Land South of Bryn Lane, LL13 9YD

784-B055176

Noise Assessment

Mauna Kea Limited

January 2025

TETRA TECH

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Acronyms/Abbreviations

Acronyms/Abbreviations	Definition
CADNA	Computer Aided Noise Abatement
DMRB	Design Manual for Roads and Bridges
HGV	Heavy Goods Vehicle
PPG	Planning Practice Guidance
UDP	Unitary Development Plan
UKAS	United Kingdom Accreditation Service

Executive Summary

A noise assessment has been undertaken in support of a full planning application for a proposed warehouse at the above location.

The results of the BS4142 assessment show that the impact of the proposed development on the existing sensitive receptors is a maximum of 3dB below existing background levels. As a result, this falls within the No Observed Adverse Effect Levels (NOAEL) against BS4142 criteria. Buildings Services Plant noise limits have also been outlined within Section 5.1.2 to ensure that noise levels do not exceed the measured background.

1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a noise assessment to support a full planning application for a proposed warehouse at the above location. 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.

A list of acoustic terminology used in this report is provided in Appendix A.

1.2 Legislative & Policy Context

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. Future Wales: The National Plan 2040 and Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. They are supplemented by a series of Technical Advice Notes (TANs), Technical Advice Note 11 which relates to Noise, Welsh Government Circulars, and policy clarification letters, which together provide the national planning policy framework for Wales. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation. A well-functioning planning system is fundamental for sustainable development and achieving sustainable places.

Paragraph 6.7.5 of PPW says “In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure,

businesses or venues can be found and implemented as part of ensuring development is acceptable."

Paragraphs 6.7.6 and 6.7.7 say "In proposing new development, planning authorities and developers must, therefore:

> "address any implication arising as a result of its association with, or location within, air quality, noise action planning priority areas or areas where there are sensitive receptors;
>
> - not create areas of poor air quality or inappropriate soundscape; and
> - seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.

To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer."

Paragraph. 6.7.24 says "The potential impacts of noise pollution arising from existing development, be this commercial, industrial, transport-related or cultural venues (such as music venues, theatres or arts centres), must be fully considered to ensure the effects on new development can be adequately controlled to safeguard amenity and any necessary measures and controls should be incorporated as part of the proposed new development. This will help to prevent the risk of restrictions or possible closure of existing premises or adverse impacts on transport infrastructure due to noise and other complaints from occupiers of new developments. It will be important that the most appropriate level of information is provided, and assessment undertaken."

TAN 11 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.

1.3 Local & Regional Policy Context

The Wrexham Borough Unitary Development Plan was adopted by Wrexham Borough Council in February 2005. The plan states in relation to noise:

Development Principle; Development Objectives;

"Policy GDP1: All new development should:-

[…]

f) Ensure the safety and amenity of the public and safeguard the environment from the adverse effects of pollution of water, land or air, hazards from industry and quarrying, and associated noise, odour or vibration arising from development."

1.4 Acoustic Consultants' Qualifications and Professional Memberships

The lead project Acoustic Consultant is Travis Smith. The report has been checked by Suzy Everett and verified by Dawit Abraham. Relevant qualifications, membership and experience are summarised in Table 1.1 below.

Table 1.1: Acoustic Consultants' Qualifications & Experience

Name	Education	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Travis Smith	BSc 2022	Jul 2022	-	-
Suzy Everett	BEng 2018	Jul 2016	Aug 2018	Sep 2022
Dawit Abraham	BSc 2008 MSc 2010	Oct 2010	Jan 2011	Jan 2015

2.0 Assessment Criteria

In order to enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 2.1 presents equivalent noise levels and associated actions with the target noise level criteria identified. The noise level criteria detailed below have been derived from standards and design guidance:

- BS8233:2014 'Guidance on sound insulation and noise reduction for buildings – Code of practice'
- BS4142:2014 'Method for rating industrial and commercial sound'
- World Health Organisations (1999) 'Guidelines for Community Noise'

A full bibliography of documents referenced within this report is provided within Appendix B.

