Land North of the A4, Hoad Way, Theale

Noise Assessment

784-B030924

CP Logistics UK Reading Propco Ltd

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1.0 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

This report presents the findings of a noise assessment to support a planning application for potential commercial units located at land to the north of the A4, Hoad Way, Theale. The application is for full planning of the construction of 2 employment units for flexible uses within planning use class E (Commercial, Business and Services), B2 (General Industrial) and B8 (Storage of distribution) with associated enabling works, access, parking and landscaping.

A previous noise impact assessment has been undertaken in July 2021, supporting a planning application for the construction of 3 employment units for flexible use. A response from Steve Wilson the EHO dated 28th September 2021 highlighted the requirement for new developments to add nothing to the existing background noise levels and to do this the Noise Rating of the development should be at least 10dB below existing background noise, as well as the possibility of HGV traffic stacking up at the site access on Hoad Way.

A response was prepared to the comments raised, dated October 2021. The scheme has been redesigned with these comments in mind, as yards associated with the units are orientated away from the nearest residential receptors and assessed accordingly.

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 and abbreviations used in this report is provided in Appendix A and Report Conditions are presented in Appendix B.

1.2 LEGISLATIVE 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. Policy guidance with respect to noise is found in the National Planning Policy Framework (NPPF), published in July 2021. With regard to noise and planning, the NPPF contains the following statement at paragraph 174:

> *"174 Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans…"*
>
> *"185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

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

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

"187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

188. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

Practice Guidance (PPG): Noise provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance is, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England (NPSE), is to, 'identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.'

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the PPG and repeated below in Table 1.1.

Table 1.1: NPPG Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No Specific Measures Required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No Specific Measures Required
Lowest Observed Adverse Effect Level (LOAEL)			

Perception	Examples of Outcomes	Increasing Effect Level	Action
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The NPPF, NPSE and PPG do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, within the context of the Proposed Development, national planning policy and appropriate guidance documents including 'BS 8233 – Guidance on Sound Insulation and Noise Reduction for Buildings' (2014) and 'BS 4142: 2014 Methods for Rating and Assessing Industrial and Commercial Sound'. Section 2.0 presents the noise level criteria used as a basis of this assessment.

The PPG also states that neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.

1.3 ACOUSTIC CONSULTANTS' QUALIFICATIONS AND PROFESSIONAL MEMBERSHIPS

The lead project Acoustic Consultant is Joe Nott. The report has been checked by Paul Bentley and verified by Nigel Mann. Relevant qualifications, membership and experience are summarised in Table 1.2 below.

Table 1.2: 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)
Joe Nott	BSc 2016	August 2016	August 2017	-
Paul Bentley	BSc 2004 MSc 2005 PgDip 2012	February 2008	June 2012	Aug 2016
Nigel Mann	BSc 1997 MSc 1999 PgDip 2001	November 1998	November 2001	July 2005

2.0 ASSESMENT CRITERIA

2.1 NATIONAL PLANNING PRACTICE GUIDANCE

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:

- BS 8233:2014 '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
- IEMA 'Guidelines for Environmental Noise Impact Assessment' (2014).

Table 2.1: Noise Level Criteria and Actions

Effect Level	Assessment	Noise Level Criteria	Action / Justification
No Observed Adverse Effect	Building Services Plant	Source noise levels below background L_{A90} dB noise levels	No Action Required Source noise levels below the background noise is an indication of the sound source having a low impact and that complaints would be unlikely
	Absolute Criteria Goods Deliveries/Car Parking/BSP	Noise levels are below: *Bedrooms: 30 dB $L_{Aeq,8hours}$* 45 dB L_{AFmax} *Living Rooms: 35 dB $L_{Aeq,16hours}$*	Within BS8233 / WHO guideline criteria
	Assessment of Overall Change in Noise Levels	Up to 3.0dB change in noise levels	No Action Required – Change in noise levels unlikely to be perceptible
Lowest Observed Adverse Effect Level (LOAEL)	Building Services Plant	Difference between source noise levels and existing background levels of zero to 5 dB	Action: None Justification: + 5 dB above background is considered an indication of an impact of marginal significance.
	Absolute Criteria Goods Deliveries/Car Parking/BSP	Noise levels are below: *Bedrooms: 30 dB $L_{Aeq,8hours}$* 45 dB L_{AFmax} *Living Rooms: 35 dB $L_{Aeq,16hours}$*	Within BS8233 / WHO guideline criteria
	Assessment of Overall Change in Noise Levels	1.0-2.9dB increase in noise levels	No Action Required – Slight Impact at Receptor of Some Sensitivity
Significant Observed Adverse Effect Level (SOAEL)	Building Services Plant	Difference between source noise levels and existing background levels of greater than 10 dB	Action: Mitigate to achieve less than 10 dB above background if possible: Justification: Depending on context, a difference of +10dB to be an indication that complaints are likely.
	Absolute Criteria Goods Deliveries/Car Parking/BSP	Noise levels are exceeded: Bedrooms: 30 dB $L_{Aeq,8hours}$ / 45 dB L_{AFmax} (More than 15 times per night) Living Rooms: 35 dB $L_{Aeq,16hours}$	Mitigate and reduce to a achieve: Bedrooms: 30 dB$L_{Aeq,8hours}$ Living Rooms: 35 dB$L_{Aeq,16hours}$

Effect Level	Assessment	Noise Level Criteria	Action / Justification
	Assessment of Overall Change in Noise Levels	3.0-4.9dB increase in noise levels	Mitigate to reduce impact to LOAEL standard
Unacceptable Observed Adverse Effect Level (UOAEL)	Building Services Plant	Difference between source noise levels and existing background levels of greater than 15 dB	Action: Reduce as far as practicable depending on context Justification: +10dB above existing background is an indication of a likely significant adverse impact
	Absolute Criteria Goods Deliveries/Car Parking/BSP	Internal noise levels exceed: Bedrooms: 51 $dBL_{Aeq,8hours}$, 67 dB L_{AFmax}	Mitigate and reduce to a achieve: Bedrooms: 30 $dBL_{Aeq,8hours}$ Living Rooms: 35 $dBL_{Aeq,16hours}$
	Assessment of Overall Change in Noise Levels	Equal to or greater than 5.0 dB increase in Noise Levels	Mitigate to reduce impact to LOAEL standard

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 the table 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	Ordnance Survey	LIDAR 1m DTM
Building heights – around site	Tetra Tech Observations	8 m height for two storey residential properties, and 4 m for Bungalows, 2.5m per additional storey.
Receptor positions	Tetra Tech	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties. 1.5 m height for model grid and monitoring locations for validation.
Proposed Plans	SGP Architects and Masterplanners	Drawing Title: Site Plan – Option 3 Drawing No: 18-095-SGP-ZZ-ZZ-DR-A-131001B Dated: 3rd November 2022

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

3.2.1 Building Services Plant (BSP)

Due to there being no fixed building services plant information available at this stage of the proposed development, it is not possible to undertake predictions to determine whether appropriate standards might be met. Instead, appropriate plant noise emission limits have been set which can feed into the future detailed design.

