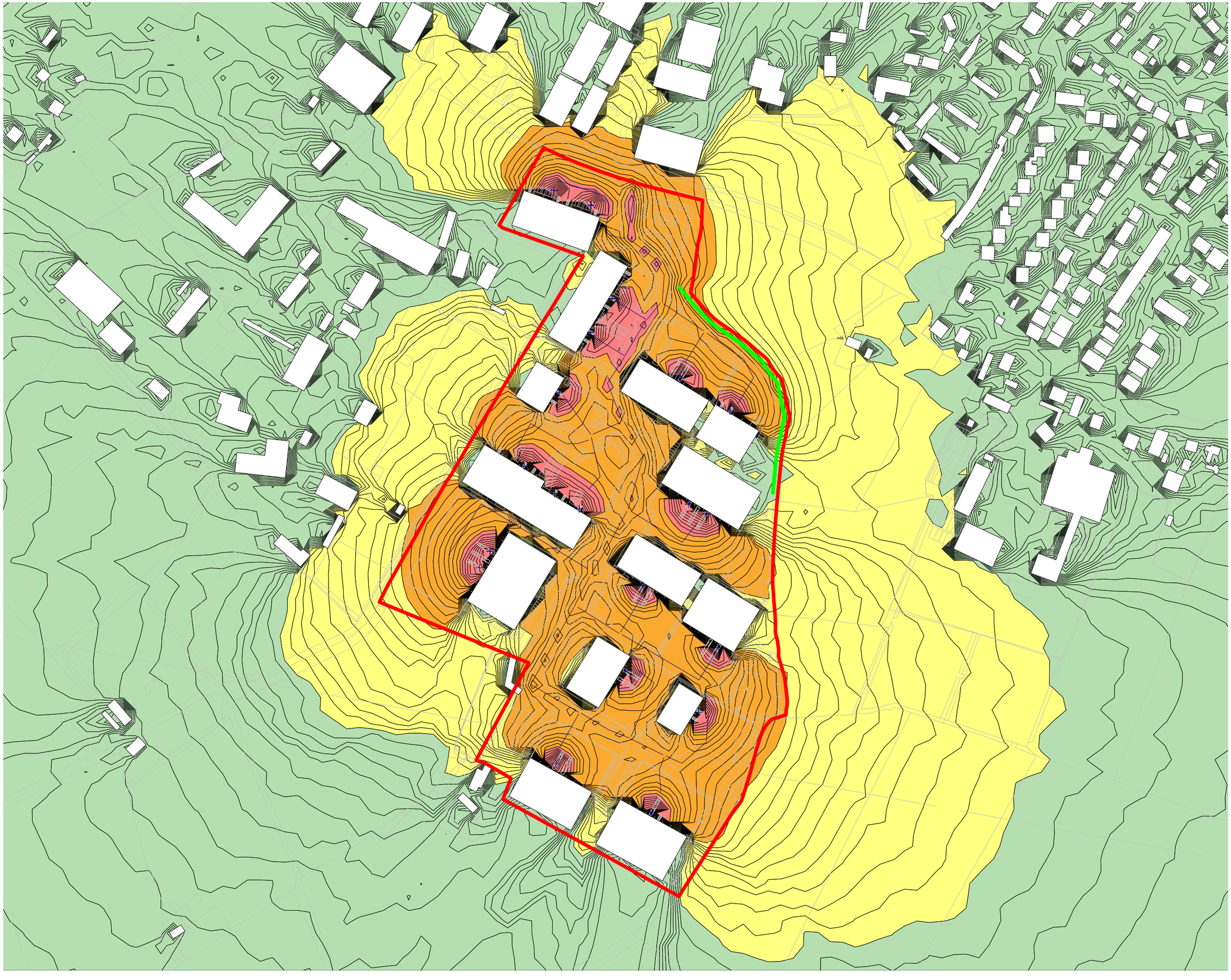
Executive Park
Avalon Way
Anstey
Leicestershire
LE7 7GR
Tel 0116 234 8000



Client:
Amber REI Holdings Ltd

Project:
Gaerwen Industrial Estate

Project Number:
A109869

Drawing Title / Scenario:
Night-time Noise Contour Plot (Delivery / Servicing) LAeq,15minute

Drawing Number:
SK03

Key:

Site Boundary:

- 0.0 - 40.0 dB
- 40.0 - 50.0 dB
- 50.0 - 60.0 dB
- >60.0 dB

Contour plot for indicative purposes only.