Table 2.1: Noise Level Criteria and Actions

Noise Sources	Noise Level Criteria	Justification for Effect Level- Action Required
No Observed Adverse Effect Level (NOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level ($L_{Ar,T}$) dB and existing background level $L_{A90,T}$ dB is less than or equal to 0dB	**Justification for Effect Level:** Below low impact threshold in BS4142:2014 **Action Required:** None
Lowest Observed Adverse Effect Level (LOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level ($L_{Ar,T}$) dB and existing background sound level $L_{A90,T}$ dB is between 1-4dB.	**Justification for Effect Level:** Within less likely for adverse or significant adverse impact to occur low impact threshold in BS4142:2014 **Action Required:** Mitigate and reduce to a minimum the exceedance over 0dB above background threshold
Significant Observed Adverse Effect Level (SOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level ($L_{Ar,T}$) dB and existing background sound level $L_{A90,T}$ dB is between 5-9dB.	**Justification for Effect Level:** Within adverse impact threshold in BS4142:2014. **Action Required** Additional mitigation required to achieve effect of LOAEL or less.
Unacceptable Observed Adverse Effect Level (UOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level ($L_{Ar,T}$) dB and existing background sound level $L_{A90,T}$ dB is equal to or greater than 10dB	**Justification for Effect Level:** Within significant adverse impact threshold in BS4142:2014 **Action Required:** Additional mitigation required to achieve effect of LOAEL or less.

3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict noise levels at a number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on ISO 9613-2 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data and model settings as given in Table 3.1 below have been used.

Table 3.1: Modelling Parameters Sources and Input Data

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	DEFRA	LiDAR 1m DTM
Building heights – around site	Tetra Tech Observations	• 4.0m height for one-storey properties • 8.0 m height for two storey properties • 3.0m per additional storey
Receptor positions*	Tetra Tech	• 1.5 m for ground floor properties • 4.0m height for first-floor properties • 3.0m per additional storey
Modelling Parameters	Tetra Tech	• Ground Absorption: 0.5 • Order of Reflections: 3 • Noise Contour Plot Grid Receiver Spacing: 4.0
Proposed Plans	PACE Architecture	Drawing Title: Proposed Site Plan Drawing No: 2042.P.004(A)
*All receptors modelled 1.0m from building façade unless otherwise stated.		

It is acknowledged that a number of the values of parameters chosen will affect the overall noise levels presented in this report. However, it should be noted that the values used, as identified above, are worst-case.

3.2 Model Input Data

Information regarding noise emissions from HGV activity and car parking has been determined using the Tetra Tech Library

Data contained within Table 3.2 below presents noise information for all the operational noise sources. Breakout noise from manufacturing has been included in Table 3.3 and is being modelled as the Noise at Work safe working limit, with the sound reduction index (SRI) for the walls and roof in Table 3.4 which have been used as a typical building makeup.

Table 3.2: Summary of Noise Input Data (Sound Pressure Levels)

Noise Level	Data Source	Modelled Source Type	Details	Sound Pressure Level Per Point		
				Daytime $L_{Aeq,1hour}$	Night-time $L_{Aeq,15minutes}$	Night-time L_{Amax}
HGV Unloading/Loading	Tetra Tech Library	Point Source	1 per Space Daytime Occupancy: 100% Night-time Occupancy: 100%	73.8 at 3m	76.3 at 3m	89.4 at 3m
HGV Movements		Line Source (Moving Point)	26 movements per hour	73.0 at 3m		
Car Park		Area Source	-	54.0 at 1m		

Table 3.3: Summary of Noise Input Data (Sound Power Level)

Noise Source	Type	Octave Band Sound Power Level (L_w)								Sound Power Level (L_w)	Source
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz		
Manufacturing Breakout	Average	73	73	73	73	73	73	73	73	80	Noise at Work Limit

Table 3.4: Sound Reduction Index of Buildings Facades

Building Facade	Octave Band Sound Power Level (L_w)								Sound Reduction Index Rw dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Roof	20	18	20	24	20	29	39	47	25
Walls	20	15	17	23	18	25	40	46	24

3.3 Modelling Inputs

Table 3.3 below presents the model input information applied to noise data presented within Tables 3.2.

Table 3.5: Modelling Inputs

Noise Source	Height (m)	Source Type	Speed (km/h)	Movements per Hour	
				Daytime	Night-Time
HGV Movement	1.0	Line Source (Moving Point)	16.1	10	10