3.2.2 Delivery Noise Data

Noise of a delivery event has been known to vary from site to site by as much as 22dB L_{Aeq} at 5m 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 14dB.

As such, the following worst-case calculations have been based on measurements of HGVs delivering goods. All measurements were undertaken by Tetra Tech during a noise survey at a similar development and were in free-field conditions.

In addition to noise from the unloading process, the levels used in the assessment includes 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 bleepers. Table 3.2 summarises the modelled noise sources and the sound pressure levels for the HGV activities.

It should be noted that for the purposes of this worst-case assessment, deliveries are assumed to take place during any given 1 hour period during the daytime (07:00-23:00) and a 15 minute period during the night-time (23:00-07:00).

Table 3.2: Modelled Sound Pressure Levels for Delivery Events

Noise Level	Data Source	Modelled Source Type	Details	Sound Pressure Level Per Point at 3m Distance (dB)		
				Daytime $L_{Aeq,1hour}$	Night-time $L_{Aeq,15minutes}$	Night-time L_{Amax}
HGV Unloading/Loading	Tetra Tech Survey	Point Source	1no. per Unloading Bay	73.8	76.3	89.4
HGV Movements		Line Source (Moving Point)	Daytime: 1no. HGV per 1-hour period Night-time: 1no. HGV per 15-minute period	73.0		

3.2.3 Car Park Noise Data

Noise levels from proposed car parking areas have been determined based upon observations within an existing warehouse unit during a staff changeover period. $L_{Aeq,T}$ noise levels, as follows, are modelled as an area source for the car parking area.

$L_{Aeq,1hr}$ Noise Level = 54.0 dB at 1.5m height

3.2.4 Operating Conditions

Deliveries times to the site are unknown at this point, therefore any noise source attributed to delivery activities including HGV movements and loading/unloading noise have been assessed for both the daytime and night-time periods.

3.3 SENSITIVE RECEPTORS

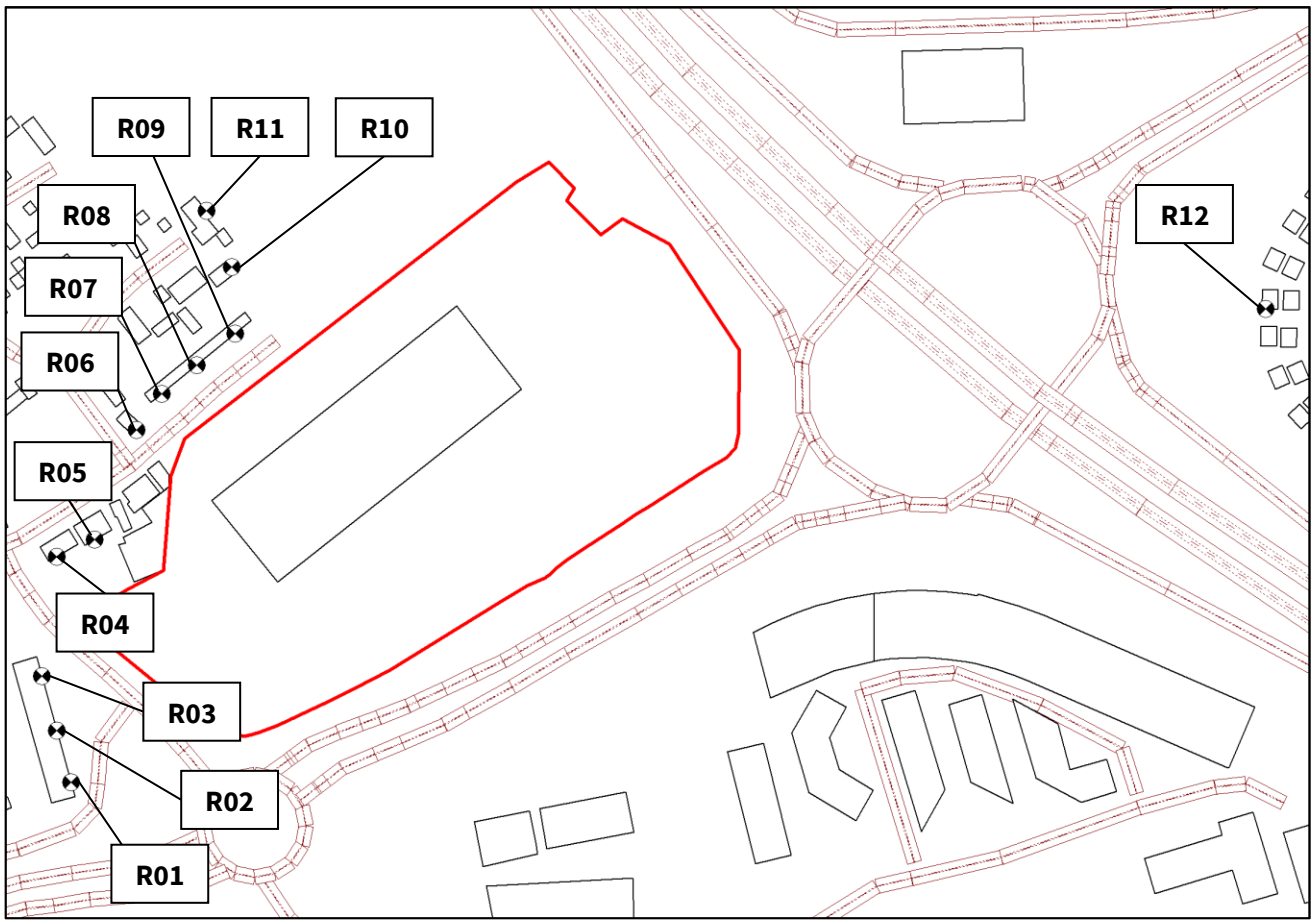
Table 3.4 below summarises receptor locations that have been selected to represent worst-case sensitive receptors with respect to direct noise from the site. Façades of the nearest noise sensitive properties to the development site have been represented. The locations of the receptors are shown in Figure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

It is worth nothing that two (no.2) proposed receptors have been excluded from this report that were assessed in the July 2021 report, this is because the application (18/00454/FULD) permission expiry date of 6th August 2023 has passed.