Contour Plot at 4.0m Height

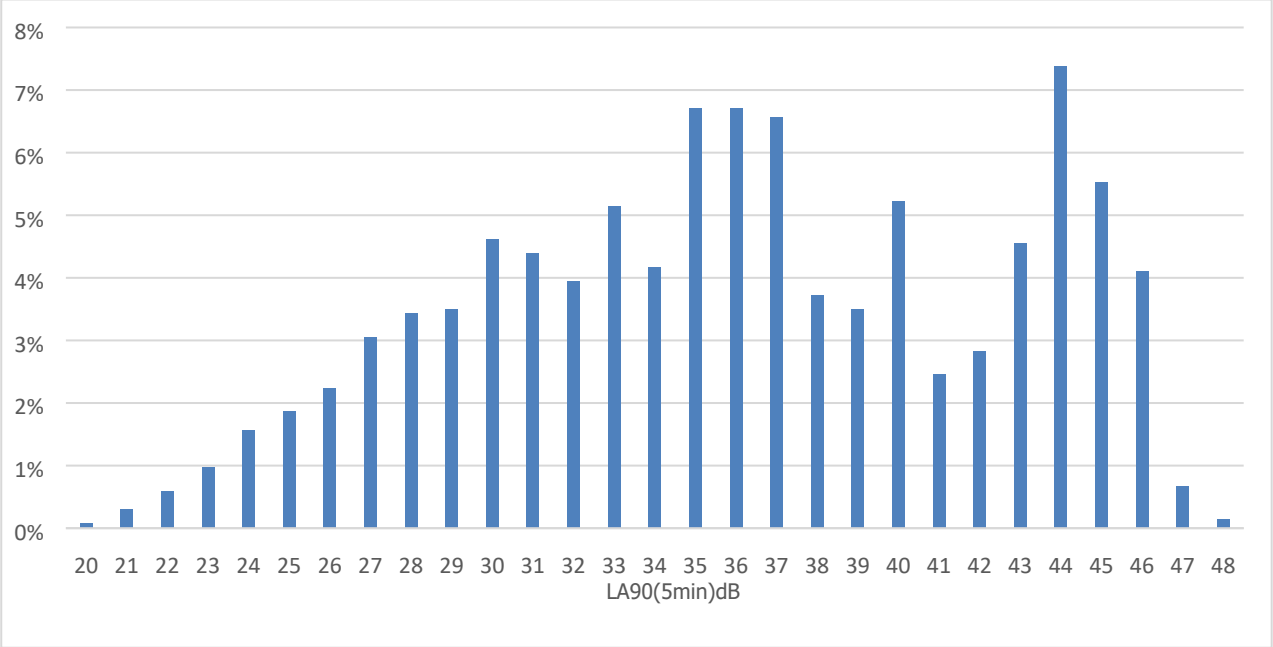
Scale : Not to scale

WYGE Leicester 15.03.19

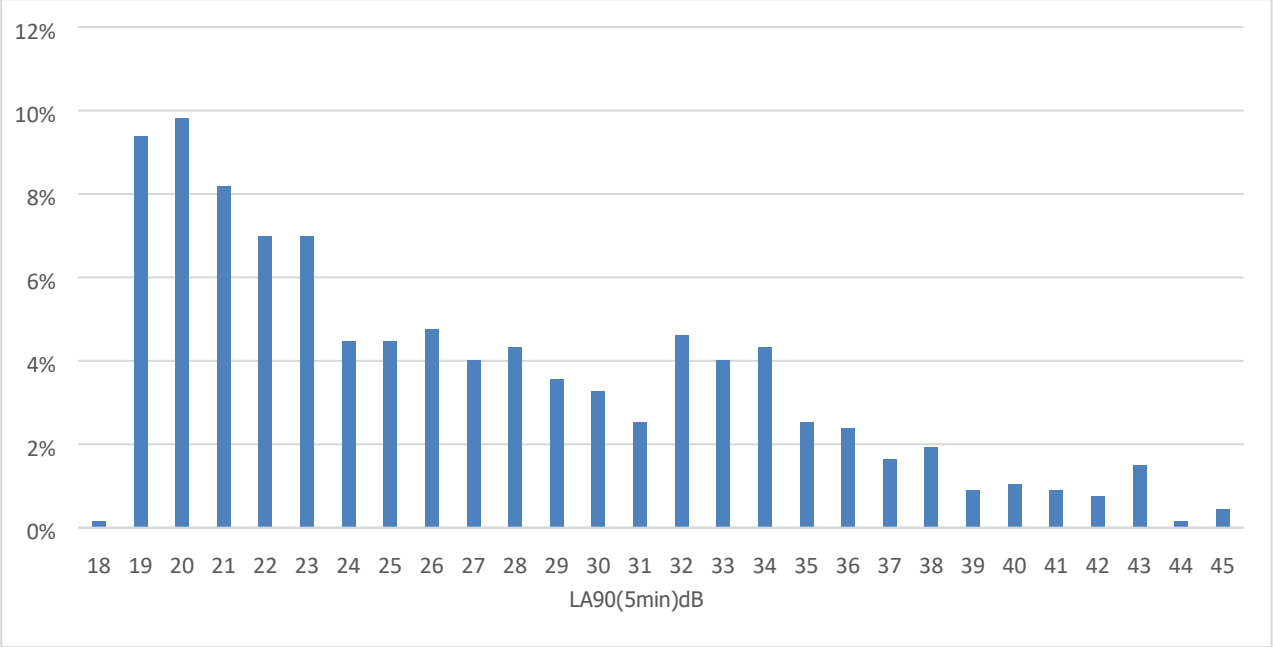
Executive Park
Avalon Way
Anstey
Leicestershire
LE7 7GR
Tel 0116 234 8000