3.4 Sensitive Receptors

3.4.1 Existing Sensitive Receptor Locations

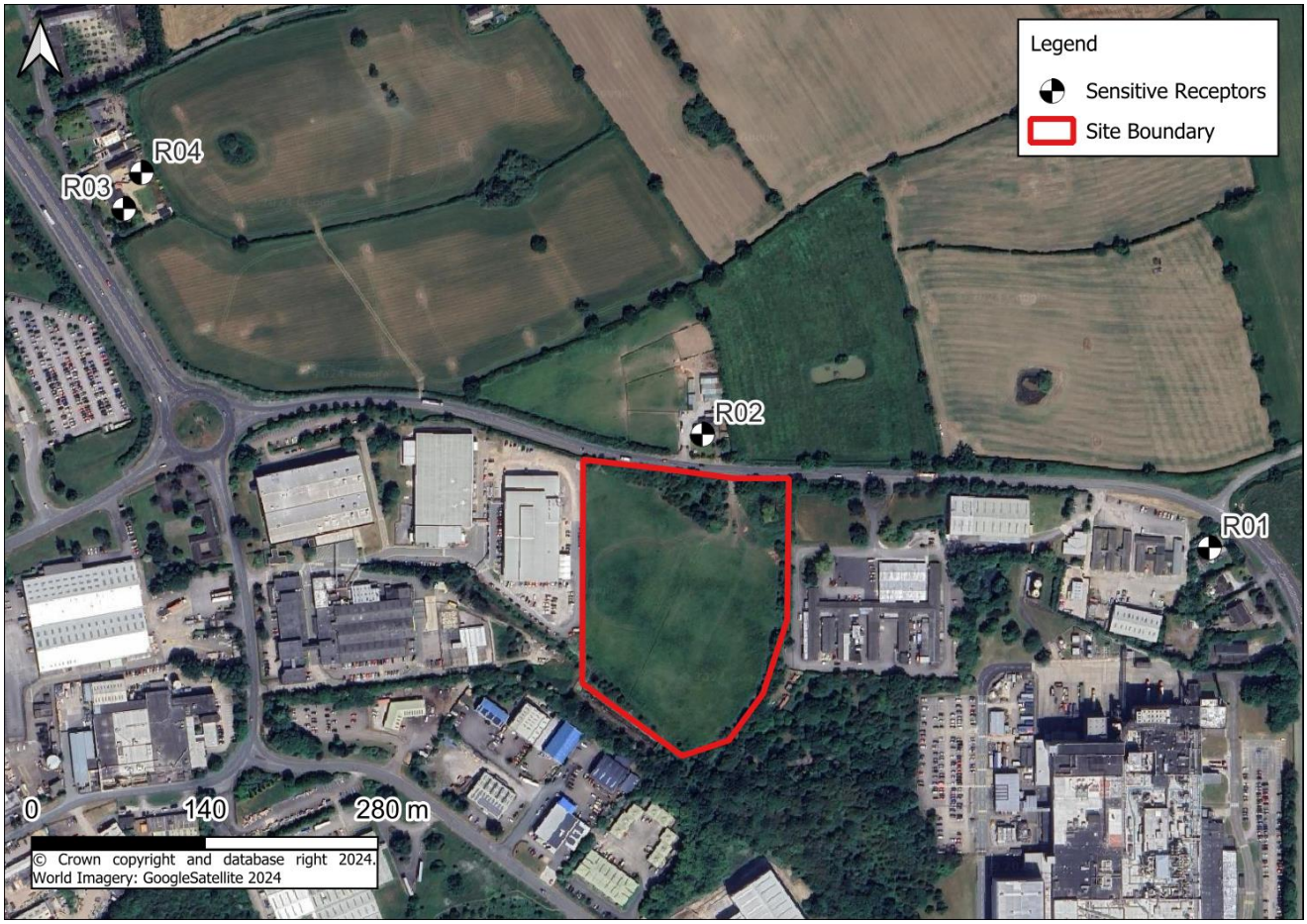
Table 3.4 below summarises receptor locations that have been selected to represent worst-case sensitive receptors with respect to direct noise from the site. Façades of the nearest noise sensitive properties to the development site have been represented. The locations of the receptors are presented within Figure 3.1 below.

Table 3.6: Existing Sensitive Receptor Locations

Ref.	Description	Type of Use	Height (m) Daytime / Night-time
R01	2 Bryn Lane	Residential	1.5 / 1.5
R02*	Little Acorns, Ridley Wood*	Residential*	1.5 / 1.5
R03	Spring Grove, Hugmore Lane	Residential	1.5/4.0
R04	Ty Gwanwyn, Hugmore Lane	Residential	1.5/4.0

*R02 is located within a site allocated in the Local Development Plan and is subject to a live planning application for employment uses. It will ultimately be demolished for employment uses. This has been assessed as residential as a worst-case assessment, as it is still a residential property at the time of assessment.