Table 3.3: Existing Receptor Locations

Ref.	Description	Type of Use	Height (m) Daytime / Night-time
R01	44 Elizabeth Court	Residential	6.5
R02	29 Elizabeth Court	Residential	6.5
R03	6 Elizabeth Court	Residential	6.5
R04	64 High Street	Residential	1.5 / 4.0
R05	Chase Court, High Street	Residential	1.5 / 6.5
R06	2 Woodfield Way	Residential	1.5 / 4.0
R07	65 High Street	Residential	1.5 / 4.0
R08	75 High Street	Residential	1.5 / 4.0
R09	89 High Street	Residential	1.5 / 4.0
R10	17 Rotherfield Close	Residential	1.5 / 4.0
R11	14 Rotherfield Close	Residential	1.5 / 4.0
R12	26 Clover Way	Residential	1.5 / 4.0

Figure 3.1: Sensitive Receptor Locations



Not to scale

4.0 NOISE SURVEY

Although a noise survey was completed alongside the 2021 assessment, it was considered sensible to undertake a further survey to provide updated baseline ambient noise levels. Long term monitoring locations were positioned adjacent to the most sensitive noise receptors to the west and to the north of the site. Equipment used during the survey included:

Rion NL52	Environmental Noise Analyser	s/n	1221575
Rion NL52	Environmental Noise Analyser	s/n	264488
Rion NL52	Environmental Noise Analyser	s/n	710313
Rion NL52	Environmental Noise Analyser	s/n	810560
Rion NC75	Sound Calibrator	s/n	34580543

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, a drift of +0.1 dB was observed on meter s/n 1221575, and +0.0 dB on meters s/n 264488, 710313, and 810560. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

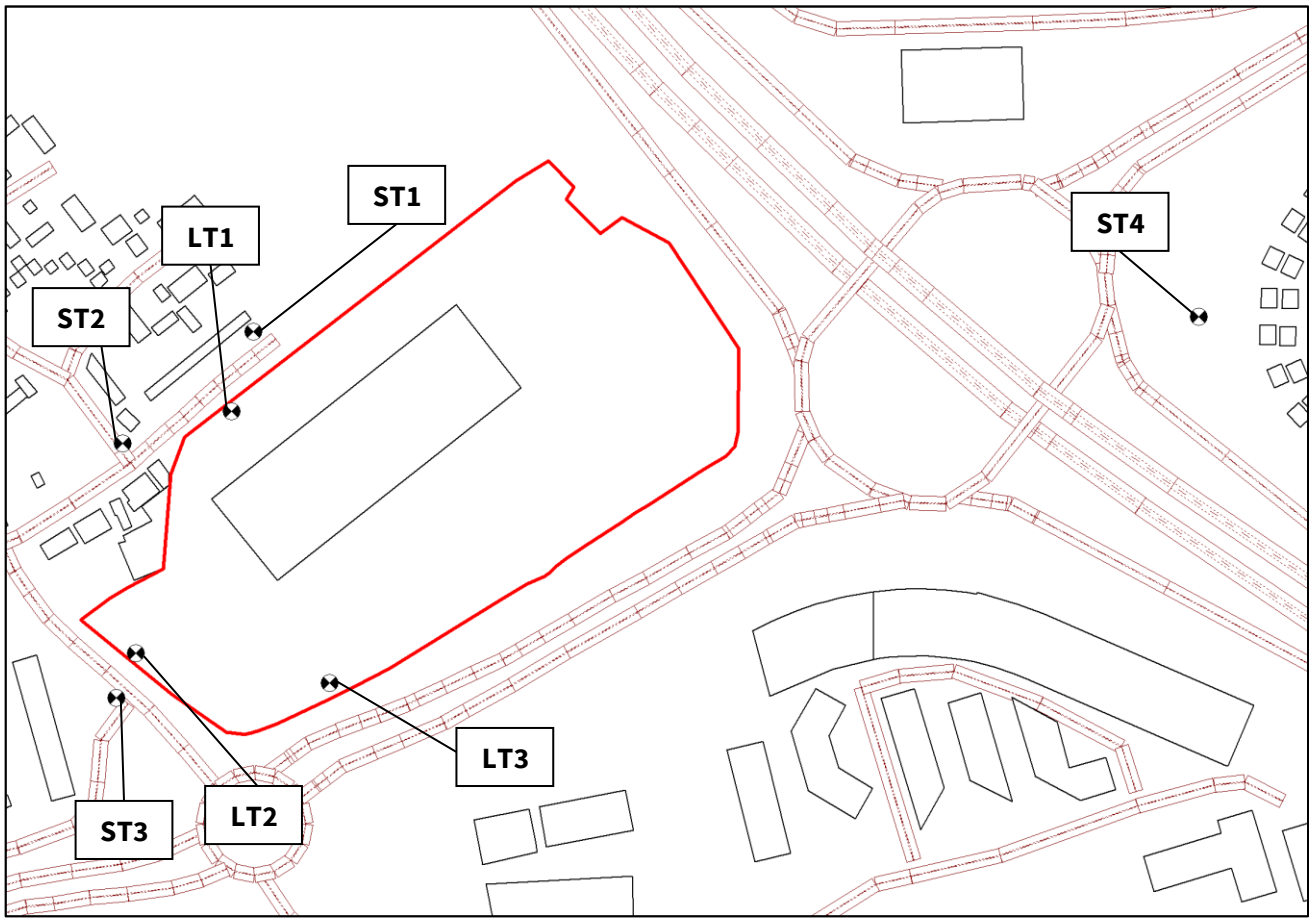
A baseline monitoring survey was undertaken at seven locations (as specified in Table 4.1 and shown in Figure 4.1 below) from Tuesday 18th July 2023 to Wednesday 19th July 2023. Attended short term (ST) measurements were undertaken at four locations during day, evening and night-time periods with three additional long -term (LT) locations being measured unattended over a 180-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. Anemometer readings confirmed that wind speeds were less than 5 ms^{-1} at all times during the survey, with a predominant north-western wind direction during the survey. The attended noise monitoring meteorological conditions are presented below in Table 4.2.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	Adjacent to High Street entrance to field
LT2	Approximately 25m East of junction between Hoad Way and James Butcher Drive
LT3	Approximately 45m North-East of roundabout between Bath Road and Hoad Way
ST1	Front of no. 85 High Street
ST2	Junction between High Street and Woodfield Way
ST3	East of 12A James Butcher Drive
ST4	West of 38 Honey Bee Street

Figure 4.1: Noise Monitoring Locations



4.1 NOISE SURVEY RESULTS

The dominant noise sources found in the area, as specified in Table 4.2, include aircraft, road traffic noise from Bath Road and the M4. Other contributions to the ambient noise environment consist of birdsong/insect noise (crickets).