Appendix C – Long-Term Noise Data Statistical Analysis

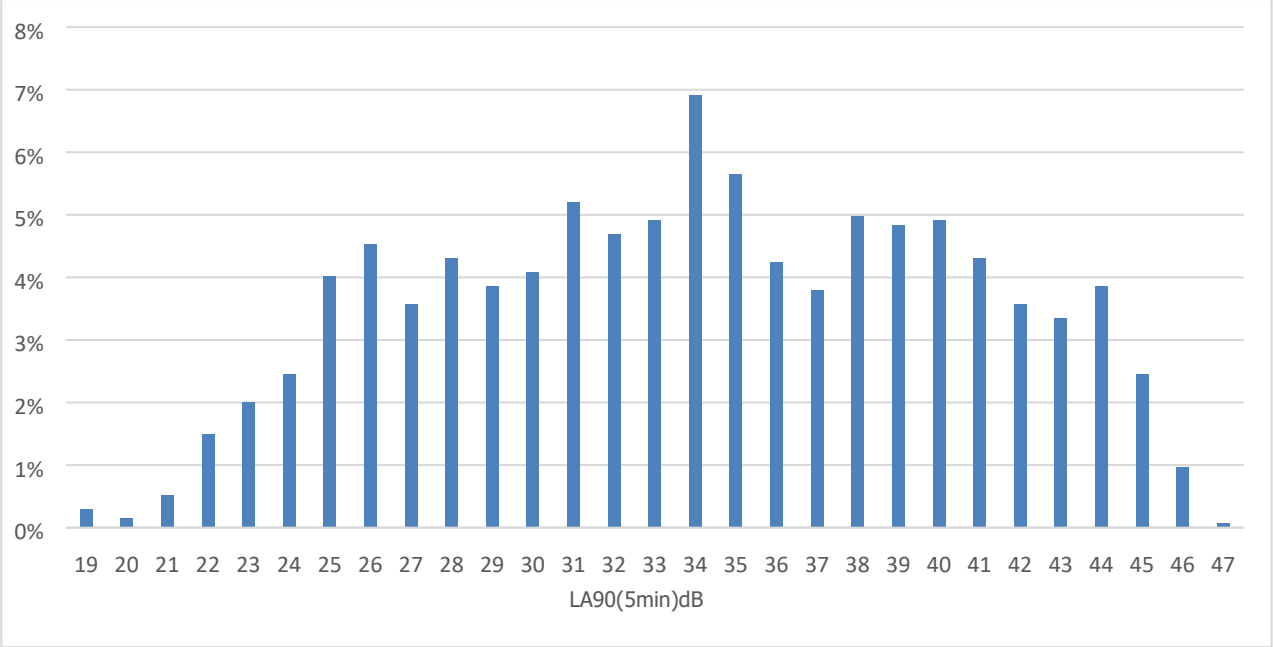
C 1 LT1 Daytime L_{A90} Analysis



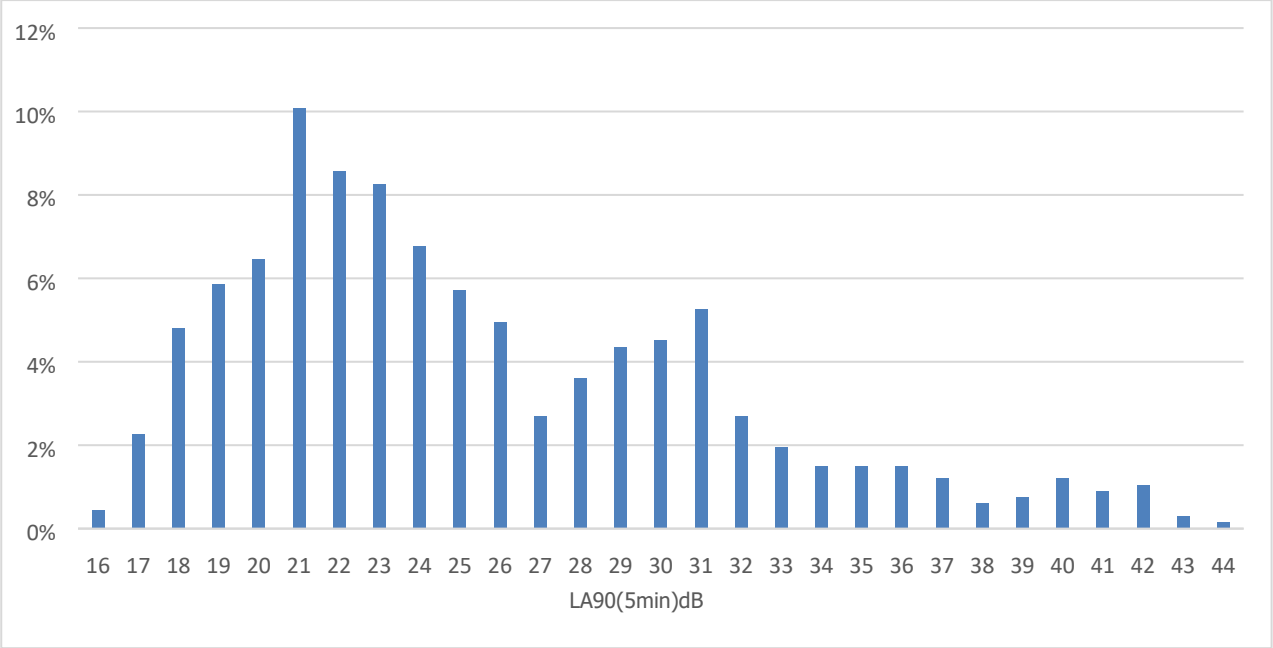
C 2 LT1 Night-time L_{A90} Analysis



C 3 LT2 Daytime L_{A90} Analysis



C 4 LT2 Night-time L_{A90} Analysis



Appendix D – Report Conditions

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The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

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