Figure 3.1: Sensitive Receptor Locations



4.0 Noise Survey (2021 & 2024)

A noise survey has been carried out for the Land North of Bryn Lane project in 2021. Due to the time lapsed, an additional survey has been undertaken to ensure noise levels are representative of the current noise climate in the area.

Section 4.1 presents the results of the 2021 survey, and 4.2 presents the full details of the most recent survey.

4.1 Noise Survey - 2021

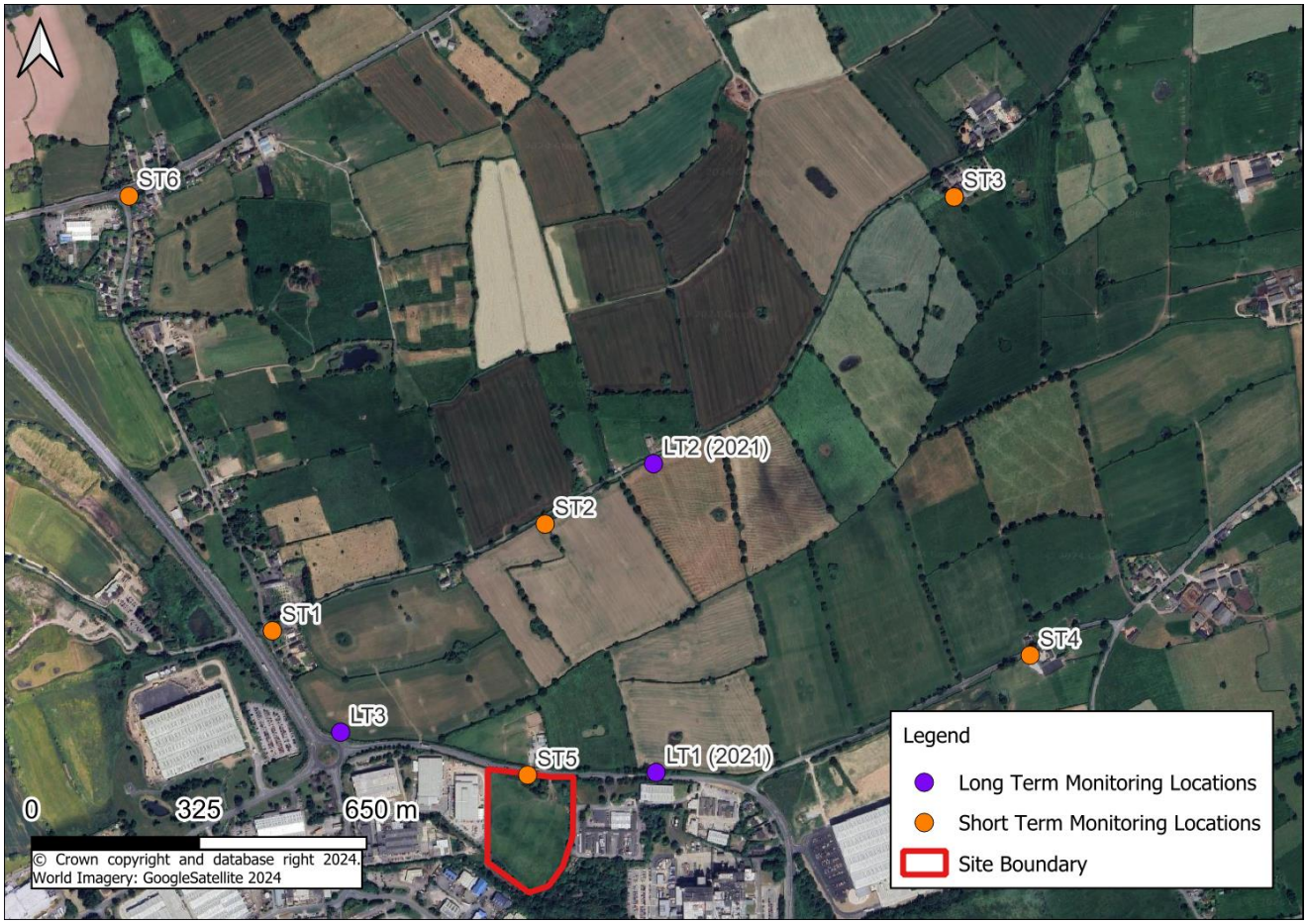
A baseline monitoring survey was undertaken at nine locations (as specified in the following table) from Tuesday 26th October 2021 to Tuesday 2nd November 2021.