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
ST3	25/07/23 12:59	19	4	NW	6	Constant road traffic noise from Bath Road, aircraft and birdsong
ST2	25/07/23 13:17	19	3	NW	6	Distant road traffic noise from Bath Road and M4, occasional road traffic noise from High Street and Woodfield Way, aircraft and birdsong

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
ST1	25/07/23 13:34	19	3	NW	5	Distant road traffic noise from Bath Road and M4, aircraft and birdsong
ST4	25/07/23 15:39	17	1-2	NW	6	Constant road traffic noise from M4 and birdsong
ST1	25/07/23 20:07	17	1-2	NW	3	Distant road traffic noise from Bath Road and M4, aircraft and birdsong
ST2	25/07/23 20:24	17	1-2	NW	1	Distant road traffic noise from Bath Road and M4, birdsong and occasional traffic on Woodfield Way and High Street
ST3	25/07/23 20:42	15	0-1	NW	0	Constant road traffic noise from Bath Road, occasional traffic noise on Hoad Way, distant road traffic noise from M4 and aircraft
ST4	25/07/23 21:54	15	0-1	NW	5	Constant road traffic noise from M4 and aircraft
ST4	25/07/23 23:00	15	0-1	NW	5	Constant road traffic noise from M4 and aircraft
ST1	25/07/23 23:24	15	0-1	NW	2	Distant road traffic noise from Bath Road and M4 and aircraft
ST2	25/07/23 23:42	15	0-1	NW	2	Distant road traffic noise from Bath Road and M4 and aircraft
ST3	26/07/23 00:01	15	0-1	NW	3	Frequent road traffic noise from Bath Road and distant road traffic noise from M4

The results of the statistical and frequency measurements conducted during the baseline noise survey are summarised below in Table 4.3. All values are sound pressure levels in dB (re: 2 x 10^{-5} Pa).

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	89	18/07/2023 – 21/07/2023 25/07/2023 – 26/07/2023 07:00 – 23:00	LT1	55.4	92.4	38.4	56.1	52.0
Weekday Night-time 23:00 – 07:00	48	18/07/2023 – 21/07/2023 25/07/2023 – 26/07/2023 23:00 – 07:00		50.1	82.2	27.3	50.5	42.0
Weekend Daytime 07:00 – 23:00	32	22/07/23 – 23/07/23 07:00 – 23:00		55.5	81.7	41.8	56.6	52.0

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	16	22/07/23 – 23/07/23 23:00 – 07:00		48.9	73.2	30.5	50.0	37.0
Weekday Daytime 07:00 – 23:00	88	18/07/2023 – 21/07/2023 25/07/2023 – 26/07/2023 07:00 – 23:00	LT2	58.6	90.7	36.4	60.7	54.0
Weekday Night-time 23:00 – 07:00	48	18/07/2023 – 21/07/2023 25/07/2023 – 26/07/2023 23:00 – 07:00		53.0	80.6	26.4	53.0	42.0
Weekend Daytime 07:00 – 23:00	32	22/07/23 – 23/07/23 07:00 – 23:00		57.6	83.3	39.1	59.9	52.0
Weekend Night-time 23:00 – 07:00	16	22/07/23 – 23/07/23 23:00 – 07:00		51.4	74.5	29.3	51.9	37.0
Weekday Daytime 07:00 – 23:00	89	18/07/2023 – 21/07/2023 25/07/2023 – 26/07/2023 07:00 – 23:00	LT3	60.9	89.0	37.9	62.1	58.0
Weekday Night-time 23:00 – 07:00	48	18/07/2023 – 21/07/2023 25/07/2023 – 26/07/2023 23:00 – 07:00		55.3	85.7	27.2	56.0	46.0
Weekend Daytime 07:00 – 23:00	32	22/07/23 – 23/07/23 07:00 – 23:00		59.3	87.3	42.3	61.0	58.0
Weekend Night-time 23:00 – 07:00	16	22/07/23 – 23/07/23 23:00 – 07:00		53.1	78.2	29.0	54.3	38.0
Daytime 07:00 – 19:00	15 Mins	25/07/2023 13:34	ST1	55.0	72.3	48.8	56.6	52.4
	15 Mins	25/07/2023 13:17	ST2	53.8	68.9	46.9	56.3	49.7
	15 Mins	25/07/2023 12:59	ST3	62.1	79.0	55.4	63.7	58.7
	15 Mins	25/07/2023 15:39	ST4	60.6	68.7	57.2	61.8	59.1
Evening 19:00 – 23:00	15 Mins	25/07/2023 20:07	ST1	57.1	67.9	51.0	58.9	54.5
	15 Mins	25/07/2023 20:24	ST2	52.6	70.3	47.2	54.1	49.3
	15 Mins	25/07/2023 20:42	ST3	59.9	73.9	50.9	62.3	56.4
	15 Mins	25/07/2023 21:54	ST4	56.3	62.2	51.7	57.8	54.4
Night-time 23:00 – 07:00	15 Mins	25/07/2023 23:24	ST1	53.0	61.2	43.8	55.6	48.9
	15 Mins	25/07/2023 23:42	ST2	45.9	58.2	38.7	48.1	42.4

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)
	15 Mins	26/07/2023 00:01	ST3	53.2	66.3	36.3	57.3	43.2
	15 Mins	25/07/2023 23:00	ST4	52.7	62.1	46.9	54.6	50.2

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

4.2 REPRESENTATIVE BACKGROUND LEVELS

Using the data collected during the baseline survey, representative background noise levels have been derived for all receptor locations presented in Figure 4.1. Table 4.4 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 4.4: Representative Background Noise Levels (All Receptors)

Receptors	Monitoring Location	Time Period	Representative Background Noise Level ($L_{A90,T}$ dB)*
R01 – R05	LT1	Daytime (07:00 – 23:00)	56
		Night-time (23:00 – 07:00)	37
R06 – R11	LT2	Daytime (07:00 – 23:00)	52
		Night-time (23:00 – 07:00)	37
R12	LT3	Daytime (07:00 – 23:00)	58
		Night-time (23:00 – 07:00)	38

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

The representative noise levels presented in Table 4.4 have been used to inform the assessment presented in Section 5.0.

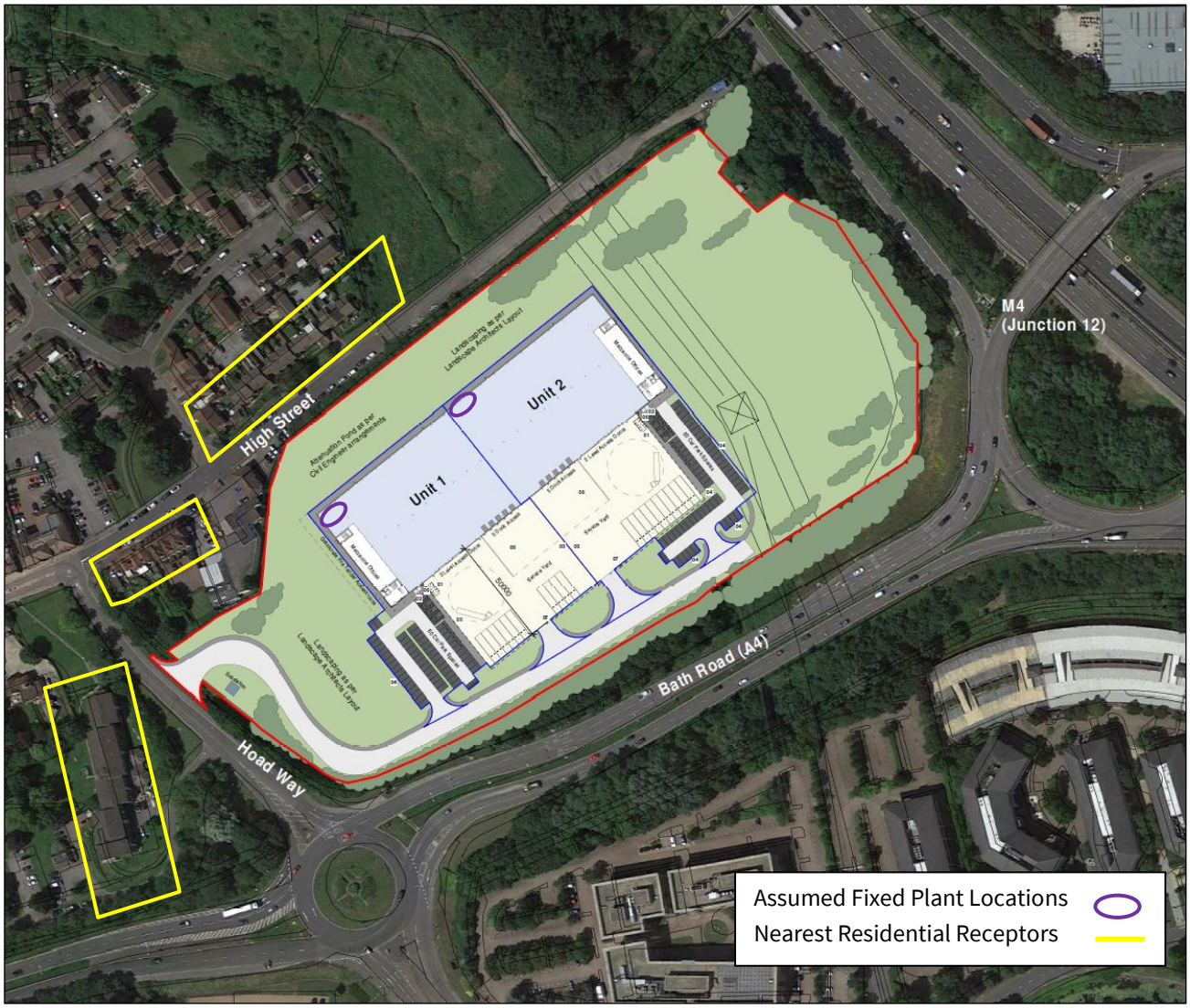
It is worth noting that the representative background noise levels used in this assessment are approximately 10dB lower during the most sensitive assessment period i.e. the night-time (23:00-07:00), when compared to those used in the July 2021 noise assessment.

5.0 ASSESSMENT OF EFFECTS

5.1 BUILDING SERVICES PLANT NOISE ASSESSMENT

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 building services plant items associated with the proposed development that may run during any particular period. Figure 5.1 illustrates the indictive locations of the assessed plant locations along with the nearest residential receptors. These locations are considered to provide a robust assessment.

Figure 5.1: Proposed External Plant Locations



This assessment has been undertaken to establish the maximum external noise levels from the proposed building services plant. The assessment compares the predicted worst-case breakout noise levels from the plant against the existing measured average background noise LA90 at the closest existing residential receptors.

As no sound levels are available for proposed plant, a series of predictions were made by defining different sound power levels at point sources. When the sound power levels are set as shown in Table 5.1 (which are considered to be achievable) at the Proposed Building Services Plant location, the noise Rating Levels at all the existing receptors are predicted to be at least 10 dB below existing background levels during the daytime and night-time and fall below the No Observed Adverse Effect Level (NOAEL).

In accordance with Section 9.2 of BS4142:2014 a character correction of +2 dB has been applied to account for any mild tonal characteristics of noise from the proposed plant which may be just perceptible at the closest sensitive receptors. The assessment presented below has been undertaken with the plant associated with both units operating at full capacity, simultaneously.

Table 5.1: Recommended sound power level for BSP units

BSP Location	Unit Sound Power Level (SWL)	
	Daytime	Night-time
Roof top fixed plant (individual unit) * **	79	60

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

** All levels assume a +2dB acoustic feature correction will be added to the above Specific Level to derive the Rating Level

Table 5.2: BS4142 Assessment – Building Services Plant

Location	Existing Measured Background $L_{A90,T}$ dB(A)		Specific Noise Level from Plant dB(A)		Noise Rating Level from Plant dB(A)		BS4142 Score dB(A)	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R01	52	37	31	12	33	14	-19	-23
R02	52	37	32	13	34	15	-18	-22
R03	52	37	34	15	36	17	-17	-21
R04	52	37	36	17	38	19	-14	-18
R05	52	37	38	19	40	21	-12	-16
R06	56	37	44	25	46	27	-10	-10
R07	56	37	41	22	43	24	-13	-13
R08	56	37	41	22	43	24	-13	-13
R09	56	37	41	22	43	24	-13	-13
R10	56	37	35	16	37	18	-19	-19
R11	56	37	29	10	31	12	-25	-25
R12	58	38	20	1	22	3	-36	-35

[1] All values are sound pressure levels in dBA re: 2x 10^{-5} Pa.

[2] 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's in the above table may appear to be up to 1 dB incorrect due to this rounding.

5.2 COMBINED NOISE INTRUSION ASSESSMENT

Internal noise levels from all sources of potential noise associated with the proposed development (including HGV movements, loading/unloading events and car parking) have been assessed at the closest sensitive receptors with windows open, where a reduction from a partially open window of 15 dB has been used, and with windows closed where an assumption of glazing with a sound reduction of 30 dB has been used. Table 5.3 and 5.4 shows the predicted noise levels at the closest sensitive receptors for daytime and night-time, respectfully.