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 and partly cloudy. Anemometer readings confirmed that wind speeds were less than 5 ms-1 at all times during the survey, with a predominant northernly wind direction during the survey.

Table 4.1: Noise Monitoring Locations - 2021

Ref	Description
LT1	On the Southern Site Boundary, opposite Meridian Foods LTD just off Bryn Lane
LT2	On the Northern Site Boundary just off Francis Lane
LT3	On the Southwest corner of site by the roundabout on Industrial Estate Road
ST1	On the Corner of Francis Lane and Hugmore Lane to the East of site
ST2	On Francis Lane located to the North of site by the residents
ST3	On Francis Lane by the Wrexham Equine Centre north of site
ST4	On Ridley Wood Lane towards the East of site
ST5	On Bryn Lane, south of site by the entrance to CrossFit Wrexham
ST6	Northwest of site on the junction of Hugmore Lane and the A534

Figure 4.1: Noise Monitoring Locations - 2021



The ambient noise climate was dominated by Road Traffic Noise, the main sources of this noise were; Bryn Lane, the A534, and Industrial Estate Lane.

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).

Table 4.2: Results of Baseline Noise Monitoring Survey (Average Levels) - 2021

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	110 Hours	26/10/2021 – 29/10/2021 13:00 – 23:00 01/11/2021 – 02/11/2021 07:01 – 11:06	LT1	64.5	94.3	40.6	66.6	58.0
Weekday Night-time 23:00 – 07:00	103 Hours	26/10/2021 – 29/10/2021 23:06 – 23:56 01/11/2021 – 02/11/2021 00:01 – 06:56		59.6	90.6	38.9	59.9	46.0
Weekend Daytime 07:00 – 23:00	40 Hours	30/10/2021 – 31/10/2021 07:01 – 23:00		62.0	91.8	42.1	64.5	50.0
Weekend Night-time 23:00 – 07:00	48 hours	30/10/2021 – 31/10/2021 00:01 – 23:56		58.0	84.8	41.1	57.2	46.0
Weekday Daytime 07:00 – 23:00	109 Hours	26/10/2021 – 29/10/2021 13:24 – 22:59 01/11/2021 – 02/11/2021 07:00 – 10:49	LT2	53.6	78.4	37.1	53.5	48.0
Weekday Night-time 23:00 – 07:00	104 Hours	26/10/2021 – 29/10/2021 23:04 – 23:59 01/11/2021 – 02/11/2021 00:04 – 06:54		52.9	76.0	33.7	51.4	40.0
Weekend Daytime 07:00 – 23:00	40 Hours	30/10/2021 – 31/10/2021 07:00 – 23:00		56.3	85.3	37.8	51.6	44.0

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 Night-time 23:00 – 07:00	48 hours	30/10/2021 – 31/10/2021 00:04 – 23:59		46.5	71.5	36.4	46.4	42.0
Weekday Daytime 07:00 – 23:00	109 Hours	26/10/2021 – 29/10/2021 12:39 – 23:00 01/11/2021 – 02/11/2021 07:00 – 10:39	LT3	62.3	88.6	38.8	64.4	52.0
Weekday Night-time 23:00 – 07:00	110 Hours	26/10/2021 – 29/10/2021 23:04 – 23:59 01/11/2021 – 02/11/2021 00:04 – 06:54		56.8	86.6	37.1	53.6	49.0
Weekend Daytime 07:00 – 23:00	40 Hours	30/10/2021 – 31/10/2021 07:00 – 22:59		59.3	86.1	37.4	60.0	44.0
Weekend Night-time 23:00 – 07:00	48 hours	30/10/2021 – 31/10/2021 00:04 – 23:59		53.8	80.7	35.8	48.4	40.0
Daytime 07:00 – 19:00	15 Mins	01/11/2021 14:13	ST1	63.8	71.8	52.3	66.8	58.3
	15 Mins	01/11/2021 14:33	ST2	53.2	80.0	43.8	53.2	46.7
	15 Mins	01/11/2021 14:54	ST3	58.0	85.3	39.2	48.6	42.7
	15 Mins	01/11/2021 15:16	ST4	67.7	90.8	44.9	65.5	47.5
	15 Mins	01/11/2021 15:35	ST5	75.0	89.2	47.7	79.6	52.6
	15 Mins	01/11/2021 15:54	ST6	72.6	83.1	53.1	77.2	59.5

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)
Evening 19:00 – 23:00	15 Mins	01/11/2021 19:21	ST1	60.2	86.2	42.4	63.8	47.8
	15 Mins	01/11/2021 19:40	ST2	54.9	84.5	40.6	50.8	44.5
	15 Mins	01/11/2021 19:59	ST3	42.7	58.2	37.1	44.8	39.2
	15 Mins	01/11/2021 20:47	ST4	55.7	81.2	38.7	53.1	40.7
	15 Mins	01/11/2021 14:13	ST5	61.8	87.6	42.8	52.8	45.0
	15 Mins	01/11/2021 19:06	ST6	69.3	82.4	49.3	74.7	53.0
Night-time 23:00 – 07:00	15 Mins	01/11/2021 23:20	ST1	54.0	67.6	39.9	58.1	42.7
	15 Mins	01/11/2021 23:40	ST2	44.5	56.0	37.7	46.6	40.7
	15 Mins	02/11/2021 00:46	ST3	47.4	79.8	31.0	40.4	32.5
	15 Mins	02/11/2021 01:07	ST4	41.7	54.2	38.1	42.7	40.0
	15 Mins	02/11/2021 01:26	ST5	61.6	88.2	44.6	49.9	46.1
	15 Mins	01/11/2021 23:02	ST6	60.2	78.9	30.9	59.4	34.9

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

4.2 Noise Survey Details – 2024

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:

Rion NL-52	Environmental Noise Analyser	s/n	264488
Rion NL-52	Environmental Noise Analyser	s/n	1043466

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice. 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 two locations (as specified in Table 4.1 and shown in Figure 4.1 below) from Friday 25th October 2024 to Tuesday 29th October 2024. Long term (LT) locations were measured unattended over the full survey period. The raw data collected from the long-term monitoring is available upon request.

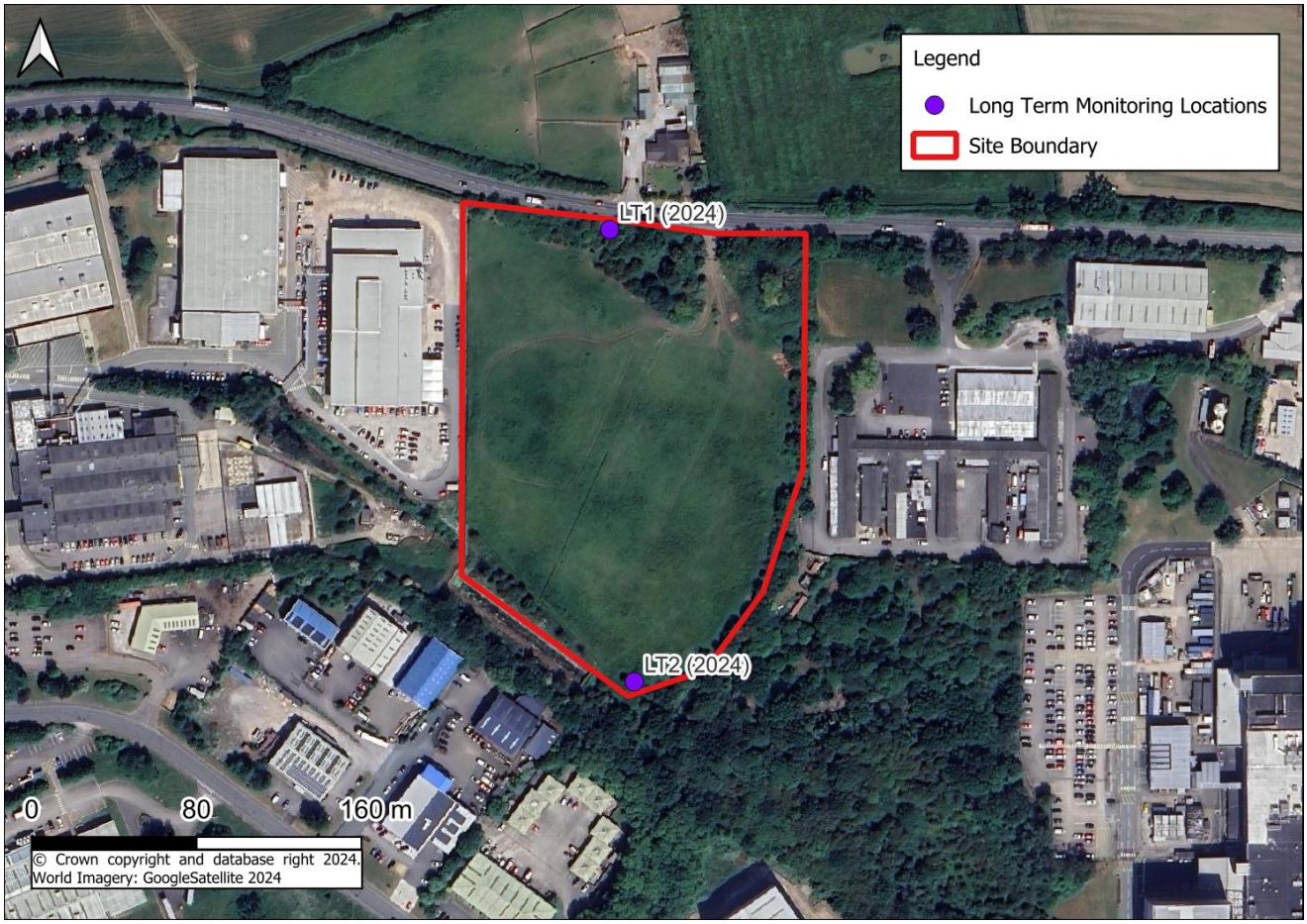
Measurements were taken in general accordance with BS 7445-1:2003 The Description and Measurement of Environmental Noise: Guide to quantities and procedures. Weather conditions during the survey period were observed as being dry. Anemometer readings confirmed that wind speeds were less than 5 ms-1 at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