Table 5.3: Daytime Noise Intrusion Levels $L_{Aeq,1hour}$

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
R01	46.4	31.4	16.4	35
R02	46.5	31.5	16.5	35
R03	42.5	27.5	12.5	35
R04	39.4	24.4	9.4	35
R05	40.5	25.5	10.5	35
R06	44.5	29.5	14.5	35
R07	41.5	26.5	11.5	35
R08	41.4	26.4	11.4	35
R09	41.3	26.3	11.3	35
R10	35.6	20.6	5.6	35
R11	30.5	15.5	0.5	35
R12	33.3	18.3	3.3	35

Predicted daytime noise levels are below the BS8233/WHO daytime $L_{Aeq,1hour}$ internal criterion of 35 dB(A) at all of the closest existing sensitive receptor locations with a windows open scenario.

Therefore, daytime noise levels at all existing receptors are predicted to result in a No Observed Adverse Effect (NOAEL).

Table 5.4: Night-time Noise Intrusion Levels $L_{Aeq,15min}$

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
R01	49.1	34.1	19.1	30
R02	49.2	34.2	19.2	30
R03	44.8	29.8	14.8	30
R04	39.3	24.3	9.3	30
R05	39.6	24.6	9.6	30
R06	37.5	22.5	7.5	30
R07	34.9	19.9	4.9	30
R08	34.8	19.8	4.8	30
R09	34.5	19.5	4.5	30
R10	31.2	16.2	1.2	30

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
R11	28.7	13.7	0.0	30
R12	36.0	21.0	6.0	30

Predicted night-time noise levels are below the BS8233/WHO night-time $L_{Aeq,15min}$ internal criterion of 30 dB(A) at all of the closest existing residential receptors with a windows closed scenario, however there are exceedance with a windows opened scenario at receptors R01, R02 and R03.

Night-time $L_{Aeq,T}$ noise levels at receptors R04-R012 are predicted to result in a No Observed Adverse Effect (NOAEL). The remaining receptors, R01, R02 and R03 night-time noise levels are predicted to result in a Lowest Observed Adverse Effect (LOAEL).

Maximum night-time have been predicted at the closest sensitive reports and can be seen in Table 5.5.

Table 5.5 Night-time Noise Intrusion Levels L_{Afmax}

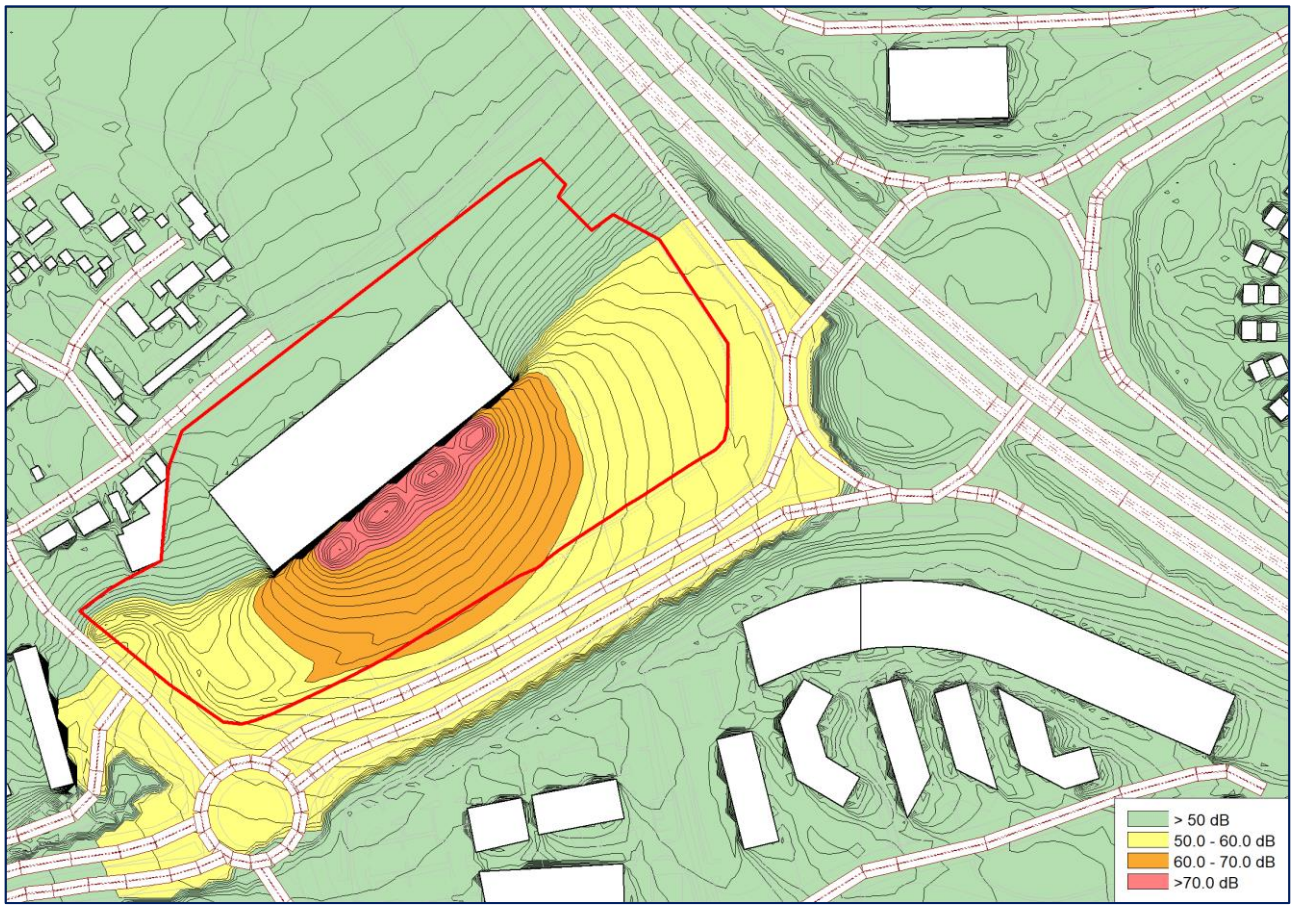
Location	External L_{Afmax}	Internal L_{Afmax} with windows open	Internal L_{Afmax} with windows closed	Criteria L_{Afmax}
R01	61.6	46.6	31.6	45
R02	61.6	46.6	31.6	45
R03	56.3	41.3	26.3	45
R04	47.6	32.6	17.6	45
R05	48.0	33.0	18.0	45
R06	49.9	34.9	19.9	45
R07	47.3	32.3	17.3	45
R08	47.4	32.4	17.4	45
R09	47.4	32.4	17.4	45
R10	44.1	29.1	14.1	45
R11	41.4	26.4	11.4	45
R12	48.5	33.5	18.5	45

Predicted night-time noise levels are below the BS8233/WHO night-time L_{Afmax} criterion of 45 dB(A) at all of the closest existing residential receptors with a windows closed scenario, however there are exceedance with a windows opened scenario at receptors R01 and R02.