Table 4.3: Noise Monitoring Locations - 2024

Ref	Description
LT1	Located at the front of the site adjacent to Bryn Lane, with the microphone situated at 10m from the nearby roadside edge.
LT2	Located at the rear of the site, towards the boundary furthest from Bryn Lane.

LT1 was located at the same location as a previous survey measurement location to validate the noise levels measured in 2021.

Figure 4.2: Noise Monitoring Locations - 2024



4.3 Noise Survey Results – 2024

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).

Table 4.4: Results of Baseline Noise Monitoring Survey (Average Levels) - 2024

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	34 Hours	Friday 25/10/2024 Monday 28/10/24 to Tuesday 29/10/2024	LT1	58	86	40	60	50
Weekday Night-time 23:00 – 07:00	16 Hours	Friday 25/10/2024 Monday 28/10/24 to Tuesday 29/10/2024		53	79	42	52	48
Weekend Daytime 07:00 – 23:00	32 Hours	Saturday 26 to Sunday 27/10/2024		55	85	43	57	48
Weekend Night-time 23:00 – 07:00	16 hours	Saturday 26 to Sunday 27/10/2024		51	76	37	50	49
Weekday Daytime 07:00 – 23:00	34 Hours	Friday 25/10/2024 Monday 28/10/24 to Tuesday 29/10/2024	LT2	49	78	40	50	46
Weekday Night-time 23:00 – 07:00	16 Hours	Friday 25/10/2024 Monday 28/10/24 to Tuesday 29/10/2024		47	66	40	48	43
Weekend Daytime 07:00 – 23:00	32 Hours	Saturday 26 to Sunday 27/10/2024		50	70	40	51	47
Weekend Night-time 23:00 – 07:00	16 hours	Saturday 26 to Sunday 27/10/2024		46	63	37	47	44

4.4 Representative Background Noise Levels

Using the data collected during the baseline survey, representative background noise levels have been derived for all receptor locations presented in Figure 3.1. Table 4.6 presents the representative background noise levels considered appropriate for the existing sensitive receptors within the area (the lower of the respective daytime and evening measurements have been used to represent daytime noise levels, where appropriate).

Table 4.5: Representative Background Noise Levels

Receptors	Monitoring Location	Time Period	Representative Background Noise Level ($L_{A90,T}$ dB)*
R01	LT1 (2021)	Daytime (07:00 – 23:00)	50
		Night-time (23:00 – 07:00)	46
R02	LT1 (2024)	Daytime (07:00 – 23:00)	48
		Night-time (23:00 – 07:00)	48
R03 & R04	LT3 (2021)	Daytime (07:00 – 23:00)	44
		Night-time (23:00 – 07:00)	40

*Lowest $L_{A90,T}$ value selected from either Weekday or Weekend.

The representative noise levels presented in Table 4.6 have been used to inform the assessment presented in Section 5.0.