Night-time L_{Afmax} noise levels at receptors R03-R012 are predicted to result in a No Observed Adverse Effect (NOAEL). The remaining receptors, R01, R02 and R03 night-time noise levels are predicted to result in a Lowest Observed Adverse Effect (LOAEL).

For indicative purposes, the night-time noise contour plots (inclusive of all potential noise sources) are presented in Figure 5.2.

Figure 5.2: $L_{Aeq,15min}$ Night-time Noise Contour Plot (4m)



5.3 NOISE CHANGE LEVEL ASSESSMENT

This assessment compares the noise from the existing ambient noise climate (based on existing measured L_{Aeq}), with the cumulative noise level from the existing noise climate and the predicted noise level from the proposed scenario from all noise sources associated with the proposed development. The difference between the 'existing' ambient noise level and the predicted 'worst-case proposed' noise level is presented in Table 5.6 and 5.7 below.

Table 5.6: Difference between Baseline and Proposed Scenarios (Daytime)

Location	Measured Baseline L_{Aeq}	Measured Baseline Combined with Contribution from the Proposed Scenario	Contribution from Proposed Development $L_{Aeq\ 16\ hour}$
R01	55.0	55.6	0.6
R02	55.0	55.6	0.6
R03	55.0	55.2	0.2
R04	55.0	55.1	0.1
R05	55.0	55.2	0.2
R06	57.0	57.2	0.2
R07	57.0	57.1	0.1

Location	Measured Baseline L_{Aeq}	Measured Baseline Combined with Contribution from the Proposed Scenario	Contribution from Proposed Development $L_{Aeq\ 16\ hour}$
R08	57.0	57.1	0.1
R09	57.0	57.1	0.1
R10	57.0	57.0	0.0
R11	57.0	57.0	0.0
R12	59.0	59.0	0.0

Table 5.7: Difference between Baseline and Proposed Scenarios (Night-time)

Location	Measured Baseline L_{Aeq}	Measured Baseline Combined with Contribution from the Proposed Scenario	Contribution from Proposed Development $L_{Aeq\ 8\ hour}$
R01	48.0	51.6	3.6
R02	48.0	51.7	3.7
R03	48.0	49.7	1.7
R04	48.0	48.5	0.5
R05	48.0	48.6	0.6
R06	51.0	51.2	0.2
R07	51.0	51.1	0.1
R08	51.0	51.1	0.1
R09	51.0	51.1	0.1
R10	51.0	51.0	0.0
R11	51.0	51.0	0.0
R12	53.0	53.1	0.1

The results presented in Tables 5.6 and 5.7 show the change in noise levels between the existing measured L_{Aeq} daytime and night-time noise levels and the contribution from the proposed development. When the differences between the 'existing' and 'proposed' scenarios are compared with the noise change criteria given in Table 2.1 of this report, the contribution from the proposed development fall within the No Observed Effect Level (<1dB change) or Lowest Observed Adverse Effect Level (1dB-2.9dB change) during the both the daytime and night-time periods for most sensitive receptors.

At receptors R01 and R02 the contribution from the proposed development are greater than +3dB change during and night-time period which falls into the Significant Observed Effect Level. At Receptor R02 the contribution from the proposed development is +2dB change during and night-time period which falls into the Lowest Observed Effect Level. To reduce the contribution of the proposed development to the Lowest Observed Adverse Effect Level during the night-time mitigation has been recommended in Section 6 of this report.

5.4 TRANQUILLITY ASSESSMENT

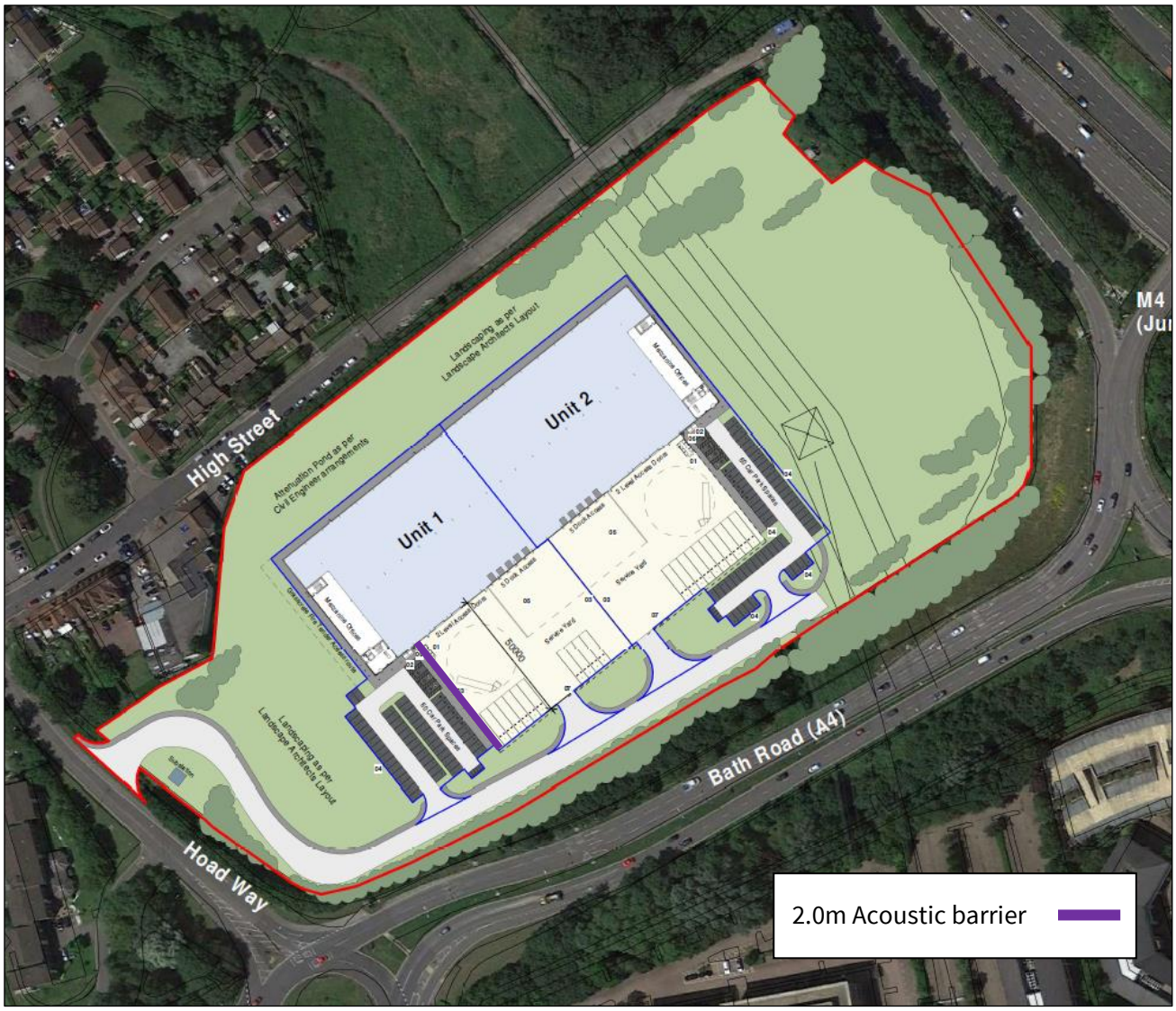
No public footpaths or public right of ways are present within the site or in the vicinity of the site. Therefore, no restrictions to areas of relative tranquillity will occur due to the proposed development.

6.0 MITIGATION

The conclusion of the noise intrusion assessment and noise level change assessment in Section 5 require that mitigation is needed at the proposed development to address the noise impact from HGV unloading noise during the night-time.

To mitigate this impact a 2m high acoustic barrier along the western boundary of the service yard for Unit 1 with approximate length of ~50 m is required. Figure 6.1 shows the indicative location of the acoustic barrier.

Figure 6.1: Indicative Barrier Location



6.1.1 Combined Noise Intrusion Assessment – With Mitigation

With the inclusion of additional mitigation, internal noise levels from all sources of potential noise associated with the proposed development (including HGV movements, loading/unloading events, car parking and refrigeration plant) have been assessed at the closest sensitive receptors with windows open, where a reduction from a partially open window of 15 dB has been used and with windows closed where a reduction of 30 dB has been used.

Table 6.1: Night-time Noise Intrusion Levels $L_{Aeq,15mins}$ – With Mitigation

Location	External $L_{Aeq,T}$ at 1m from façade	Internal $L_{Aeq,T}$ with windows open	Internal $L_{Aeq,T}$ with windows closed	Criteria $L_{Aeq,T}$
R01	42.6	27.6	12.6	30
R02	43.4	28.4	13.4	30
R03	42.7	27.7	12.7	30
R04	39.0	24.0	9.0	30
R05	39.5	24.5	9.5	30
R06	37.2	22.2	7.2	30
R07	34.6	19.6	4.6	30
R08	34.6	19.6	4.6	30
R09	34.4	19.4	4.4	30
R10	31.2	16.2	1.2	30
R11	28.7	13.7	0.0	30
R12	36.0	21.0	6.0	30

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

The predicted daytime noise levels are below the BS8233/WHO night-time $L_{Aeq,15min}$ internal criterion of 30 dB(A) at all receptors with windows opened. Noise levels at all receptors are predicted to fall below the No Observed Adverse Effect (NOAEL).

Table 6.2: Night-time Max Noise Intrusion Levels L_{AFmax}– With Mitigation

Location	External $L_{Aeq,T}$ at 1m from façade	Internal $L_{Aeq,T}$ with windows open	Internal $L_{Aeq,T}$ with windows closed	Criteria $L_{Aeq,T}$
R01	54.6	39.6	24.6	45
R02	55.3	40.3	25.3	45
R03	53.6	38.6	23.6	45
R04	47.0	32.0	17.0	45
R05	47.8	32.8	17.8	45
R06	49.6	34.6	19.6	45
R07	47.0	32.0	17.0	45
R08	47.2	32.2	17.2	45
R09	47.3	32.3	17.3	45
R10	44.1	29.1	14.1	45
R11	41.4	26.4	11.4	45
R12	48.5	33.5	18.5	45

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

The predicted daytime noise levels are below the BS8233/WHO night-time L_{AFmax} internal criterion of 45 dB(A) at all receptors with windows opened. Noise levels at all receptors are predicted to fall below the No Observed Adverse Effect (NOAEL).

6.1.2 Noise Level Change Assessment – With Mitigation

With the inclusion of additional mitigation, this assessment compares the noise from the existing ambient noise climate (based on existing measured L_{Aeq}), with the predicted noise level from the proposed mitigated scenario from all noise sources associated with the proposed development. The difference between the 'existing' ambient noise level and the predicted night-time 'mitigated proposed' noise level is presented in Table 6.3.

Table 6.3: Difference between Baseline and Mitigated Proposed Scenario (Night-time)

Location	Measured Baseline L_{Aeq}	Measured Baseline Combined with Contribution from the Proposed Scenario	Contribution from Proposed Development $L_{Aeq,T}$
R01	48.0	49.1	1.1
R02	48.0	49.3	1.3
R03	48.0	49.1	1.1
R04	48.0	48.5	0.5
R05	48.0	48.6	0.6
R06	51.0	51.2	0.2
R07	51.0	51.1	0.1
R08	51.0	51.1	0.1
R09	51.0	51.1	0.1
R10	51.0	51.0	0.0
R11	51.0	51.0	0.0
R12	53.0	53.1	0.1

The results presented in Tables 6.3 show the change in noise levels between the existing measured L_{Aeq} daytime and night-time noise levels and the contribution from the proposed development with mitigation. When the differences between the 'existing' and 'proposed' scenarios are compared with the noise change criteria given in Table 2.1 of this report, the contribution from the proposed development fall within the Lowest Observed Effect Level during the both the daytime and night-time periods (< +3 dB change).

7.0 CONCLUSIONS

A noise assessment was undertaken for a planning application for proposed cold store unit, access roadway and yard at the above site , access roadway and yard at the above site.

Operational Phase

BS4142 rating levels for building services plant have been recommended against measured background levels ($L_{A90,T}$)

The combined operational noise levels (including HGV activities, building services plant and car park activities) from all proposed noise sources associated with the Site were assessed utilising the WHO/BS 8233 criteria.

A change of noise level assessment indicates that when predicted noise levels associated with the proposed development are compared with existing ambient noise levels, an increase of no more than +3.5 dB is predicted, which falls within the SOAEL in terms of the NPPF conclusions.

With the incorporation of the mitigation outlined in Section 6 of this report noise levels during the daytime and night-time at the closest sensitive receptors are predicted to result in a impact no greater than the Lowest Observed Adverse Effect (LOAEL).

NPPF paragraphs 185 (b), 187 and 188

Considering the existing use of the site and wider development site, it is not considered that any existing businesses wanting to develop would be restricted by the proposals.

Planning Practice Guidance: Noise

It has been predicted that with the on-site operational noise effects associated with the Development will result in Lowest Observed Adverse Effect Level (LOAEL) for the closest receptors and therefore the development will have a low impact in relation to noise.

APPENDICES

APPENDIX A – ACOUSTIC TERMINOLOGY AND ABBREVIATIONS

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.

Abbreviations

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

APPENDIX B – 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.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. Tetra Tech accept no liability for issues with performance arising from such factors.