5.0 Assessment of Effects

5.1 Operational Phase

5.1.1 Operational Activities Assessment

The operational noise assessment below compares the existing typical background daytime and night-time noise levels ($L_{A90,T}$) at the nearest sensitive receptors to the predicted noise from the proposed development, including noise from all operational activities such as HGV activities and internal manufacturing breakout. A character correction of +3 dB has been applied to account for potential acoustic feature corrections, such as tonal characteristics, associated with the specific noise generating events.

The assessment has been carried out with proposed development operating 24 hours per day and 7 days a week as a worst case, and has been undertaken against daytime and night-time noise limits. To carry out a robust assessment, no reductions have been made to night-time operations at the site. The results of the operational noise assessment are presented within Table 5.1.

Table 5.1: BS4142 – Operational Activities Assessment

Location	Existing Measured Background L_{A90}		Noise rating level from operational activities		BS 4142 Score	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R01	50	46	19	20	-31	-26
R02*	48	48	45	45	-3	-3
R03	44	40	32	33	-12	-8
R04	44	40	32	32	-12	-8

All values are sound pressure levels in dBA re: 2×10^{-5} Pa.
All calculations used to derive the above table (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.

*R02 is located within a site allocated in the Local Development Plan and is subject to a live planning application for employment uses. It will ultimately be demolished for employment

uses. This has been assessed as residential as a worst-case assessment, as it is still a residential property at the time of assessment.

As demonstrated within Table 5.1, the results of the assessment indicate that the BS4142 Noise Rating Levels at sensitive façades of the existing noise sensitive properties are below the existing background levels. As such, the effect of the proposed development on the existing sensitive receptors falls within the No Observed Adverse Effect Level (NOAEL), and therefore no noise mitigation is required.

5.1.2 Building Services Plant

Based on the baseline noise monitoring data detailed in Section 4 of this report, maximum plant emission levels have been set for controlling fixed building services plant to an acceptable level. Noise limits apply at a position 1 m from the façade of the nearest sensitive receptors and include the total contribution of noise from all plant items associated with the proposed development that may run during any particular period.
In order to reduce the risk of fixed plant noise making a significant contribution to background noise levels in the area, a target for fixed plant Rating Level ($L_{A,Tr}$) has been set to be at the existing background levels during daytime and night-time periods respectively. Representative worst-case background noise levels at existing receptors have been used to determine appropriate fixed plant noise limits.

The maximum permissible external noise levels from the potential fixed plant for daytime and night-time are presented in Table 5.2 below.

Table 5.2: Recommended Rating Level for Plant Noise at Nearby Existing Receptors

Receptors	Measurement Location	Daytime (07:00 – 23:00)		Night-time (23:00 – 07:00)	
		Representative Background Noise Level L_{A90} (dB)	Proposed Rating Level Criteria L_{ArT} (dB)	Representative Background Noise Level L_{A90} (dB)	Proposed Rating Level Criteria L_{ArT} (dB)
R01	LT1 (2021)	50	50	46	46
R02	LT1 (2024)	48	48	48	48
R03 & R04	LT3 (2021)	44	44	40	40

The Rating Level associated with fixed plant should not exceed the criteria presented above. When predicting fixed plant noise, the cumulative noise from all fixed plant in the area (including the proposed substation) will need to be considered to demonstrate compliance. By adhering to the fixed plant limits, the noise levels associated with building services plant would not result in an adverse impact at the closest sensitive receptors.

6.0 Conclusion

A noise assessment has been undertaken in support of a full planning application for a proposed warehouse at the above location.

The results of the BS 4142 assessment show that the impact of the proposed development on the existing sensitive receptors is, at worst, 3dB below existing background levels. As a result, this falls within the No Observed Adverse Effect Levels (NOAEL) against BS 4142 criteria. Buildings Services Plant noise limits have also been outlined within Section 5.1.2 to ensure that noise levels do not exceed the measured background.

Appendices

Appendix A – Acoustic Terminology

Acoustic Terminology

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 16-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_n 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.

Appendix B – References

British Standards Institute (BSI). (2003). BS 7445:2003. Description and Measurement of Environmental Noise. United Kingdom.

British Standards Institute (BSI). (2014). BS 4142:2014+A1:2019. 'Method for Rating Industrial and Commercial Sound'. United Kingdom.

British Standards Institute (BSI). (2014). BS 8233:2014. 'Guidance on Sound Insulation and Noise Reduction for Buildings'. United Kingdom.

World Health Organisation (WHO). (1999). Guidelines for Community Noise.